

of the final chapter on health physics, designed to give the experimenter an understanding of the precautions required for reactor research.

The scientific contribution of the book is significant, since it pulls together a wealth of unorganized research data appearing in the normal periodical literature as well as Atomic Energy Commission reports and gives them a logical sequence. The fitting together and interpretation of the recent work on the optical properties of cold neutrons are perhaps especially significant.

The appendixes include the most recent set of thermal neutron cross sections tabulated as total, activation, and various scattering cross sections. A set of experiments used for instruction at Argonne National Laboratory has been included to show the varieties of studies open to first year graduate students.

Pile Neutron Research, although not intended as a classroom text, has been so used successfully. It was found more satisfactory than other presentations in the field. It is a significant contribution to a growing field of research and will certainly be a cornerstone in this branch of nuclear physics.

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Metallurgical Equilibrium Diagrams. By W. Hume-Rothery, J. W. Christian, and W. B. Pearson. 311 pp. The Institute of Physics, London, England, 1952. 50s.

To a physicist, metallurgical equilibrium diagrams resemble medieval maps of the world: some of them describe apparently well-known territories but many are either totally or partially blank or with wrong rivers and with nonexistent mountain ranges. Most physicists would prefer to leave to someone else the rather uninteresting job of exploring these puzzling territories. Unfortunately this attitude entails also a lack of criticism of the value of results obtained by various methods. It is thus gratifying to have this book which deals in a concise way with the diverse experimental techniques used in the study of equilibrium diagrams and with the limitations of such techniques. The book gives a very good survey and covers all of the basic techniques used by metallurgists. The material is divided into 32 small chapters grouped into: general principles, experimental methods, determination of the liquidus, determination of the solidus, determination of phase boundaries in the solid state, ternary systems and presentation of results. The material is presented expertly and one feels that much is based on the authors' own wide experience. It should be mentioned that the title of the book is somewhat misleading since it is not a collection of metallurgical equilibrium diagrams as one might think but a survey of experimental methods for determining such diagrams. It should be well received by physicists interested in the theories of phase transformations in solids, of existence of solutions and compounds, etc.

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Antennas: Theory and Practice. By Sergei A. Schelkunoff and Harald T. Friis. 639 pp. John Wiley and Sons, Inc., New York, 1952. \$10.00.

"This book is about antennas: about the physical principles underlying their behavior, the theory needed in sound antenna design and in planning meaningful experiments, the applications of theory to antennas in various frequency ranges. We have written it primarily for students and practitioners of radio engineering. . . ." It is also of interest to physicists in illustrating current problems and certain physically ingenious methods of obtaining practical solutions. The book is not a collection of engineering data, but rather a physically motivated study of fundamental theory and accepted practice by two men who are well known for their various contributions to the subject. With the above in view the text is perhaps the most comprehensive treatment of the subject on an intermediate level.

Starting with a survey of fundamental radiation phenomena, Maxwell's equations are introduced and their plane and spherical wave solutions discussed. Following chapters treat directional properties and impedance of antennas, the effect of the ground, and antenna currents. The remainder of the text deals with conventional antennas, antenna arrays, horns, slot antennas, reflectors and lenses. Particularly noteworthy are Sec. 4.13 ff on the dipole and Ch. 8 on antenna current.

Not much more than a general background of elementary physics and calculus is required to follow the text, the authors relying on physical arguments to circumvent the more usual analytical treatment. However, a greater flexibility could have been gained by the explicit use of vector methods. Vector analysis has been respectable for some time so that the somewhat Victorian attitude of the authors in this connection (not that they use quaternions) is scarcely justified.

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Advanced Antenna Theory. By Sergei A. Schelkunoff. 216 pp. John Wiley and Sons, Inc., New York, 1952. \$6.50.

This book gives a unified account of recent applications of advanced mathematical methods to the solution of antenna problems. The author's mode theory of antennas forms the backbone of the development and much hitherto unpublished material concerning this approach is included. The text is divided into six chapters: spherical waves, mode theory of antennas, spheroidal antennas, integral equations, cylindrical antennas, and natural oscillations. The text is followed by a collection of problems and numerical tables of antenna impedance functions.

The major part of the text deals with the author's work on biconical antennas and thin antennas of arbitrary shape. However, brief expositions of Hallén's

method of obtaining asymptotic solutions for linear antennas, Stratton's and Chu's theory of spheroidal antennas, and Tai's variational treatment of biconical antennas are included.

V. T.

Reprint Service

The Physical Society, London, has recently started a reprint service available to its members and to subscribers to the *Proceedings of The Physical Society*. A monthly booklet containing abstracts of forthcoming papers is circulated free to all members and subscribers; reprints of any of these papers may then be ordered within a certain time limit. Members can receive up to twenty-five reprints in any one year at the special price of £1.1s (\$3.00), while vouchers for the use of subscribers can be purchased for 10s (\$1.40) for a book of five. Full details may be obtained from The Physical Society, 1 Lowther Gardens, Prince Consort Road, London, S.W. 7, England.

Rocket and Comet Orbits

Tables for Rocket and Comet Orbits, by Samuel Herrick, is a series of tables for computing the position and velocity at any time of an object, such as a comet or a rocket, traveling either in a rectilinear orbit, i.e. directly toward or away from the earth, or in ellipses and hyperbolas about the earth, whose eccentricities are nearly unity. The introduction discusses the kinds of motion covered by the tables, the use of the tables, and references to literature in the field. (National Bureau of Standards Applied Mathematics Series 20; 100 pp.; \$1.75; order from Government Printing Office, Washington 25, D. C.)

