

point. These chapters display a nice balance in the discussion of experimental techniques, data, and theoretical analysis. Transition probabilities are calculated for all the decay processes. A uniform point of view is maintained throughout. A discussion of the neutrino's properties is included.

The tandem Van de Graaff, sector-focused cyclotron, and electron linac, together with the more classical accelerators are explained with operating specifications.

The chapter on nuclear reactions has examples and cross-section calculations (and a discussion of their regions of validity) for the compound nucleus, optical model, stripping reactions, coulomb excitation, and photonuclear reactions. The spectroscopy of elementary particles is treated, but unfortunately without the help of the quark model.

Each of the fifteen chapters has a problem set of varying degree of difficulty. Some of these are "term problems" that require a considerable amount of work on the part of the student.

This is an up-to-date and thoughtfully put together text. Relatively simple concepts with a minimum of mathematical complexities do allow the student to gain a feeling of understanding of the data. Perhaps the job has been done too well and the student might get the impression that there are no open problems in nuclear physics. An instructor should have little trouble setting him straight on this point, however.

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James O'Connell is a nuclear physicist at the National Bureau of Standards specializing in photonuclear reactions.

A reference text

PROBABILITY, RANDOM VARIABLES, AND STOCHASTIC PROCESSES. By Athanasios Papoulis. 583 pp. McGraw-Hill, New York, 1965. \$19.50

by Joseph G. Hoffman

The stated purpose of explaining the theory of random processes to students of engineering and physics is admirably achieved. A careful pedagogic method of discussing concrete examples, and even paradoxes, is displayed,

especially in the first 5 of the 16 chapters. For instance, chapter 4 on the concept of a random variable has 17 examples interspersed among basic materials. This same chapter has in one section a comparison of the normal, Poisson, binomial, gamma, beta, Laplace, Cauchy, Rayleigh and Maxwell distributions in a useful compilation for students of other texts on statistics. The special meaning of the binomial distribution is made clear in the comparison. The orderly presentation makes for teaching at its best, but it also provides a handy reference text.

Since it is aimed at engineers and physicists, there are numerous applications as indicated by some chapter titles: Harmonic Analysis of Stochastic Processes, Brownian Movement and Markoff Processes, Poisson Process and Shot Noise, and Correlation and Power Spectra. The major effort, however, is to develop basic concepts. Chapter 9, entitled "Basic Concepts of Stochastic Processes," is a concise presentation of random walk, Wiener-Levy process, binary transmission, correlation, stationary processes and ergodicity, among other concepts. The interrelationships between the concepts are carefully worked out for the student.

There are numerous figures; the physical format is attractive; and a table of contents and subject index make the materials readily accessible. Essential bibliographic references are given as footnotes at relevant points in the text. I recommend this work not only for its excellent presentation of stochastic processes, but as a basic intermediate reference.

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The reviewer is professor of physics at the State University of New York at Buffalo.

Interdisciplinary and mature

ADVANCES IN RADIATION BIOLOGY. Volume 2. L. G. Augenstein, R. Mason, M. R. Zelle, eds. 371 pp. Academic Press, New York, 1966. \$15.00

by Joseph G. Hoffman

The six papers comprising this volume illustrate the subject of radiation biology in its broadest possible sense. B. Rosenberg's article on a "Physical Approach to the Visual Receptor Process" presents a model of a transducer

for making vision possible. In an entirely different direction, L. I. Grossweiner reviews "The Study of Labile States of Biological Molecules with Flash Photolysis" and describes work on proteins, amino acids, visual pigments, chlorophyll and sensitizing dyes.

Three articles deal with the genetic aspects of radiation effects. They are: "Repair of Premutational Damage," by R. F. Kimball; "The Genetic Control of Radiation Sensitivity of Micro-Organisms," by H. I. Adler; and "The Role of Genetic Damage in Radiation Induced Cell Lethality," by D. R. Davies and H. J. Evans. The last named is representative in its scholarly analysis of a difficult subject. The reader is made aware of the possibilities of ionizing radiation as a tool for probing the information content of living matter.

