Martin A. Uman, who is continuing his research on long laboratory sparks at the Westinghouse Research Laboratories, has carefully analyzed all the modern work and has referenced his chapters with a very full bibliography. The book is also made pleasant reading by a carefully selected background survey of each subject, including pertinent epigraphs from relevant historical sources.

The treatment of the subject is mainly by diagnostic technique. This is varied only by an introductory chapter that defines subject matter and terms and a final chapter presenting the various theories of the discharge processes. The author has therefore grouped various classes of experiments together and provides the reader with a logical and constructive way of understanding sometimes conflicting reports.

In anticipation of another edition, Uman offers himself as a clearinghouse for unpublished as well as published reports on lightning. He also suggests for each diagnostic technique what, in his opinion, further work using these particular techniques should be. Because our understanding of the subject is still so incomplete, it is satisfying to look forward to sequels of this book as more information about the subject matter unfolds.

SANBORN C. BROWN
Professor of Physics
Massachusetts Institute of Technology

Electron Optics

By Bohdan Paszkowski
305 pp. American Elsevier, New York, 1969. $13.00

The first book on electron optics appeared in Germany in 1934. In the intervening 35 years many books have been published on the subject in many different languages. But quality is uneven; some of them are very good, others are not. The English-language literature possesses some of the best ones, yet the same can not be said of B. Paszkowski's book. Under these conditions I fail to understand why this book has been translated into English and published.

The author states in the preface: "The material . . . grew out of lectures given . . . over a decade . . . for students in the Electronics Faculty, Warsaw Technical University." The

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Publications in Physics

MODERN DIFFRACTION AND IMAGING TECHNIQUES IN MATERIALS SCIENCE
Proceedings of the International Summer Course on Materials Science, held at the University of Antwerp, July–August, 1969
Edited by S. Amelinckx, R. Gevers, G. Remaut, and J. van Landuyt, *State University of Antwerp, Belgium*
1970. Approx. 730 pages. $34.50
Diffraction and imaging techniques have developed in recent years into indispensable tools for the study of structural and topographical properties of materials. This book provides a survey in parallel of the different techniques and of the theories required for a detailed interpretation of the experimental results.

STUDIES IN STATISTICAL MECHANICS, Volume 5
Edited by J. de Boer, *University of Amsterdam, The Netherlands*, and G. E. Uhlenbeck, *The Rockefeller Institute, New York*
1970. Approx. 218 pages. $13.75
Part I contains five reports on the kinetic theory of gases.
Part II is devoted to a study of the theory of the propagation of sound in mono-atomic gases.
CONTRIBUTERS: J. Foch, G. W. Ford, G. E. Uhlenbeck, C. S. Wang Chang.

NUCLEAR REACTIONS INDUCED BY HEAVY IONS
Proceedings of the International Conference on Nuclear Reactions Induced by Heavy Ions
Edited by R. Bock and W. R. Hering, *Max-Planck-Institut für Kernphysik, Heidelberg, Germany*
1970. 840 pages. $34.75
The book includes 35 invited papers and reports and 69 contributed papers.
CONTENTS: Elastic Scattering. Transfer Reactions I. Transfer Reactions II. Cluster Structure. Coulomb Excitation. State of Heavy Ion Accelerator Projects. Compound Nuclear Reactions. Open Problems.

METHODS AND PROBLEMS OF THEORETICAL PHYSICS
In Honor of R. E. Peierls
Edited by J. E. Bowcock, *University of Birmingham, United Kingdom*
1970. 450 pages. $21.75
CONTENTS: Statistical Physics and Changes of State. Excitations and Reactions. Elementary Particle and Field Theoretical Methods. Nuclear Models and Many-Body Theory. Symmetries, Groups and Algebras. Concluding Lecture. Author Index.

FIELD-ION MICROSCOPY
By K. M. Bowkett, *University of Cambridge*, and D. A. Smith, *University of Oxford, United Kingdom*
1970. 267 pages. $17.25
In this fully illustrated volume the principles, design, and operation of this important piece of apparatus are described and its varied applications treated in detail. Particular attention is given to information which can be obtained only by means of the field-ion microscope. The difficult problem of image interpretation is covered thoroughly, and sufficient information is provided to enable the reader to analyze field-ion micrographs without previous experience.
Defects in Crystalline Solids, Volume 2

STATISTICAL AND COMPUTATIONAL METHODS IN DATA ANALYSIS
By S. Brandt, *Institute of High Energy Physics, Heidelberg University, Germany*
1970. 335 pages. $16.50
A significant feature of this book is the mature treatment of the material which makes it suitable not only for students and research workers faced with the problem of evaluating experimental data, but also for such professional scientists as physicists, mathematicians, engineers, and economists. Mathematical rigor is not overstressed, but the concepts and principles of the statistical methods are explained.

