

there is an introductory chapter in mathematics—in this case, the second chapter. However, it is not vector analysis that is treated but partial derivatives, line integrals and so forth. The chapter can easily be skipped and used solely as an appendix or reference source if the student's mathematical background is sufficient. After chapter two the usual topics found in textbooks written for this level are covered.

There is one difference that the authors explain in their first chapter, which deals with basic definitions. Battino and Wood use what they call the "operational" approach whereby "a word used to describe a phenomenon observed in nature has meaning only with reference to the phenomenon itself..." Whether or not this approach will have its full effect on the student will, to a great extent, depend on the teacher. Certainly it is an interesting and commendable modern method.

Although all the mathematics are present, there is a real and successful effort to devote time and space to physical discussions. This is particularly well done in the use of simple and clear diagrams and discussion of experiments. The chapters on heat and work serve as good foundations for the following chapter on the First Law. A brief chapter is devoted to the "porous-plug" (Joule-Thomson) experiment, and this coverage appears worthwhile. The succeeding chapters, on the Second Law, entropy, and so on, cover the material with considerable clarity. If the instructor would like to introduce the student to kinetic theory or a few concepts in statistical mechanics, the Battino-Wood book is not for him; as a text in what might be called classical thermodynamics with some chemical overtones, however, this is a worthwhile book to examine carefully. There are ample problems with answers supplied.

• • •

James B. Kelley, professor of physics at Marquette University, specializes in electromagnetism and electrodynamics.

Revolution in analytical chemistry

PRACTICAL X-RAY SPECTROMETRY.
By Ronald Jenkins, Johan L. de Vries. 182 pp. Springer-Verlag, New York, 1967. \$7.80

by H. A. LIEBHAFSKY

Physics is revolutionizing analytical

chemistry. Not the least important aspect of this revolution is the use of emitted x rays for the determination of all but the lightest elements. Shortly after World War II the precise measurement of x-ray intensity became an easy routine, and analytical chemists came to realize that they could turn to good use the simplicity of x-ray spectra. Applications of x-ray methods soon multiplied. They were accompanied by similar applications drawn from experimental nuclear physics and by the development of new equipment, of which the electron microprobe is perhaps the outstanding example. Now the computer is beginning to make itself felt, and the end is not in sight.

Among the many recent books that deal with x rays in analytical chemistry, *Practical X-Ray Spectrometry* distinguishes itself by the emphasis it puts on practical problems "as opposed to the multitude of success stories which regularly saturate the scientific press." The authors are on sound ground, and they no doubt arrived there because of their extensive experience. Associated with a major international manufacturer of x-ray equipment, Jenkins and de Vries have, over several years, trained newcomers to the field, and they have organized scientific meetings for those physicists who are more experienced. The book is based on their lecture notes.

The physicist will find some of the subjects familiar, and others new. The familiar: the physics of x rays, their dispersion and detection, pulse-height selection and the statistics of counting. The new: matrix effects, the determination of elements, sample preparation and trace analysis—topics that principally concern the analytical chemist. For an impression of the authors' approach, consider the treatment of x-ray dispersion by crystals (Bragg reflection). The usual treatment is augmented by three extensive and critical tables that deal with six geometric arrangements of spectrometers, with analyzing crystals, and with comparative intensities obtained with five crystals for x rays of long wave length; these crystals are useful in the (difficult but rapidly growing) determinations of elements as light as fluorine. In addition the effects of the general conditions of the crystals, of changing temperature, of the emission of characteristic lines by the crystals and of

"Each football player is represented by an X. The team is represented by eleven 'particles'..."

Liberal arts students are accustomed to working with models.

Introductory Physics:

A Model Approach

By Robert Karplus

University of California, Berkeley

April 1969/518 pages

INTRODUCTORY PHYSICS: A Model Approach,

by Robert Karplus, is a unique new text for one-semester liberal arts physics. Dr. Karplus stresses *models* rather than mathematics. He exposes as models the approximations we use every day, and successfully relates scientific theories to the student's experience, using examples like the one given above.

