

sign dreams for the alternating-gradient monsters now contemplated by men with their eyes on the horizon. It's a nice book because it emphasizes principles. You are told the requirements of orbital and phase stability, and you see how these requirements are individually satisfied in the various types of machines, and how acceleration is applied at the same time. It deals also in a descriptive way with the engineering of the accelerators, but here again it is the engineering *principles* that are discussed rather than the length of this or that member or the placing of nuts and bolts. For example, a chapter is devoted to the Brookhaven cosmotron, and in it the requirement of varying the frequency of the accelerating voltage over a wide range is made clear; this then leads to an engineering discussion of how the requirement of a broadly tuned, high-impedance cavity of the right resonant frequency was met through the use of ferrite. It may be a pity that the extensive discussion of the East-Coast cosmotron has practically crowded the West-Coast bevatron out of the book, but one feels in the writing the author's having lived through the creation of the cosmotron and one senses his intimacy with the very sophisticated electrical engineering applied by the Brookhaven group to their machine. The book is very readable; simple differential equations are used as required, and explanations are helped by analogy in such spots as the discussion of phase stability (loaded pendulum analogy) and in the description of alternating-gradient focusing (optical analogy). Sometimes two or three ways of looking at a point are presented. The more classical accelerators such as direct-current machines, betatrons, microtrons, and ordinary cyclotrons are not discussed, but within its defined limitation of subject material, the book presents an enjoyable exposition.

The Compleat Strategyst. By J. D. Williams. 234 pp. McGraw-Hill Book Company, Inc., New York, 1954. \$4.75. *Reviewed by Ernest A. Lynton, Rutgers University.*

In the preface to this delightful book the author states that "... it was felt to be worth while to try to bridge the gap between the priestly mathematical activity of the professional scientist and the necessarily blind reaction of the intelligent layman who happens not to have acquired a mathematical vocabulary". In this he has succeeded admirably, producing a thoroughly enjoyable and highly instructive primer on the theory of games of strategy.

After an introductory discussion of the aims, methods, and limitations of game theory, the reader is taken gently but firmly through a successive treatment of two-, three-, and four-strategy, zero-sum games. Each of these sections consists of a series of amusing and delightfully illustrated examples, followed by a general discussion of the pertinent methods, and concluded with a group of problems left to the reader, with solutions given at the back of the book.

This sounds rather like a textbook, and the book is

in a way just that. It requires from its reader (supposedly an intelligent layman) much concentration and a good deal of work, and is most definitely not one of those insultingly sophomoric popularizations which purport to "teach effortlessly". But this book is written (and illustrated) with so much wit and charm that it quite lacks the soporific effect of so many otherwise truly instructive treatises.

An equally remarkable characteristic of the book is that from the beginning to the very end it never lets the reader forget that it is no more than a primer. There is no pretension to completeness, none of the "you too can be an expert" attitude. Instead the approach is rather: "You can have fun reading this and doing some work, and then you'll at least know what game theoreticians are talking about."

Indeed a laudable aim, which makes this book a wonderful acquisition or gift for any outsider to the field. And if any scientist buys this book for a friend, let him be sure to read it himself before rewrapping it carefully.

Textbook of Physics. Edited by R. Kronig. 855 pp. Interscience Publishers, Inc., New York, 1954. \$10.50. *Reviewed by M. L. Stitch, Varian Associates.*

This textbook by a distinguished group of Dutch scientists under the editorship of R. Kronig represents in many ways a new departure in undergraduate texts available in this country.

It is novel to have a textbook, and especially an undergraduate textbook written in the "Handbuch" manner, with different authors for different chapters. It is unusual to find a chapter on medical physics and a section of biographical notes. The last has some puzzling qualifications for its choices. (Thus one, Dominique François Jean Arago, is mentioned. And while Lawrence and Millikan are included, Gibbs and Oppenheimer are ignored.) The really extraordinary thing is that despite such esoteric topics as good derivations of Debye's theory of specific heat of solids or of Van der Waals' law, and a fairly extensive treatment of modern physics, this is essentially a text of physics at the phenomenological level which is unusually detailed and diverse, and which is suitable for sophomores and juniors with a grounding in differential and integral calculus.