Photoreactivation is reviewed by C. S. Rupert and W. Harm in "Reactivation after Photobiological Damage." A textbook clarity is achieved to describe target theory, reactivation mechanisms, and even the terminology used in the technical literature.

An impressive feature of the reviews is in their approach: the tools of radiation are made ancillary to the job of solving the biological problems. This gives a remarkable scientific maturity to the interdisciplinary subjects presented in a highly commendable volume. The physical format is excellent; there is a table of contents, an author index, a topical index, and each article is well documented.

BRIEFLY NOTED

DIRECTORY OF BRITISH SCIENTISTS, 1966-67. In two volumes. 2318 pp. Bowker, New York, 1966. \$44.10

Containing 54 000 entries, this directory includes with each scientist's brief biography the titles of his most important publications and his present affiliation. An index is provided, classifying the scientists according to field of interest. Additional features include listings of British scientific societies and their journals, other scientific periodicals, and British research establishments.

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Its wealth of pedagogical aids make it an outstanding book from which to teach as well as to learn. Unlike many texts on the same level, this book's 1200 problems deal in frames of reference readily recognizable to the pre-medical, pre-dental, or liberal arts students. The problems are not oriented toward the engineering student. The invaluable marginal notations placed throughout the book make reference to material presented earlier in the text that is germane to the concept being discussed. The notations suggest specific chapter-end problems testing the new concept, and, in addition, point up the most important material on any given page. A chapter-long review of trigonometry gives the student the necessary mathematical background.

The authors have made their discussion of

physics as advanced as is compatible with the elementary level of mathematics employed. Descriptive chapters interspersed throughout the text handle topics of current research interest. All applications have been put into a group of chapters at the end of the book. These chapters do not contain any physical concepts not introduced previously and are intended to provide specific and helpful information.

The authors' style is simple and direct, always at a level readily understandable to the intended audience. The difficult topics of quantum theory, relativity, and statistical mechanics—so often omitted in a book at this level—are introduced in an elementary and clear manner. Drs. Stevenson and Moore strive meticulously to help the student develop an up-to-date insight into physical phenomena. By their unusual presentation, the authors succeed in portraying the excitement of physics to the often unmotivated non-major.

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1966. 525 pages. il. \$10.50

ATOMIC AND NUCLEAR PHYSICS Solutions Manual 1966. 90 pages. \$1.00

THE ELEMENTS OF PHYSICS

F. A. Kaempffer, *University of British Columbia*

Intended for non-physics students in the Arts and Sciences. In emphasizing the large numbers of unsolved problems posed by the so-called elementary branches of physics, the text is useful as a supplement for physics majors. The author devotes much of the text to the elementary treatment of more modern concepts — symmetry, field theory, probability amplitudes, and variational principles. Although methods for solving numerical problems have been intentionally de-emphasized, there are numerous exercises and examples.

1967. 336 pages. In press

PHYSICAL SCIENCE

William A. Rense, *University of Colorado*

In a non-mathematical approach to the physical sciences, emphasis is placed on the development of physics and its application to natural phenomena. The evolution of various theories in physics is used to correlate developments in astronomy, chemistry and geology. The student is lead through simple molecular kinetic theory and the atomic theory of matter to an understanding of modern theories of relativity and wave mechanics.

1966. 430 pages. il. \$8.75



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THE NATURE OF THE LUNAR SURFACE. Conf. proc. (Greenbelt, Md., April 1965) W. N. Hess, D. H. Menzel, J. A. O'Keefe, eds. 320 pp. Johns Hopkins Press, Baltimore, 1966. \$13.50

The lunar surface, the nearest nonterrestrial one, has been under intensive scrutiny by telescope, radio, radar, and most lately close-up photography transmitted by television. The IAU-NASA symposium whose proceedings appear here was pre-Surveyor, but it was post-Ranger. More than a third of the text is devoted specifically to interpretation of Ranger photos, and they come up now and then in discussions under other headings as well. Other techniques of observation (ordinary light, polarized light, radar and radio) also have their innings in the remaining two thirds of the book under the headings "Crater Formation and Surface Structure" and "Physics and Chemistry of the Lunar Surface." There are altogether 18 contributions, including a summation by E. J. Opik; the names appended to them will command instant recognition from those interested in selenography.

