fields of thin films and integrated electronics.

In chapters 1 and 2 of this book the properties of passive and active thin-film circuit elements are discussed. These sections contain a detailed description of the properties of matter in very thin films and the research done in this field; it gives the facts and sometimes the know-how, but it states only what has been done and does not go very deep into the physical behavior of the materials applied in thin films. The first chapter on passive elements gives about 120 references, the second on active components mixes a little bit of integrated solid-state devices with thin-film active elements, but it does not provide very much knowledge in this field.

Chapter 3 deals with semi-conductor integrated circuits and discusses technological problems of isolation in solid-state regions. In a second part we find some remarks on manufacturing and packaging problems. Chapter 4 consumes about one third of the book and deals with vacuum deposition apparatus and techniques. The discussion of the equipment for thin-film production is insufficiently broad and thus not adequate to the space it consumes in the book. In chapter 5 on thin-film monitoring techniques we find not very much more than a review of this very important field in thin-film manufacture.

The last chapter is entitled "The Layout of Microcircuits, Masking and Etching Techniques." It does discuss very roughly masking and etching techniques for thin-films, but nothing about microcircuits in the sense of integrated circuits. The index at the end of the book is very short and should have been extended because this book is a collection of facts and technological methods that should have been referred to in a well organized index.

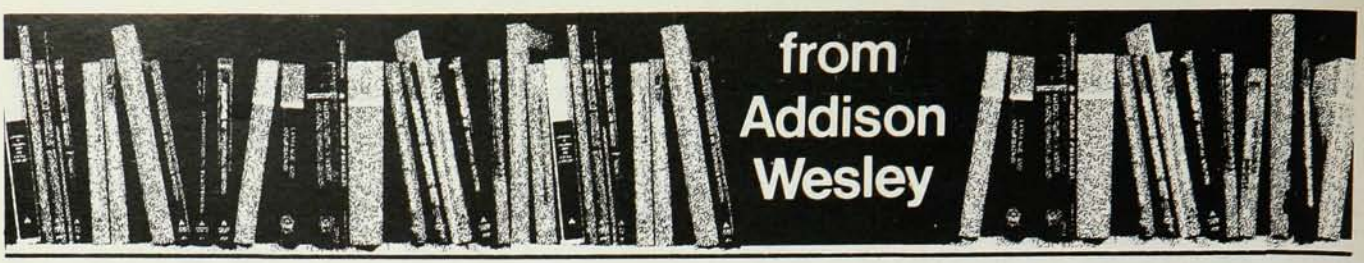
Unfortunately the book gives only a rough picture of thin-film electronics—it contains too many research results without providing the strings holding them together. The appearance of a chapter on semiconductor integrated circuits is strange in a book on thin films and it is far too short to be complete (only 30 pages). Thin films made of magnetic materials have not been treated. The book, however, will certainly be useful for component makers and may also be of some value for circuit engineers engaged in thin-film applications who wish to obtain some knowledge of the capabilities of thin films.

BRIEFLY NOTED

OPTICAL PROPERTIES AND ELECTRONIC STRUCTURE OF METALS AND ALLOYS. Conf. proc. (Paris, Sept. 1965) F. Abelès, ed. 643 pp. Wiley, New York, 1966. $18.50

The proceedings of the first international meeting devoted to optical properties of metals and alloys describe the kinds of information that can be learned about their electronic structures from their measurement. 54 papers are organized into nine sections on simple, 3-*d* transition, rare-earth, and liquid metals; on photoemission, optical plasmas, superconductivity, and magneto-optical effects; and on the properties of nonperiodic systems. The papers describe primarily experimental studies although a number of theoretical papers are also included, some of which are fairly general.

Probably one of the most attractive features of this compendium is the inclusion of discussions following the papers and the concluding summary by A. B. Pippard. The importance of the discussions manifests itself most clearly when some of the more controversial papers are examined. Citing just one example, the relationship between the band models of 3-d transition metals, and their optical (including x-ray) properties was the entire or partial subject of about one tenth of the papers presented. In one of these, reporting the results of photoemission measurements, Spicer presented evidence purportedly proving that the rigid-band model does not apply to nickel. Taken by itself, his arguments sound quite convincing, but when viewed in terms of the discussions by P. A. Wolff, J. Friedel, H. Brooks, V. Heine, N. Mott, and later by A. B. Pippard, alternatives to his interpretation of the experimental results begin to emerge. The discussions are as important as the papers themselves in transmitting the import of a confer-



INTRODUCTION TO PHYSICS, VOLUME I: MECHANICS, HYDRODYNAMICS, THERMODYNAMICS

By P. Frauenfelder and P. Huber.

In the Adiwes International Series.

This text is a translation of the authors' *Einführung in die Physik*, which has been widely used in Europe. It assumes the prerequisites of differential and integral calculus, and three years of physical science.

The deductive approach is taken in the development of a wide range of ideas, and the book contains somewhat more information on certain topics than is usually found in an American text at this level.

