

than those of the U. S. A. and Canada. There are, nevertheless, many physicists and chemists who should find the book an unusually readable review of basic alloy theory and basic principles of atomic physics. Nuclear physics is discussed in brief, and plastic deformation of metals is given a few pages.

There are no mathematical derivations or detailed discussion of theories, but much effort is given, on the other hand, to explanations of what the theories are about and why they are important. Jones' theory of alloy phases is given considerable emphasis, as in all of Hume-Rothery's books.

The concluding chapter of the book points out the need for more science in metallurgy in the future and is a rousing plea for more fundamental science courses and less technological courses in the training of metallurgists in universities, together with a plea for the metallurgical industry to hire more scientifically trained men than in the past. The average man entering the chemical industry, it is emphasized, has a much wider knowledge of the science of his subject and a smaller knowledge of technology than the average man entering the metallurgical industry—and this fact has contributed to the enormous progress of the chemical industry in the last fifty years. This chapter was written in 1947 and was based on conditions in Britain as the author saw them at that time. There has been a gradual change since that time in the direction that is urged, in curricula, in the type of research problems undertaken in the metallurgical departments of several British universities, and in the use of scientifically trained men in metallurgical industry. Nevertheless, changes in this direction have been slow, both in Britain and on this side of the Atlantic, and the chapter has a message that is still of value.

Variational Principles in Dynamics and Quantum Theory. By Wolfgang Yourgrau and Stanley Mandelstam. 155 pp. Pitman Publishing Corporation, New York, 1955. \$5.50. Reviewed by Arthur Beiser, New York University.

The variational principles of dynamics, which assert that a certain quantity (generally an integral of motion) be an extremum along the actual path, are intuitively appealing and have played an important part in the formulation of this subject. An account of their long (since 600 B. C. or so) and colorful history, together with an exposition of their present status, is contained in this book. The formal development of such topics as transformation theory and the Hamilton-Jacobi equation is conventional, but the historical and philosophical discussions make interesting reading.

Acoustics

Acoustics, by L. L. Beranek, is a quite complete text on the engineering applications of acoustics in sound

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REACTOR PHYSICS

By J. J. LITTLER and J. F. RAFFLE, British Atomic Research Establishment, Harwell, England. In press

An excellent, concise survey of the nuclear physics of reactors written primarily for engineers and experimental physicists who need to know the theoretical background of reactors. It treats in a single volume elementary nuclear physics, theory of thermal reactors, and descriptions of Geiger and scintillation counters. Calculations, shielding, instrumentation, radiation precautions are all treated in brief, readable style. As a whole, the book is a simplified account of reactor theory, written for people with no previous knowledge of the subject.

THE ATOMIC NUCLEUS

By ROBLEY D. EVANS, Massachusetts Institute of Technology. *International Series in Pure and Applied Physics.* 998 pages, \$14.50

Here is a new and outstanding text and reference work in fundamental nuclear physics for college graduate students, involving both "intra-nuclear" and "extra-nuclear" fields. The sequence and discussion of each topic—new for books on nuclear physics—begin at the introductory level, then carry through intermediate levels of difficulty into advanced areas of most recent current research. In the discussion of each subtopic, the book deals both with the experimental facts and with their interpretation of contemporary theories. Thus it combines the experimental and theoretical approach, and operates in the area in which theory and experiment meet. Many practical illustrations are included to familiarize the students with experimental instruments and techniques in nuclear physics.

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production and control, suitable for a course for electrical engineers. The specialized fields of ultrasonics and of sound recording are not included, but the analysis of microphone and loudspeaker properties, of room acoustics, the treatment of noise measurement and control are given in considerable detail and are up-to-date. In addition there is a short discussion of the aspects of the psychoacoustics of hearing and of speech intelligibility which are pertinent to the rest.

The treatment is chiefly by use of the analogy between electric and mechanical circuits, the steady-state and transient behavior of the electrical, mechanical, and acoustical elements is expressed in terms of equivalent impedances, their intercoupling by means of equivalent circuits. There are discussions of directivity patterns for both loudspeakers and microphones, of the use of baffles and resonant enclosures to improve loudspeaker behavior and of the properties of horns of various shapes. The discussion of room acoustics includes some of the more recent developments of criteria for acoustic criteria. The section on noise control includes a discussion of the properties of noise sources and of the attenuation of sound by walls and through ducts. At the back of the book are 22 pages of problems, 12 pages of tables of conversion factors and a 12-page index. (481 pp.; McGraw-Hill Book Company, Inc., New York, 1954; \$9.00.)

Nuclear Engineering

Raymond L. Murray's *Introduction to Nuclear Engineering* (418 pp.; Prentice-Hall, Inc., New York, 1954; \$9.35) is a very comprehensive treatment on an advanced undergraduate level. Starting with a review of atomic and nuclear physics, the book treats reactor principles and construction, the design of auxiliary equipment such as heat exchangers, shielding, and detection instruments, and a description of some experiments that can be performed with neutrons. The last three chapters deal with the uses of isotopes, the nuclear propulsion of airplanes, submarines, and rockets, and the production of electrical power from reactors. Numerous references add to the utility of the text.