Throughout, emphasis is placed on the tentative nature of scientific explanations, so that the non-major is engaged on historical and philosophical levels.

Mathematical material is carefully kept to a minimum, and the sequence of topics is such that the student is not immediately confronted with discouraging algebra and abstractions. (For example, Newtonian mechanics is reserved until the latter part of the text.)

INTRODUCTORY PHYSICS: A Model Approach

is written for one-semester courses, and for two-semester courses when expanded with readings from the extensive bibliography.

RESERVE YOUR
EXAMINATION COPY NOW!



W.A. BENJAMIN, INC.

TWO PARK AVENUE
NEW YORK, N.Y. 10016



Digital Electronics for Scientists

H. V. Malmstadt

University of Illinois

C. G. Enke

Michigan State University

Co-authors of the widely used text,
ELECTRONICS FOR SCIENTISTS.

Comprehensive and Up-to-Date

The work of every scientist and engineer is profoundly affected by the powerful new instrumentation and automation now being developed. At a time when most present texts dealing with digital electronics have been outdated by recent advances in integrated circuit technology, **DIGITAL ELECTRONICS FOR SCIENTISTS** provides a systematic introduction to the digital circuits, concepts, and systems basic to the new instrumentation-computation revolution.

The text leads the reader from the simplest discrete switching devices, such as semiconductor diodes and transistors, into the latest high-speed integrated circuits and digital instrumentation systems. Professors Malmstadt and Enke give a thorough exposition of the tools needed to build and experiment with digital and analog-digital instruments.

A complete sequence of experiments is included, accompanied by the necessary details of the equipment required. Digital circuit cards, parts, modules, and instruments have been prepared for use with this text by the Heath Company of Benton Harbor, Michigan.

DIGITAL ELECTRONICS FOR SCIENTISTS can be used as the main text for a course on digital electronics and can also be incorporated in traditional courses that present linear circuits. It will also be a valuable aid in any instrumentation course as well as in a course on computer electronics. The material will be of interest to the widest range of practicing scientists and engineers, including chemists, biologists, physicists, as well as those in the bio-medical disciplines.

Available June 1969. Approximately 320 Pages. \$9.50 Clothbound.

Detailed brochure available
upon request.

W.A. BENJAMIN, INC.
Two Park Avenue • New York 10016

abnormal reflections are all described. The book contains extensive worked out problems.

There is an understandable emphasis on Philips's work and equipment. Occasional mistakes in English have survived proofreading. More important to me, however, is the matter of nomenclature. I feel that "x-ray spectrometry" ought to be restricted to the measurements of wavelengths and intensities, and that "fluorescence" as applied to x rays has outlived any usefulness it might once have had. I prefer "x-ray emission spectrography" to describe what the authors variously call "x-ray spectrometry" (title), "x-ray fluorescence spectrometry" (preface), "x-ray fluorescence analysis" (p. 160), and "x-ray spectroscopy" (p. 171). The book is badly needed and is highly recommended.

• • •

The reviewer, professor of chemistry, Texas A & M University, has been interested in x rays for the past 20 years; he is a senior author of X-Ray Emission and Absorption in Analytical Chemistry, Wiley, New York, 1960.

NEW BOOKS

CONFERENCE PROCEEDINGS

Proceedings—Electron Microscopy Society of America. (Conf. proc.) Claude J. Arceaux, ed. (New Orleans, La., 16–19 Sept. 1968) 496 pp. Claitor's Publishing Division, Baton Rouge, La., 1968.