PROGRESS IN LOW TEMPERATURE PHYSICS, Volume 6
Edited by C. J. Gorter, *Kamerlingh Onnes Laboratory, Leiden, The Netherlands*
1970. 450 pages. $23.00
CONTENTS: Intrinsic Critical Velocities in Super-Fluid Helium. Third Sound. Experimental Properties of Pure He^3 and Dilute Solutions of He^3 in Super-Fluid He^4 at Very Low Temperatures: Application to Dilution Refrigeration. Pressure Effects in Superconductors. Superconductivity in Semiconductors and Semimetals. Superconducting Point Contacts Weakly Connecting Two Superconductors. Superconductivity Above the Transition Temperature. Critical Behaviour in Magnetic Crystals. Diffusion and Relaxation of Nuclear Spins in Crystals Containing Paramagnetic Impurities. The International Practical Temperature Scale of 1968.

NUCLEAR MODELS
Collective and Single-Particle Phenomena
By J. M. Eisenberg, *University of Virginia, Charlottesville*, and W. Greiner, *J. W. Goethe Universitat, Frankfurt, Germany*
1970. Approx. 480 pages. $23.00
CONTENTS: Introduction. Varieties of Collective Motion. Collective Coordinates. The Structure of the Nuclear Hamiltonian. The Collective Potential Energy Surface. Quantum Mechanics of the Rotator. The Rotation-Vibration Model. The Asymmetric Rotator Model (ARM). Single-Particle Models. The Deformed Shell Model–The Unified Model. Nuclear Hydrodynamics. The Dynamic Collective Model for Deformed Nuclei. The Application of Nuclear Models to Heavy Ion Scattering. Appendices, References. Subject Index.
Nuclear Theory series, in three volumes, Volume 1
Excitation Mechanisms of the Nucleus, Volume 2, published 1970
Microscopic Theory of the Nucleus, Volume 3, in preparation

PAUL EHRENFEST
Volume 1: The Making of a Theoretical Physicist
By M. J. Klein, *Yale University, New Haven, Connecticut*
1970. 346 pages. $9.50
This is the first volume of a study of Paul Ehrenfest's life and work. The book conveys the exceptional qualities of this great physicist and teacher who played a unique and essential role in the revolutionary developments of twentieth century physics.

PULSED HIGH MAGNETIC FIELDS
By H. Knoepfel, *Laboratorio Gas Ionizzati (EURATOM-CNEN), Frascati, Italy*
1970. Approx. 400 pages. $23.00
Presents for the first time a comprehensive treatment of the problems connected with the generation and application of transient magnetic fields ranging from the kilo-oersted to the multi-mega-oersted level with a pulse length of typically less than 0.1 sec.

INTRODUCTION TO THE THEORY OF ION-ATOM COLLISIONS
By M. R. C. McDowell and J. P. Coleman, *University of Durham, United Kingdom*
1970. 450 pages. $25.75
The first text on the theory of scattering directed specifically toward *ion-atom (and atom-atom) scattering*. All of the major theoretical methods employed in studying the collisions of positive ions are presented; the applications of the most important are illustrated by showing a particular reaction in detail. The approach is critical, and an attempt is made, where appropriate, to assess the success and validity of current methods.

THE ELECTRODYNAMICS OF MAGNETO-ELECTRIC MEDIA
By T. H. O'Dell, *Imperial College, University of London, United Kingdom*
1970. 320 pages. $19.25
CONTENTS: Preface. Historical Survey of the Magneto-Electric Effect. The Electrodynamics of Magneto-Electric Media. Moving Media. The Magneto-Electric Properties of Magnetic Crystals. The Measurement of Magneto-Electric Susceptibility. The Theory of the Magneto-Electric Effect in Magnetic Crystals. Appendices. Author and Subject Indices.
Selected Topics in Solid State Physics, Volume 11

ATOMIC COLLISION PHENOMENA IN SOLIDS
Proceedings of the International Conference on Atomic Collision Phenomena in Solids, Brighton, Sussex, September, 1969
Edited by D. W. Palmer, M. W. Thompson, and P. D. Townsend, *University of Sussex, Brighton, United Kingdom*
1970. 706 pages. $32.00
Contains the complete texts of some 40 papers and summaries of a further 20, delivered by acknowledged experts from nearly every major scientific country at this truly international conference. Topics include dynamic aspects of particle bombardment of solids, such as interatomic potentials, sputtering, penetration and ranges, energy loss, channeling, scattering, secondary particle emission, photon emission, and displacement thresholds.