NEW BOOKS

ELEMENTARY PARTICLES & FIELDS

Non-Compact Groups in Particle Physics. Conf. proc. (Milwaukee, May 1966). Y. Chow, ed. W. A. Benjamin, New York, 1966. \$8.50

The Analytic S Matrix: A Basis for Nuclear Democracy. By G. F. Chew. 103 pp. W. A. Benjamin, New York, 1966. \$7.50

NUCLEI

Reactor Physics in the Resonance and Thermal Regions. Vol. 1: Neutron Thermalization. Conf. proc. (San Diego, Feb. 1966). A. J. Goodjohn, G. C. Pomraning, eds. 421 pp. MIT Press, Cambridge, Mass., 1966. \$7.50

Reactor Physics in the Resonance and Thermal Regions. Vol. 2: Resonance Absorption. Conf. proc. (San Diego, Feb. 1966). A. J. Goodjohn, G. C. Pomraning, eds. 452 pp. MIT Press, Cambridge, Mass., 1966. \$7.50

Incidents and Radiation Accidents in Nuclear Plants: 20 years of World-Wide Experience. By E. H. Schulz. 416 pp. (In German). Verlag Karl Thiernig KG, Munich, 1966. DM 128.

SOLIDS

The Physics and Chemistry of Scintillators. Conf. proc. (Munich, Sept. 1965). N. Riehl, H. Kallmann, eds. 471 pp. Papers in German (23), English (28), French (15). Verlag Karl Thiernig KG, Munich, 1966. DM 68.

Materials of High Vacuum Technology. Vol. 1. By W. Espe. 912 pp. Pergamon Press, Oxford, 1966. \$45.00

Beryllium Technology. Vol. 1. Conf. proc. (Philadelphia, Oct. 1964). 690 pp. Gordon and Breach, New York, 1966. Cloth \$35.00, paper \$19.00

Beryllium Technology. Vol. 2. Conf. proc. (Philadelphia, Oct. 1964). 590 pp. Gordon and Breach, New York, 1966. Cloth \$35.00, paper \$19.00

CLASSICAL PHYSICS

Longitudinal Space-Charge Waves. By R. E. Trotman. 219 pp. Barnes & Noble, New York, 1966. \$5.50

The Measurement of Temperature. By J. A. Hall. 96 pp. Science Paperbacks, New York, 1966. Paper \$3.75

Thermodynamics: Principles and Applications to Engineering. By E. Schmidt. Trans. from German by J. Kestin. (Reprint of 1949 edition). 531 pp. Dover, New York, 1966. Paper \$3.00

Molecular Physics of Boundary Friction. By A. S. Akhmatov. Trans. from Russian by N. Kaner. (Israel Program for Scientific Translations). Davey, New York, 1966. \$19.00

Modern Optical Engineering: The Design of Optical Systems. By W. J. Smith. 468 pp. McGraw-Hill, New York, 1966. \$15.00

Agricultural Physics. By C. W. Rose. 226 pp. Pergamon Press, Oxford, 1966. Paper \$3.50

MATHEMATICS & MATHEMATICAL PHYSICS

Integral Equations and Their Applications. Vol. 1. By W. Pogorzelski. Pergamon Press, Oxford, 1966. \$18.50

Homology and Feynman Integrals. By R. C. Hwa, V. L. Teplitz. 331 pp. W. A. Benjamin, New York, 1966. \$12.50

Methods of the Theory of Functions of Several Complex Variables. By V. S. Vladimirov. Trans. from Russian by Scripta Technica. 353 pp. MIT Press, Cambridge, Mass., 1966. \$12.00

INSTRUMENTATION & TECHNIQUES

The Development of High-Energy Accelerators. (Reprint collection.) M. S. Livingston, ed. 317 pp. Dover, New York, 1966. Paper \$2.50

Mass Spectrometry: Theory and Applications. By R. Jayaram. 225 pp. Plenum Press, New York, 1966. \$12.50

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