

"the scientific and aesthetic views of nature, their possible conflicts, and their connection to religious belief." One of the most attractive features of this biography is that the author not only gives admirable critical accounts of Hamilton's individual scientific achievements, but he also provides succinct presentations of the historical backgrounds so that the reader can see the significance of Hamilton's own contributions. In addition, he traces some main topics up to the twentieth century, such as the principle of least action and the development of quantum mechanics. Furthermore, Hankins provides valuable information on such ancillary topics as the organization of science (Hamilton was a founding member of the British Association for the Advancement of Science), scientific education, science and philosophy (and religion), and scientific creativity. All in all, this is a model of a scientific biography.

I. BERNARD COHEN
Harvard University

Experimental High-Resolution Electron Microscopy

J. C. H. Spence

370 pp. Oxford, U.P., New York, 1981.
\$74.00

This is a very useful little book that contains a great deal of information concerning the use of conventional electron microscopes at high resolution. It neatly summarizes various theoretical results and gives practical examples. In addition, a considerable fraction of the volume is set aside for practical information on setting up and using the microscope.

The book is not for everyone, however. In spite of the title, the primary focus is upon the use of electron microscopes with thin crystalline specimens where diffraction and interference effects predominate. It is of little value to the biologist.

There is a wealth of information included in this volume, but it is not always correct. In fact, it can sometimes be misleading. To quote a couple of examples, in the chapter on electron optics, one reads:

"It can be seen that the lens shown ... is very inefficient, since most of the power dissipated supports a field in the z direction which produces no force on the electron entering parallel to the axis. An octopole lens, while far more efficient, appears to have intractable practical problems associated with accurate alignment." It is difficult to make sense of this remark since octupoles have no first-order focusing properties whatsoever.

Then again, when discussing the

measurement of ac stray fields, Spence writes: "a field can easily be measured with a coil connected to an oscilloscope which will also indicate the important frequency components of the interference. For maximum sensitivity use the largest possible number of turns of very fine wire." This is certainly misleading since the use of a very large number of turns can increase the inductance to the point where 60 Hz would not be detected at all.

In spite of these deficiencies, I can recommend the book to those interested in crystalline specimens who want to get the most out of their instruments.

ALBERT V. CREWE
University of Chicago
Enrico Fermi Institute

Electrons at the Fermi Surface

M. Springford, ed.

556 pp. Cambridge U. P., New York, 1980.
\$85.00

This book, written in honor of David Shoenberg of Cambridge University, contains articles on subjects ranging from Shoenberg's specialty, the de Haas-van Alphen effect, to general principles of electrons in metals and provides interesting accounts of the current understanding of properties of metals involving the Fermi surface.

In the part of the book dealing with general principles, the first chapter, I. M. Lifshitz and M. I. Kaganov explain the semiclassical approach to electron motion and describe the different electron orbits used in determining the shape and topology of the Fermi surfaces of metals. It is an excellent review that will be useful to those who feel that there is some mystery involved in the "Fermiology" of metals. The second chapter, by John Wilkins, surveys the understanding of many-body effects in metals and He^3 and demonstrates how fermion excitation can be conceived as nearly independent. It provides a very readable account of many-body effects present in a number of phenomena without overemphasizing formalisms and mathematical detail. This article is highly recommended for required supplementary reading for students learning about formal many-body theory.

The third chapter presents R. G. Chambers' clear treatment of the Boltzmann equation and its application to the path-integral method of calculating transport properties of metals. Unfortunately, no description of recent uses of the theory is included.

The first article dealing primarily with the de Haas-van Alphen effect, by A. B. Pippard, is of general interest to solid-state readers because it discusses

the cooperative effect of magnetic interaction, which mean-field theory can explain. (The mean magnetization field in the de Haas-van Alphen effect is not \mathbf{H} but \mathbf{B} .)

Three articles on Fermi surface studies of transition metals, itinerant-electron ferromagnets and the effect of strain on the Fermi surface bring theory and experiment together to provide critical reviews; they will serve as excellent references. These articles will be favored by research workers but disappoint those seeking introductory presentations.

The last four articles concern particular aspects of the de Haas-van Alphen effect. Written for experimentalists, they show the wealth of information, on topics from Fermi surface topology to many-body effects, that this effect can yield.

