

Rensselaer Polytechnic Institute since 1967).

This slender book (144 pages of text) undertakes in its first 70 pages to review nearly the whole field of physical optics. The level of the presentation is definitely not for the layman, but could be appreciated by a senior majoring in physics. Many well drawn diagrams greatly aid the exposition. It does not seem appropriate in this review to belabor minor errors in the equations; on the whole the pedagogy is excellent.

Nonlinear phenomena are treated in the remaining 74 pages. The subject is divided into two parts, nonlinear phenomena in passive media (harmonic generation, parametric amplification) and nonlinear phenomena in active media (stimulated Raman scattering, acoustic modulation of light). An active medium is here defined as one that "imposes its own characteristic frequencies on that of the impressed light." I was disappointed to find no discussion of the propagation of short pulses in optically pumped media. The high level of pedagogy is maintained, although the reader is hereby warned that the correct answer to the numerical example on page 96 is 3.3 cm, not 4.11 mm.

On the whole this book succeeds very well in meeting the limited objectives as frankly and clearly stated in its first few pages. It does indeed provide a relatively elementary but nonetheless thorough account and is highly recommended for the engineer with little time for study in depth or the manager who must make decisions.

DAVID A. KLEINMAN
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The Design of Optical Spectrometers

By J. F. James,
R. S. Sternberg
239 pp. Chapman and Hall, New York, 1969. \$10.50

Although spectroscopy is a very widely used tool in physical, chemical and biological studies, surprisingly few investigators know much about the limitations of their instruments or the principles on which the designs are based.

Course work in the physical sciences emphasizes the uses of spectroscopy, leaving the analyses of aberrations and experimental problems to be learned elsewhere. Unfortunately they are rarely learned anywhere. The small book by J. F. James and R. S. Sternberg attempts to present enough information about optical design principles, aberration minimization and so forth to permit intelligent assessment of the capabilities of different designs. I believe

the book succeeds in achieving its aim.

One reason the authors succeed is that they suppress the temptation to expose, in encyclopedic fashion, all the underlying optical theory. Instead, an "it can be shown" attitude is adopted. In other hands this approach often fails because insufficient information is given; here a good harmony is reached among details of exposition, motivation in using a particular analysis and practical designs. The principal topics covered are plane- and concave-grating spectrometry, Fabry-Perot spectrometry and multiplex spectrometry. Other, shorter, sections discuss detectors, optical components and general construction criteria.

With the exception of some older books that contain some but not all of the same material (for example, R. A. Sawyer's *Experimental Spectroscopy*) most of the subject matter presented by James and Sternberg is not available elsewhere in as compact and useful a package. I believe that all graduate students beginning research using spectroscopy would benefit from reading this book; I will certainly recommend it to my students.

STUART A. RICE
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University of Chicago

College Physical Science

By Vaden W. Miles, G. Ray Sherwood and Willard H. Parsons
(second edition) 529 pp. Harper and Row, New York, 1969. \$9.95

For over a decade it has appeared that physicists have believed their principal goal to be reproduction of their own kind. Every bright youngster who passed through college found his physics professors trying to seduce him with the idea of "physics as a career" and to gain a new convert to the faith that the need to accelerate particles ever faster should be an axiom of our social order.

It couldn't last, of course, and it didn't. Now, more than ever, it is important that the meaning of pure science (and perhaps even some of its delights) should be rehabilitated in the public mind.

College Physical Science makes this task a lot easier. It is intended for courses taught to liberal-arts and business majors, and does a very good job of interspersing the hard facts of physics and chemistry among the less demanding concepts of meteorology, astronomy and geology. The illustrations are plentiful and well chosen, and the style of writing is clear and direct.

The sad thing is that all the complimentary remarks of the previous paragraph apply equally well to the first

Oxford



Spin-Temperature and Nuclear Magnetic Resonance in Solids

By MAURICE GOLDMAN, *Centre d'Etudes Nucléaires de Saclay*. This book presents a unified description of the high-temperature approximation for spin-temperature theory, and of its chief applications to nuclear magnetic resonance in solids. (*International Series of Monographs on Physics*.) 51 text figures. \$13.75

Lectures on the Electrical Properties of Materials

By L. SOLYMAR, *Brasenose College, Oxford*; and D. WALSH, *Oriel College, Oxford*. These lectures stress the fundamental ideas relevant to the understanding of the electrical properties of materials. Topics are selected so that the operation of devices having applications, or possible future applications, in engineering can be explained. The mathematical treatment is kept on a basic level. 183 text figures. \$13.00

Experimental Crystal Physics SECOND EDITION

By W.A. WOOSTER and ALAIN BRETON. Simple experiments in crystalline materials are presented in this volume. Each experiment is preceded by an introduction and background material about the theory involved. The subjects covered include: dielectric constants, dynamic measurements of piezoelectricity and elasticity, the growth of crystals, semi-conductors, the Hall effect, ferroelectricity and ferrimagnetism. Plates and text figures. \$9.75

Tables for Group Theory

By C.S.G. PHILLIPS, *Merton College, Oxford*; P.W. ATKINS, *Lincoln College, Oxford*; and M.S. CHILD, *St. Edmund Hall, Oxford*. This booklet of approximately thirty-two pages provides the essential tables (character tables, direct products, descent in symmetry and subgroups) required for using group theoretical methods, together with general formulae, examples, notes, and other relevant information. Text figures. Paper \$1.00

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edition (published five years ago). Typical changes are a minor rearrangement of the order in which the chapters appear, an attempt to make chemistry sound more like physics and a discussion of DNA (complete with a reference to James Watson's *The Double Helix*). In all, this new edition is but a marginal improvement of a text that was already excellent.