Wolf-Rayet Stars. (NBS-307). (Symp. proc.) Katharine B. Gebbie and Richard N. Thomas, eds. (Joint Institute for Laboratory Astrophysics, NBS, Boulder, Colorado, 10–14 June 1968) 277 pp. National Bureau of Standards, Washington, DC, 1968. \$3.00

The Structure of Low-Medium Mass Nuclei. (Symp. proc.) J. P. Davidson, ed. (University of Kansas, 18–20 April 1968) 294 pp. Univ. Press of Kansas, Lawrence, Kansas, 1968. \$12.50

Energetics in Metallurgical Phenomena, Vol. IV. (Symp. proc.) William M. Mueller, ed. (University of Denver, 1965). 381 pp. Gordon & Breach, New York, 1968. Cloth \$19.50, paper \$12.50

Fundamental Problems in Elementary Particle Physics. (Conf. proc.) Solvay Institute, eds. (University of Brussels, October 1967) 250 pp. Wiley (Interscience), New York, 1968. \$13.50

The Use of Small Accelerators for Teaching and Research. (Conf. proc.) Jerome L. Duggan, ed. (Oak Ridge Associated Universities, Oak Ridge, Tenn., 8–10 April 1968) 464 pp. Clearinghouse for Federal Scientific and Technical Information, NBS, Springfield, Va., 1968. \$3.00

ELEMENTARY PARTICLES

Advances in Particle Physics, Vol. 2. R. L. Cool and R. E. Marshak, eds. 734 pp. Wiley, New York, 1968. \$24.95

Lectures in Theoretical High Energy Physics. H. H. Aly, ed. 439 pp. Wiley (Interscience), New York, 1968. \$17.50

NUCLEI

Collective Excitations in Nuclei. By S. T. Belyaev. 74 pp. Gordon & Breach, New York, 1968. Cloth \$5.50, paper \$3.50

Lectures on the Mossbauer Effect. By J. Danon. 150 pp. Gordon & Breach, New York, 1968. Cloth \$7.50, paper \$4.50

ATOMS, MOLECULES, CHEMICAL PHYSICS

Foundations of Quantum Chemistry. By T. E. Peacock. 162 pp. Wiley, New York, 1969. \$6.50

Photoemissive Materials: Preparation, Properties, and Uses. By A. H. Sommer. 256 pp. Wiley, New York, 1968. \$12.95

ACOUSTICS

The Physics of Vibrations and Waves. By H. J. Pain. 241 pp. Wiley, New York, 1969. \$5.95

Physical Acoustics, Vol. 5: Principles and Methods. Warren P. Mason, ed. 301 pp. Academic, New York, 1969. \$14.50

OPTICS

Principles of Quantum Electronics. By Will S. C. Chang. 540 pp. Addison-Wesley, Reading, Mass., 1969. \$17.50

Plasma Spectroscopy. By Geoffrey V. Marr. 316 pp. American Elsevier, New York, 1969. \$21.50

ELECTRICITY AND MAGNETISM

Theorie du Magnetisme. By André Herpin. 882 pp. Presses Universitaires de France, Paris, 1968.

Advances in Electronics and Electron Physics, Vol. 25. L. Marton and Claire Marton, eds. 340 pp. Academic Press, New York, 1969. \$16.00

FLUIDS, PLASMAS

Plastics Rheology: Mechanical Behaviour of Solid and Liquid Polymers. By R. S. Lenk. 214 pp. Wiley (Interscience), New York, 1968. \$11.00

Gas Dynamics. By Ernst Becker. 297 pp. Academic, New York, 1969. \$15.00

Plasma Physics, Vol. 2. By J. L. Delcroix. 188 pp. Wiley, New York, 1969. \$9.95

Plasma Diagnostics. W. Lochte-Holtgreven, ed. 928 pp. Wiley (Interscience), New York, 1968. \$38.50

Plasma Spectroscopy. By Geoffrey V. Marr. 316 pp. American Elsevier, New York, 1969. \$21.50

Physics of Simple Liquids. H. N. V. Temperley, J. S. Rowlinson and G. S. Rushbrooke, eds. 713 pp. Wiley (Interscience), New York, 1968. \$33.50