This book will be of value to researchers studying the electron properties of metals experimentally and theoretically. It is useful companion to a 1968 book, *Electrons in Metals*, edited by J. F. Cochran and R. R. Heering, and A. P. Cracknell's monograph *The Fermi Surface of Metals*. Parts of the book also provide good background and excellent supplementary reading for students taking solid-state physics courses.

W. R. DATARS
McMaster University
Hamilton, Ontario

new books

Theory and Mathematical Physics

Uniform Numerical Methods for Problems with Initial and Boundary Layers. E. P. Doolan, J. J. H. Miller, W. H. A. Schilders. 324 pp. Boole, Dublin, 1980. \$60.00

Mécanique de l'Ingénieur II. Milieux Déformables. Y. Bamberger. 289 pp. Hermann, Paris, 1981. 96F

Theory of Nonlinear Lattices. M. Toda. 203 pp. Springer, New York, 1981. \$35.00

Global Lorentzian Geometry. J. K. Beem, P. E. Ehrlich. 460 pp. Dekker, New York, 1981. \$45.00

Current Issues in Quantum Logic. Workshop, Erice, 1979. E. Beltrametti, B. C. van Fraassen, eds. 492 pp. Plenum, New York, 1981. \$59.50

Lectures on Geometric Methods in Mathematics Physics. J. E. Marsden. 97 pp. Society for Industrial and Applied Mathematics, Philadelphia, 1981. \$12.50

Computer Simulation Using Particles. R. W. Hockney, J. W. Eastwood. 540 pp. McGraw-Hill, New York, 1981. \$49.50

Selected Papers on Gauge Theory of Weak and Electromagnetic Interactions. C. H. Lai, ed. 450 pp. World Scientific, Singapore, 1981. no price stated

Introduction to Nonlinear Oscillations. R. E. Mickens. 224 pp. Cambridge, New York, 1981. \$69.00

The Mathematical Theory of Wave Motion. G. R. Baldock, T. Bridgeman. 261 pp. Wiley, New York, 1981. \$64.95

Elements of Algebra and Algebraic Computing. J. D. Lipson. 342 pp. Addison-Wesley, Reading, Mass., 1981. \$34.50

Mean-Field Magnetohydrodynamics and Dynamo Theory. F. Krause, K. H. Rädler. 271 pp. Pergamon, New York, 1981. \$36.00

Nonlinear Differential Equations in Abstract Spaces. V. Lakshmikantham, S. Leela. 258 pp. Pergamon, New York, 1981. \$45.00

Catastrophe Theory for Scientists and Engineers. R. Gilmore. 665 pp. Wiley, New York, 1981. \$45.95

To Fulfill a Vision: Jerusalem Einstein Centennial Symposium on Gauge Theories and Unification of Physical Forces. Y. Ne'eman, ed. 279 pp. Addison-Wesley, Reading, Mass., 1981. \$39.50

The Inertia of the Vacuum. D. R. McGregor. 69 pp. Exposition, Smithtown, N. Y., 1981. \$6.00

Engineering Calculation Methods for Turbulent Flow. P. Bradshaw, T. Cebeci, J. H. Whitelaw. 332 pp. Academic, New York, 1981. \$45.00

Geometry of the Time-Dependent Variational Principle in Quantum Mechanics. P. Kramer, M. Saraceno. 98 pp. Springer, New York, 1981. \$9.80

Atomic, Molecular and Chemical Physics

Inelastic Particle-Surface Collisions. Proceedings of the Third International Workshop on Inelastic Ion-Surface Collisions, Feldkirchen-Westerham, 1980. E. Taglauer, W. Heiland, eds. 329 pp. Springer, New York, 1981. \$29.80

The Excited State in Chemical Physics, Part II. J. W. McGowan, ed. 609 pp. Wiley, New York, 1981. \$60.00

Theoretical Chemistry: Theory of Scattering: Papers in Honor of Henry Eyring, Vol. 6, Part A. D. Henderson, ed. 299 pp. Academic, New York, 1981. \$45.00

Spectral Line Shapes. Proceedings, Fifth International Conference, Berlin, 1980. B. Wende, ed. 1200 pp. de Gruyter, New York, 1981. \$135.90

Picosecond Phenomena II. Proceedings of the Second International Conference on Picosecond Phenomena, Cape Cod, 1980. R. Hochstrasser, W. Kaiser, C. V. Shank, eds. 382 pp. Springer, New York, 1981. \$38.00