Books Received

THE ELEMENTS OF ASTRONOMY. A Nonmathematical Textbook for Use as an Introduction to the Subject in Colleges, Universities, etc., and for the General Reader (Revised Fifth Edition). By Edward Arthur Fath. 369 pp. McGraw-Hill Book Company, Inc., New York, 1955. \$5.50.

PROCEEDINGS OF THE EASTERN JOINT COMPUTER CONFERENCE (Philadelphia, December 1954). 92 pp. Published by the American Institute of Electrical Engineers, New York, 1955. \$3.00.

AN INTRODUCTION TO THE ELECTRONIC THEORY OF VALENCY (Revised Third Edition). By J. C. Speakman. 180 pp. (Edward Arnold, England) St. Martin's Press, Inc., New York, 1955. \$2.50.

EINFÜHRUNG IN DIE QUANTENELEKTRODYNAMIK. By Walter Thirring. 122 pp. Franz Deuticke, Vienna, Austria, 1955. DM 17.50.

MANGANESE. Volume 3 of Metallurgy of the Rarer Metals. By A. H. Sully. 305 pp. (Butterworths, England) Academic Press Inc., New York, 1955. \$6.50.

SOME ASPECTS OF THE CRYSTALLIZATION OF HIGH POLYMERS. Communication No. 276. By G. Schuur. 82 pp. Rubber-Stichting, Delft, Netherlands, 1955. Paperbound 5 Dutch florins.

SOME FUNDAMENTALS OF COMBUSTION. Volume II of Gas Turbine Series. By D. B. Spalding. 250 pp. (Butterworths, England) Academic Press Inc., New York, 1955. \$7.50.

GAS DYNAMICS OF COSMIC CLOUDS (1953 Symposium, Cambridge, England). Edited by J. M. Burgers and H. C. van de Hulst. 247 pp. (North Holland, Netherlands) Interscience Publishers, Inc., New York, 1955. \$5.75.

PETROGRAPHIC MINERALOGY. By Ernest E. Wahlstrom. 408 pp. (Chapman & Hall, England) John Wiley & Sons, Inc., New York, 1955. \$7.75.

PROCEEDINGS OF THE INTERNATIONAL CONFERENCE OF THEORETICAL PHYSICS (Kyoto and Tokyo, Japan, September 1953). 942 pp. Maruzen Co., Ltd., and Kinokuniya Book Store Co., Ltd., Tokyo, Japan, retailers. Published by the Science Council of Japan, Conference Committee, 1955. \$10.00 (Postage \$1.00).

MACHINE TRANSLATION OF LANGUAGES. Fourteen Essays. Edited by William N. Locke and A. Donald Booth. 243 pp. (Chapman & Hall, England) The Technology Press of Massachusetts Institute of Technology and John Wiley & Sons, Inc., New York, 1955. \$6.00.

VAPOR-PLATING. The Formation of Coatings by Vapor Deposition Techniques. By C. F. Powell, I. E. Campbell, and B. W. Gonser. 158 pp. (Chapman & Hall, England) John Wiley & Sons, Inc., New York, 1955. \$5.50.

THEORY OF ORDINARY DIFFERENTIAL EQUATIONS. By Earl A. Coddington and Norman Levinson. 429 pp. McGraw-Hill Book Company, Inc., New York, 1955. \$8.50.

MODERN PHYSICS. By John C. Slater. 322 pp. McGraw-Hill Book Company, Inc., New York, 1955. \$5.50.

ESSENTIALS OF BIOLOGICAL AND MEDICAL PHYSICS. By Ralph W. Stacy, David T. Williams, Ralph E. Worden, and Rex O. McMorris. 586 pp. McGraw-Hill Book Company, Inc., New York, 1955. \$8.50.

THIS WORLD OF OURS. By Abram Glaser. 492 pp. Philosophical Library, New York, 1955. \$5.00.

DIELECTRIC BEHAVIOR AND STRUCTURE. Dielectric Constant and Loss, Dipole Moment, and Molecular Structure. By Charles Phelps Smyth. 441 pp. McGraw-Hill Book Company, Inc., New York, 1955. \$9.00.

QUANTUM THEORY OF SOLIDS. By R. E. Peierls. 229 pp. Oxford University Press, New York, 1955. \$4.80.

BASIC PROCESSES OF GASEOUS ELECTRONICS. By Leonard B. Loeb. 1012 pp. University of California Press, Berkeley, California, 1955. \$13.50.

REPORT OF THE COMMITTEE ON THE MEASUREMENT OF GEOLOGIC TIME, 1953-54. NAS-NRC Publication 333. John Putnam Marble, Chairman. 193 pp. National Academy of Sciences-National Research Council, Washington 25, D. C., 1955. Paperbound \$1.75.

PRACTICAL PHYSICS (Second Edition). By Marsh W. White, Kenneth V. Manning, and Robert L. Weber. 484 pp. McGraw-Hill Book Company, Inc., New York, 1955. \$5.50.