Useful pedagogical devices are employed such as specially marked sections for topics of specialized interest, fine print sections for topics requiring more sophisticated mathematics, and distinguishing print for verbal formulations of important principles. There are many illustrations, and the printing and format are better than average.

Although there are no problems, the number and choice of practical examples are unusual. Thus one finds several examples of practical kinematical constraints, an automatic urinal flush illustrated as an example of a nonharmonic relaxation oscillator, three-phase currents and rotating fields, and a discussion of spectacles.

Other noteworthy items are the generous use of cross referencing between the chapters to cut down duplication (which indicates good editing), the use of rationalized MKS units, and placement of the chapter on thermodynamics after a chapter on atomic theory of heat.

The editor's stated objective was an attempt to treat all subjects on the same level. Although several of the chapters are too superficial, or lacking in cohesiveness, this objective has been largely achieved.

Some may question the extensive inclusion in an elementary undergraduate textbook of topics in modern physics on the grounds that their treatment must of necessity be more fragmentary, and descriptive, and less rational, and quantitative. Others may feel that the tremendous advances primarily in quantum physics justify the student's introduction to it as soon as possible. This book should find favor in either camp because of the over-all excellence of the writing, particularly of the classical topics. The chapter on thermodynamics by J. de Boer should be singled out, in the reviewer's opinion, as the finest presentation of this topic at this level presently available in the English language.

Neutron Optics. By D. J. Hughes. 136 pp. Interscience Publishers, Inc., New York, 1954. \$2.50. *Reviewed by C. G. Shull, Oak Ridge National Laboratory.*

This little volume appears to be a pocket-sized edition of the author's more complete *Pile Neutron Physics*. It is attractive in offering a very readable and easily followed description of the many interesting experiments which have been performed with beams of slow neutrons. The various refractive, reflective and diffractive experiments all share in the treatment and their applications in determining important physical data such as the neutron-proton coherent scattering amplitude are discussed. The more serious-minded reader will, of course, want to refer to the research papers or reviews which are bountifully referred to.

The easy reading which characterizes this tract, labelled Number 1 in a series on physics and astronomy, is occasionally bought at the expense of rigor but these lapses appear as genuine attempts on the part of the author to achieve simplicity. This reviewer for one is anything but critical of such an effort in a volume like this.

Seismology

The science of seismology, aside from its importance in the study of earthquake phenomena, yields information in other fields as well. An example is the behavior of materials at pressures higher than attainable in the laboratory yet lower than those for which theoretical predictions exist. For such pressure, between 10^5 and 10^7 atmospheres, the interior of the earth is the sole source of data, with the seismograph as probe. In a brief but thorough book, *Seismology* (John Wiley and

OUTSTANDING McGRAW-HILL BOOKS

COLLEGE PHYSICS

By ROBERT L. WEBER, MARSH W. WHITE, and KENNETH V. MANNING, Pennsylvania State University. Second edition. 820 pages, \$6.50

This outstanding college text presents the basic ideas of physics for students of science and engineering. Simple, direct, and concise explanations and solved numerical examples help students acquire exact knowledge of physical principles. Facility in the application of physical principles is encouraged by discussion questions, careful treatment of units, proper use of significant figures, and pairing of problems. Emphasis is upon the vitality of physics. The historical development of our modern ideas is stressed by introducing significant experimental and theoretical contributions and endeavoring to relate them systematically in the progress of the development of physical thought. Changes have been made throughout to clarify statements, and the problems are completely revised.

EXPERIMENTAL COLLEGE PHYSICS

By MARSH W. WHITE, and KENNETH V. MANNING, The Pennsylvania State College. Third edition. 347 pages, \$5.00

This book is basically a laboratory manual for experiments in various courses in general physics. The 45 chapters include the background theory, procedure, review questions, and thought-provoking questions and problems for 76 experiments. The topics covered include all of those usually included in laboratory courses in general college physics. More than a set of directions for performing experiments, this book gives a concise, but complete, treatment of the pertinent basic theory. The book has been completely revised, many chapters rewritten and improved experiments included. All of the illustrations have been redone to produce improved readability and more problems have been included.

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