ably. Its main feature is a fresh commanding approach to the basic ideas of statistical mechanics without an aura of involved mathematics.

After a concise discussion of fundamental principles, this monograph then elucidates two major areas treated by statistical mechanics—the vibrations of crystalline solids and gaslike assemblies. With special emphasis on questions of particular interest to physicists, problems of normal coordinates, Debye and Einstein models for solids, details on anharmonicity and some nonequilibrium phenomena are dealt with. Considerable attention is paid to Fermi-Dirac and Bose-Einstein statistics and to a Bose-Einstein application to the liquid-helium problem. Mathematical simplicity, which characterizes this monograph, has been achieved by including more detailed physical essentials in five appendices.

The book is well written. It is interesting and even enjoyable to read. In particular, a noteworthy feature is the many footnotes which give both an informal and historical insight to the growth of statistical mechanics that is rarely seen in text books.

Theory of Elasticity of an Anisotropic Elastic Body. By S. G. Lekhnitskii. Transl. from 1950 Russian edition by P. Fern. Edited by Julius J. Brandstatter. 404 pp. Holden-Day, San Francisco, 1963. $10.95.
Reviewed by ***E. H. Dill,*** *University of Washington.*

Lekhnitskii is responsible for the pioneer work, beginning in 1936, in the use of complex variable techniques in the two-dimensional theories of anisotropic bodies, and he eventually published two monographs on anisotropic problems, *Anisotropic Plates* (1947) and the present book in 1950. A translation of the first book has been available for some time, and all scholars of elasticity, as well as those persons who are merely interested in the applications to anisotropic bodies, will welcome this translation of his second classic monograph.

The book appears to be photo-offset from a typed copy, but the quality of reproduction, paper, and binding is excellent. The contents include an extension of the elementary solutions for isotropic materials to the anisotropic case, and an extensive treatment of the two-dimensional problem. No attempt is made to include the bending of plates and shells.

This is, of course, an old book and represents the state of knowledge at the time of writing, but little more has been done with regard to the linear theory since that time. The treatment uses elementary mathematics, and may appeal therefore to a wider class of readers than more modern treatments which tend to use tensor analysis. It is unfortunate that the editor has not chosen to provide introductory remarks which orient this book in the history of the subject and which relate it to more recent publications on anisotropic materials.

Ausgewählte Abhandlungen. Mit einem Verzeichnis der wissenschaftlichen Schriften. By Max Born. Vol. 1, 718 pp; Vol. 2, 706 pp. Vandenhoeck and Ruprecht, Göttingen, 1963. DM 100 per set.
Reviewed by ***Emilio Segrè,*** *University of California, Berkeley.*

The author was born in 1882 in Breslau, Germany. Thus he was 18 years old at the time of the introduction of h into physics, and 23 at the time of Einstein's first paper on relativity. From these dates it is apparent that Born is a contemporary of Bohr and Einstein. He could not have chosen a better time to participate in the development of quantum theory and relativity. In his maturity from the early 1920's until 1933, he was professor of theoretical physics at Göttingen, and one of the most popular teachers and leaders in the field. Between 1920 and 1925, Heisenberg, Jordan, Pauli, Fermi, and many, many other young physicists from Germany and other countries learned from and worked with Born at Göttingen, which was then one of the major centers of theoretical physics in the world. The advent of Hitler destroyed that center of learning; however, the works performed there remained, and these volumes are a suitable testimonial to that golden period of theoretical physics.

The selection of Born's papers collected in this volume reflects several of the most important developments in theoretical physics during the last 50 years. It is divided into six classes according to subject: (1) Mechanics, relativity, thermodynamics; (2) Crystal

Selected New and Forthcoming Books

ELECTRODYNAMICS AND CLASSICAL THEORY OF FIELDS AND PARTICLES

By **A. O. Barut,** University of Colorado

This is a systematic, covariant treatment of the classical theory of fields and particles. The relativistic point of view is used throughout, combined with a deductive approach in which general theory is presented and then backed up with specific problems. Much of the material is original work that has never before appeared in print. The interaction of charged particles with the electromagnetic field receives particular attention, and Lorentz transformations, radiation, and the formulation of conservation laws are considered in detail. Covariant equations, the Lorentz group, classical spin, and introductory quantum field theory are some of the non-standard topics covered. Problems, alternate proofs, and additional topics appear at the end of each chapter.

Ready in February, approx. 230 pages, prob. $7.50

SLOW VISCOUS FLOW

By **William E. Langlois,** IBM Research Laboratory, San Jose, California

This study develops the equation of viscous hydrodynamics from basic principles, giving much more detail than the usual treatments. It includes discussions of several classes of boundary-value problems which can be treated without the assumption of high-speed flow. Particular attention is given to flow of non-ideal materials, slow-flow approximations, and lubrication theory. Research engineers will appreciate the inclusion of a bibliography at the end of each chapter that gives a brief review comment on each entry.

Ready in February, approx. 250 pages, prob. $8.95

BIOASTRONAUTICS

Edited by **Karl E. Schaefer,** United States Naval Medical Research Laboratory, New London, Connecticut

The papers in this unique study center on the physiological and psychological problems of man in space. The book is divided into four sections, each based upon the latest experimental data, covering physiological problems of space flight, space flight operations, technological aspects of man-machine systems, and visual perception in space. It contains a new approach to visual space perception by Von Schelling and an informative foreword by Orr Reynolds, Director of Bio-science Programs for NASA.