PHILIP TAYLOR
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The Physics of Metals: Electrons

J. M. Ziman, ed.
433 pp. Cambridge U. P., New York,
1969. \$14.50

This book is the first half of a two-volume work prepared in tribute to Sir Nevill Mott by some of his colleagues past and present. The second volume, which has yet to appear, will treat mechanical properties and defects of solids.

The subject of volume 1 is band structure, Fermi surfaces and transport properties of metals. Approximately half the content is standard fare available elsewhere in similar, if not almost identical, form. However, in total the book is a fairly unique combination of topics. Because the authors are well known to solid-state physicists for their research and prior writings, much of the book's flavor may be conveyed simply by a brief summary of names and subjects.

The opening chapter, written by V. Heine, provides an excellent theoretical discussion of electronic structure from the viewpoint of the pseudopotential method. This is followed in logical sequence by a masterful review by D. Shoenberg of experimental work on Fermi surfaces. Conduction electrons in a magnetic field are dealt with by A. B. Pippard. Surface and size effects are treated by R. G. Chambers in one of the best written chapters, and the editor, J. M. Ziman, has contributed a chapter on ordinary transport properties.

A relatively unique feature, and surely a mark of progress, is the inclusion of a long chapter on liquid metals. T. E. Faber has written an authoritative and lucid summary of the status of our understanding of the transport properties of this difficult state of matter. Experimental work on the structure of metals and alloys is discussed by P. J. Brown and W. H. Taylor. The book concludes with a lengthy and valuable contribution by J. Friedel on band structure, cohesive energy, and magnetism of the transition metals.

The emphasis, the editor informs us in the preface, is on the physics; thus elaborate mathematics is avoided. The interpretation of this varies considerably among the authors and results in a lack of uniformity. Some reviews contain virtually no mathematics; others present detailed mathematical analysis and, in my opinion, generally come off better in the reading.

The book would not suffice as a textbook in most solid-state physics courses, and presumably was not so intended. But that is no loss since by now we may have enough texts except, of course, for that impossibility known as "one really good one." In essence Ziman and colleagues have given us an organized collection of authoritative reviews that may be highly recommended as a supplementary reference in an advanced solid-state physics course.

THOMAS SCOTT
University of Florida

new books

CONFERENCE PROCEEDINGS

Quantum Fluids. (Proc. of Batsheva Seminar at Israel Inst. of Technology, Haifa, Israel, 28 July-14 Aug., 1968.) N. Wiser, D. J. Amit, eds. 614 pp. Gordon and Breach, New York, 1970. Reference \$47.50, professional \$19.50

Nuclear Reactions Induced by Heavy Ions. (Proc. of the Intl. Conf. on Nuclear Reactions Induced by Heavy Ions, Heidelberg, 15-18 July, 1969.) R. Bock, W. R. Hering, eds. 821 pp. American Elsevier, (North-Holland), New York, 1970. \$34.75

Coral Gables Conference on Fundamental Interaction at High Energy II. (Proc. of Conf. on Fundamental Interactions at High Energy, Coral Gables, Fla., 21-23 Jan., 1970.) A. Perlmutter, G. J. Iversen, R. M. Williams, eds. 369 pp. Gordon and Breach, New York, 1970. Reference \$22.50, professional \$12.00

The Chemistry of Extended Defects in Non-Metallic Solids. (Proc. of the Inst. for Advanced Study on the Chemistry of Extended Defects in Non-Metallic Solids, Scottsdale, Ariz., 16-26 April, 1969.) L. Eyring, M. O'Keeffe, eds. 670 pp. American Elsevier, (North-Holland), New York, 1970. \$34.50

Three Body Problem in Nuclear and Particle Physics. (Proc. of 1st Intl. Conf. on the Three Body Problem in Nuclear and Particle Physics, Birmingham, UK, 8-10 July, 1969.) J. S. C. McKee, P. M. Rolph, eds. 564 pp. American Elsevier, (North-Holland), New York, 1970. \$32.00

Elementary Particle Physics and Scattering Theory, Vol. 2. (Proc. of Brandeis Univ. Summer Inst. in Theoretical Physics, 1967.) M. Chrétien, S. S. Schweber, eds. 434 pp. Gordon and Breach, New York, 1970. Cloth \$27.50, paper \$12.50

Atomic Collision Phenomena in Solids. (Proc. of Int. Conf. on Atomic Collision