PROGRESS IN OPTICS, Volume 8
Edited by E. Wolf, *University of Rochester, New York*
1970. Approx. 460 pages. $24.00
CONTENTS: Synthetic-Aperture Optics (J. W. Goodman). The Optical Performance of the Human Eye (G. A. Fry). Light Beating Spectroscopy (H. Z. Cummings, H. L. Swinney). Multilayer Antireflection Coatings (A. Musset, A. Thelen). Statistical Properties of Laser Light (H. Risken). Coherence Theory of Source-Size Compensation in Interference Microscopy (T. Yamamoto). Vision in Communication (L. Levi). Theory of Photoelectron Counting (C. L. Mehta).

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book is essentially a compilation of the most important tools (analytical, experimental, analog) needed by the designer of electron-optical devices. No doubt quite a bit of the material has considerable didactic value, although put together in a somewhat pedestrian way.

It also contains material that, in my opinion, should be omitted from a modern text. For instance, in the discussion of the methods used for the determination of electrostatic-field distributions, ten pages are devoted to what the author calls the "Liebmann" method. This is a numerical iterative process, invented in 1918 by H. Liebmann (no relation to the better known G. Liebmann), that is, in a manner of speech, a forerunner of Brian Southwell's relaxation technique. If sufficient time is devoted to the solving of the problem on hand, the accuracy is reasonably good. It is doubtful, however, that in most laboratories, where more advanced means are available (digital or analog computers, electrolytic tanks or conducting paper) that anybody would be able to find the time necessary for applications of this method.

The description of many other older techniques dominates the book. Ample references are given, with the center of gravity in the 1930's and 1940's. No references appear with a later date than 1965 and even those are rather scarce. According to the blurb on the jacket, the Polish original appeared in 1960.

I can not, in good conscience, recommend it as a textbook, partly because better ones are available and partly because of its price.

LADISLAUS MARTON
National Bureau of Standards

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CONFERENCE PROCEEDINGS

Thermal Neutron Diffraction. (Conf. Proc. of the International Summer School on the Accurate Determination of Neutron Intensities and Structure Factors, Harwell, 1–5 July 1968.) B. T. M. Willis, ed. 229 pp. Oxford U. P., New York, 1970. $10.40

Space Engineering. (Conf. Proc. of 2nd International Conference on Space Engineering, Venice, 7–10 May 1969.) G. A. Partel, ed. 728 pp. Springer-Verlag, New York, 1970. $36.00

The Science, Technology and Application of Titanium. (Conf. Proc. of International Conference on Titanium, London, 21–24 May 1968.) R. I. Jaffee, N. E. Promisel, eds. 1202 pp. Pergamon, New York, 1970. $48.00

ELEMENTARY PARTICLES

Unitary Symmetry and Elementary Particles. By D. B. Lichtenberg. 246 pp. Academic, New York, 1970. $13.00

NUCLEI

Progress in Nuclear Physics, Vol. 11. D. M. Brink, J. H. Mulvey, eds. 320 pp. Pergamon, New York, 1970. $19.00

Progress in Nuclear Physics, Vol. 12, Part 1. D. M. Brink, J. H. Mulvey, eds. 75 pp. Pergamon, New York, 1970. $3.40

Correction: July, page 71—The price of *Essays in the History of Mechanics* by C. Truesdell is $19.50 instead of *cloth $4.95; paper $1.45.*

ATOMS, MOLECULES, CHEMICAL PHYSICS

Progress in Nuclear Magnetic Resonance Spectroscopy, Vol. 5. J. W. Emsley, J. Feeney, L. H. Sutcliffe, eds. 406 pp. Pergamon, New York, 1969. $18.50

Introduction to the Theory of Ion-Atom Collisions. By M. R. C. McDowell, J. P. Coleman. 442 pp. American Elsevier, New York, 1970. $27.75

Advances in Chemical Physics, Vols. 17, 18. I. Prigogine, S. Rice, eds. 284 pp. and 321 pp. Interscience, New York, 1970. $18.95 and $19.95

ACOUSTICS

Acoustical Holography, Vol. 2. A. F. Metherell, L. Larmore, eds. 376 pp. Plenum, New York, 1970. $22.50

ELECTRICITY AND MAGNETISM

The Electrodynamics of Magneto-Electric Media. By T. H. O'Dell. 304 pp. American Elsevier (North-Holland), New York, 1970. $19.25

An Introduction to the Phenomenological Theory of Ferroelectricity. By J. Grindlay. 255 pp. Pergamon, New York, 1970. $10.50

International Series of Monographs in Electromagnetic Waves, Vol. 3: Electromagnetic Waves in Stratified Media. By J. R. Wait. (2nd edition) 608 pp. Pergamon, New York, 1970. $21.50

FLUIDS, PLASMAS

Reviews of Plasma Physics, Vol. 5. M. A. Leontovich, ed. (Trans. from Russian) 525 pp. Plenum, New York, 1970. $25.00

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