591 pp. 477 illus. $9.75

WAVE PHENOMENA

By Dudley H. Towne, *Amherst College.*

Presenting a unified treatment of transverse waves on a string and acoustic and electromagnetic waves, this text aims at developing the orientation of theoretical physics with a minimal use of mathematics which is not already familiar to the student. The book stresses the mastery of certain mathematical techniques, emphasizing the wave properties common to sound and light and showing how the mathematics unifies diverse physical situations in which the wave equation plays a role. Descriptive material on experimental aspects of optics and acoustics is also contained.

In Press

INTRODUCTION TO NUCLEAR PHYSICS

By Harald Enge, *Massachusetts Institute of Technology.*

This book gives the student an introduction to one of the most important areas of modern physics. In a fast-moving field, this book is a complete and up-to-date presentation of the subject. It can be used in the curriculum for physics majors, and also as a foundation for the study of nuclear engineering, at the junior-senior-graduate level.

The text treats two-body problems, properties of stable nuclei, nuclear models, disintegration of unstable nuclei, nuclear reactions, nuclear power, and elementary particles.

582 pp. 281 illus. $12.75

CLASSICAL CHARGED PARTICLES

By F. Rohrlich, *Syracuse University.*

Written at the graduate level, this text is intended to fill a gap in the usual electricity and magnetism—relativity sequence. Its purpose is to present the theory of classical charged particles consistently and completely and to use the theory as an example of the interrelationship of physical theories. Thus, the approach emphasizes the structure of physical theory in a way that cuts across many different areas of physics.

305 pp. 18 illus. $13.50

KINETIC EQUATIONS OF GASES AND PLASMAS

By Ta-You Wu, *State University of New York at Buffalo.*

The object of this graduate-level text is to introduce the student to some basic aspects of the theory of irreversible processes in gases and some of the recent developments in the formulation of the kinetic equation of plasmas. Rather than attempting to cover a wide range of topics in this rapidly growing field, the author concentrates on a few topics which may serve as a useful introduction.

The text covers the Boltzmann theory, and the more recent theories of Bogoliubov, Frieman, Sandri, Rosenbluth, Rostoker, Prigogine, Balescu and others.

298 pp. 4 illus. $9.75

PHYSICS OF NUCLEAR KINETICS

By G. Robert Keepin, *International Atomic Energy Agency, Vienna.*

This book assembles in one place the latest and best basic fission data and reactor kinetics data in precise, clear, and directly usable form. It then develops in detail the role of these basic data in determining the dynamic behavior of nuclear chain reacting systems. Throughout the text the emphasis is on the *physics* of nuclear kinetics. Assuming a knowledge of the fundamentals of nuclear physics and reactor theory, this book is well suited for senior-graduate level courses in nuclear kinetics and reactor kinetics. It also provides an excellent standard reference source for all practicing reactor scientists and engineers.

435 pp. 108 illus. $12.50

ADVANCED QUANTUM MECHANICS

By J. J. Sakurai, *University of Chicago.*

The purpose of this second-year graduate-level text is to present major advances in quantum physics not covered in usual courses in nonrelativistic quantum mechanics. Emphasizing both theory and applications, the book is intended to teach as much physics as possible. Specific examples are employed to illustrate basic theoretical ideas.

In content the book covers the usual fundamental topics, *viz* the quantum theory of radiation and the Dirac theory of the electron. In addition, a number of diverse topics are included which are designed to address a wide community of physicists.

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THE SIGN OF EXCELLENCE

ence to those who must read about it later. The conference served an important need to focus attention on the kind of results that modern optical techniques can obtain and on the relative paucity of elegantly rigorous theories to explain them. This book documents this fact most successfully.

SPHERELAND. By Dionys Burger. Trans. from Dutch by C. J. Rheinboldt. 208 pp. Thomas Y. Crowell, New York, 1965. $4.95

Sphereland is a delightful addition to the genre of Flatland and Mr Tompkins. Readers who were saddened by the all too human fate of A Square in E.A. Abbott's *Flatland, a Romance of Many Dimensions* will be pleased to read this sequel, which reveals a more enlightened stage in the Flatlanders' history. We may share the intellectual puzzlement of A Square's hexagonal grandson as he attempts to appreciate spaces of dimensionality beyond his perception. He is faced with curious problems such as triangles with interior angles summing to more than 180 degrees, an expanding 2-dimensional universe and the strange phenomena of animals and people inverted through an unperceived dimension. Visits to the one-dimensional world of Lineland and advice from his three-dimensional friend The Sphere help him, and the reader, over the rough spots. Unfortunately, despite enlightenment, genius still goes unrecognized and unappreciated in Flatland. However, from our superior vantage point, we who live in Sphereland will appreciate Hexagon's ability and admire this enjoyable tale of his discoveries.

NEW BOOKS

ELEMENTARY PARTICLES & FIELDS

Unitary Symmetries and their Application to High Energy Physics. By M. Gourdin. 303 pp. North-Holland, Amsterdam (Interscience, New York), 1967. $12.75

Group Theory and Elementary Particles. By Penelope A. Rowlatt. 97 pp. American Elsevier, New York, 1966. $6.00

The Method of Second Quantization. By F. A. Berezin. Trans. from Russian by