Photographic Sensitivity

Colloque sur la Sensibilité des Cristaux et des Emulsions Photographiques is the title of the recently published proceedings of a meeting held in September 1951 in Paris on the subject of photographic theory. The book is divided into five sections, 1. Crystals, 2. Emulsions (the latent image, optical sensitizing and desensitizing, preparation and chemical sensitizing), 3. Emulsions (treatments, properties of images), 4. Nuclear Emulsions, and 5. Miscellany. The papers of some seventy authors are included, and discussions of the papers that occurred at the meeting have been incorporated. These proceedings are in French and were edited by M. Morand and Mrs. A. Vassy. The publisher is Revue d'Optique Théorique et Instrumentale, 165 rue de Sèvres et 3 boulevard Pasteur, Paris XV*, and the price is 5300 francs including postage.

Visas and Passports

A discussion of the visa and passport work of the State Department and the Foreign Service under the Immigration and Nationality Act of 1952 (McCarran Act) has been issued by the Department as Publication 4980 of its Foreign Service Series 31. It is available for 15¢ from the Superintendent of Documents, Washington 25, D. C.

Books Received

FUNDAMENTALS OF PHYSICAL SCIENCE. AN INTRODUCTION TO THE PHYSICAL SCIENCES (Third Revised Edition). By Konrad Bates Krauskopf. 694 pp. McGraw-Hill Book Co., Inc., New York, 1953. \$6.00.

NATURFORSCHUNG UND MEDIZIN IN DEUTSCHLAND 1939-1946 (Fiat Review of German Science). PHYSIK DER FESTEN KÖRPER; Part I and II. Edited by Georg Joos. 228 pp.; 235 pp. Verlag Chemie, GmbH, Weinheim, Germany, 1947/48. Each volume DM 10.00.

FERROUS ANALYSIS. MODERN PRACTICE AND THEORY. (Second Revised Edition). By E. C. Pigott. 690 pp. John Wiley and Sons, Inc., New York, 1953. \$12.50.

ALUMINUM IN IRON AND STEEL. By Samuel L. Case and Kent R. Van Horn. 478 pp. John Wiley and Sons, Inc., New York, 1953. \$8.50.

ADVANCES IN CATALYSIS AND RELATED SUBJECTS. Vol. V. Contributors: R. B. Anderson, J. A. Christiansen, E. Field, E. A. Gulbransen, G. S. John, M. Katz, E. Lieber, F. L. Morritz, A. Nielsen, M. Orchin, T. N. Rhodin, Jr., J. G. Tolpin. Edited by W. G. Frankenburg, V. I. Komarewsky, and E. K. Rideal. 487 pp. Academic Press Inc., New York, 1953. \$11.00.

GALVANI. COMMENTARY ON ELECTRICITY. Translated by Robert Montravelle Green. 97 pp. Elizabeth Licht, Publisher, Cambridge, Massachusetts, 1953. \$4.00.

A SURVEY OF MODERN ALGEBRA (Revised Edition). By Garrett Birkhoff and Saunders MacLane. 472 pp. The Macmillan Company, New York, 1953. \$6.50.

LOW TEMPERATURE PHYSICS. By Charles F. Squire. 244 pp. McGraw-Hill Book Company, Inc., New York, 1953. \$6.50.

REVIEW OF CURRENT RESEARCH AND DIRECTORY OF MEMBER INSTITUTIONS. Edited by V. E. Neilly. 330 pp. Published biennially by the Engineering College Research Council of the American Society for Engineering Education, State College, Pennsylvania, 1953. \$2.50.

MEASUREMENT TECHNIQUES IN MECHANICAL ENGINEERING. By R. J. Sweeney. 309 pp. John Wiley and Sons, Inc., New York, 1953. Chapman & Hall, Ltd., London, England. \$5.50.

A BIBLIOGRAPHY ON METEORITES. Edited by Harrison Brown, assisted by Gunnar Kullerud and Walter Nichiporuk. 686 pp. The University of Chicago Press, Chicago, Illinois, 1953. \$10.00.

INTERNATIONAL SYMPOSIUM ON ATMOSPHERIC TURBULENCE IN THE BOUNDARY LAYER. Massachusetts Institute of Technology, June 4-8, 1951. Geophysical Research Papers No. 19. Edited by E. W. Hewson. 530 pp. Air Force Cambridge Research Center, Cambridge, Mass., 1952. U. S. Department of Commerce, Office of Technical Services, Washington 25, D. C.

PHYSICS PRINCIPLES AND APPLICATIONS (Second Edition). By Henry Margenau, William W. Watson, C. G. Montgomery. 814 pp. McGraw-Hill Book Co., Inc., New York, 1953. \$7.50.

OUR NEIGHBOUR WORLDS. By V. A. Firsoff. 336 pp. Philosophical Library, New York, 1953. \$6.00.

ATOMS AND ENERGY. By H. S. W. Massey. 174 pp. Elek Books Ltd., London, England, British Book Centre, New York, 1953. \$3.50.

MATHEMATICAL STRUCTURE OF THE THEORIES OF VISCOELASTICITY. By Bernhard Gross. 74 pp. Hermann & C^o, Éditeurs, Paris, France, 1953.