Ready in February, approx. 350 pages, prob. $15.00

ULTRAPURIFICATION OF SEMICONDUCTOR MATERIALS

Edited by **Marvin S. Brooks** and **John K. Kennedey,** United States Air Force Electronics Research Directorate

The forty-nine papers in this volume present up-to-date material on the synthesis, purification, analysis, and physical chemistry of elemental and compound semiconductors. In addition to assessing inorganic synthesis methods for obtaining high purity metals, the book shows potential applications for gas liquid chromatography as a technique for purification. There is a survey of the capabilities and limitations of current methods for the analysis of trace impurities, and suggestions for the application of mass spectrometry, X-ray diffraction microscopy, and other techniques to that purpose. The most recent studies on the parameters important to the zoning technique and the latest research in physical chemistry are also discussed. *1962, 660 pages, $12.50*

ELEMENTARY INFRARED SPECTROSCOPY

By **Clifton H. Meloan,** Kansas State University

A non-mathematical presentation for those with no previous background in spectroscopy, this book offers a concise analysis of the capabilities and limitations of infrared instrumentation. Following a brief history of the process, Professor Meloan describes the basic equipment, including sources, cells, monochromators, and detectors, and he acquaints the reader with standard terminology. He shows where infrared fits into the electromagnetic spectrum and gives examples of the interconversion of units of energy and wave length. Discussions that judiciously combine theory, techniques, and practical applications are illustrated by interpretations of sample spectra. *1963, 192 pages, $8.95*

A MANUAL OF EXPERIMENTS IN REACTOR PHYSICS

Edited by **Frank A. Valente,** Rensselaer Polytechnic Institute

This valuable manual provides an orderly compilation of the basic theoretical and practical information immediately applicable to reactor experimentation. It also supplies a complete set of experiments that are suitable for assemblies both with and without pulsable sources of neutrons. Chapters on radioactivity, instrumentation, pulse techniques, and health physics are included in this introductory section to serve as a basis for experimentation. Pertinent theory is discussed with the experiments.

1963, 335 pages, $7.50

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lattices; (3) Atoms, molecules, and fluids; (4) Quantum mechanics; (5) Field theory; and (6) Commemorations. The books of the author, many of which are popular among physicists, are not included in the collection. The papers are reproduced by offset from the original publications, and presented in an excellent typographical form.

In the great wealth of memorable results presented, Section 4 on quantum mechanics stands out. We can follow here all the excitement of the discovery of matrix mechanics, initiated by Heisenberg and developed to a large extent by the Göttingen Group of which Born was the senior and mathematically most sophisticated member. We find here also the memorable papers on collision theory which contributed fundamentally to the interpretation of Schrödinger's "field scalar ψ." Incidentally, Born's method of approximation has also become, thanks to its simplicity, one of the most popular in practical calculations and has a practically unlimited number of applications. Second in importance is the group on lattice theory, one of the foundations of solid-state physics.

Many of the papers contained in this book are familiar in their original form to middle-aged physicists. The younger generation will have learned their contents from textbooks because most of them have been absorbed in the standard physics books. The historian will be grateful for this beautiful collection reflecting the work of one of the important scientists of our century.

Radiation and Optics. An Introduction to the Classical Theory. By John M. Stone. 544 pp. McGraw-Hill, New York, 1963. $11.75.

Reviewed by ***W. T. Wintringham****, Bell Telephone Laboratories, Incorporated.*

All too often an author's style in the text of a book intended for classroom use reveals his low regard for the intelligence of his students. The rare exception, of which *Radiation and Optics* is an example, through its organization and by the author's choice of language, displays high esteem for the competence of the classes to which the text is directed.

Despite the fact that Dr. Stone's text is intended for undergraduate students, he has written an advanced and comprehensive book on physical optics. Following material which might be considered either as brief reviews of, or introductory texts on, vector analysis and the complex representation of sinusoidal oscillations and waves, the book contains a derivation of Maxwell's equations, and their application to the calculation of the field produced by an infinitesimal dipole radiator in a uniform isotropic medium. This leads logically to consideration of the subject of diffraction. At this point Dr. Stone introduces the Fourier integral and the Fourier transform and illustrates the application of these powerful tools to problems of diffraction and of imaging.

By another logical step, the author takes up the spectrum of radiation from Lorentz atoms, spectrographs, coherence, and interferometry. In an orderly fashion, Dr. Stone then treats scattering and the related problems of waves incident on crystal lattices, etc.

Following a development of the *macroscopic* Maxwell theory, the student finds himself prepared to study boundary problems and the optical performance of doubly refractive materials. This leads naturally and inevitably to a treatment of electro- and magneto-optics. A discussion of the quantum theory as distinct from the classical theory of atomic behavior brings the book to a close.

Each chapter in Dr. Stone's text includes a number of well-chosen problems. There are five appendices, in which are presented detailed derivations of the more difficult matters discussed within the text proper. In many places Dr. Stone directs the student to the literature on the topic under discussion. A bibliography of 104 items serves as a guide to this extension of the text.

It should be evident that this reviewer has found *Radiation and Optics* to be a capable and scholarly presentation of physical optics. He was so well impressed with Dr. Stone's text that one minor flaw came as a distinct shock. In his discussion of the *Faraday effect,* Dr. Stone presents the equation for optical rotation as the product of the Verdet constant, the strength of the magnetic field, and the