Lasers in Chemical Analysis. G. M. Hieftje, J. C. Travis, F. E. Lytle, eds. 310 pp. Humana, Clifton, N. J., 1981. \$39.50

Comprehensive Treatise of Electrochemistry, Vol. 2. Electrochemical Processing. J. O'M. Bockris, B. E. Conway, E. Yeager, R. E. White, eds. 616 pp. Plenum, New York, 1981. \$57.50

Spin-Orbit Coupling in Molecules. W. G. Richards, H. P. Trivedi, D. L. Cooper. 105 pp. Oxford U. P., New York, 1981. \$29.95

Boundary and Interior Layers: Computational and Asymptotic Methods. Proceedings of a Conference, Dublin, 1980. J. J. H. Miller, ed. Boole, Dublin, 1980. \$60.00

Ultrafast Phenomena in Spectroscopy. Vols. 1 & 2. 192 pp., 541 pp. Physikalische Gesellschaft der DDR, Jena, DDR, 1980. price not stated.

Atomic Physics. Vol. 7. D. Kleppner, F. M. Pipkin, eds. 573 pp. Plenum, New York, 1981. \$69.50

Proceedings of China-US Bilateral Symposium on Polymer Chemistry and Physics, 1979, Beijing. 434 pp. Science, Beijing, 1981 (US dist.: Van Nostrand, New York, 1981). \$32.50

Principles of Polymer Morphology. D. C. Bassett. 242 pp. Cambridge U. P., New York, 1981. \$55.00 cloth, \$19.95 paper



SABEL 81MC
fully expandable
to 1000 channels
built-in ECMA-34
cassette drive

SABEL 85MC
50-channel
capacity
Low cost

**Where there are no power mains...
When power fails...
The SABEL* System keeps on logging.**

Equally at home installed in factory or laboratory or used in the field far from power lines, SABEL system dataloggers operate either on 117-volt AC or on their built-in, automatically recharged battery system.

SABEL Model 85MC, highly price competitive, accommodates as many as 50 channels of analog or digital input. Model 81MC is expandable to 1,000 channels and incorporates a cassette recorder for program or data storage.

Both models are controlled by an embedded programmed microprocessor and provide complete signal conversion for thermocouples, RTD's, industrial transmitters and nearly all other sensors encountered in instrumentation systems.

For full details, Consolidated Controls Corporation, Bethel, Connecticut 06801, (203) 743-6721

CONDEC

Consolidated Controls

*Stand-Alone, Battery-Energized Logging

Circle No. 51 on Reader Service Card

NEW TECHNOLOGY REDUCES PRICES 33% ON STREAK CAMERAS NOW ONLY \$26,750



Now industrial and university laboratories can afford Hamamatsu cameras for time resolved spectroscopy and other fast kinetics research.

New manufacturing technology and increased production volume has permitted a 33% price reduction on fast and slow Temporaldisperser® Streak Cameras. These are the same precise, dependable cameras that have been consistently chosen over the competition in comparative performance tests.

Each Hamamatsu streak camera features a streak tube with a built-in microchannel plate for weak signal

amplification of greater than 3×10^3 . Since no external image intensifier is needed, the camera is dependable, compact and easy to use. Precise shot-to-shot reproducibility is better than 95%.

Your industrial or university R & D laboratory now can afford a streak camera, or an entire system, for fast kinetics research. With the entire Temporaldisperser® System, you'll be able to see results as they happen in the 3 dimensions of intensity vs. time vs. position.

For immediate information about these versatile and affordable streak cameras and systems, call for a demonstration in our Fast Kinetics Applications Laboratory. Or write for our new brochure and price lists.

CALL OR WRITE FOR NEW BROCHURE

HAMAMATSU

HAMAMATSU CORPORATION • 420 SOUTH AVENUE • MIDDLESEX, NEW JERSEY 08846 • PHONE: (201) 469-6640

International Offices in Major Countries of Europe and Asia.

Booth #45—Plasma/Fusion Show

Circle No. 52 on Reader Service Card

**Astronomy, Cosmology
and Space Physics**

Observing Visual Double Stars. P. Cou-teau. 257 pp. MIT P., Cambridge, Mass., 1981. \$19.95

Galactic Astronomy: Structure and Kinematics. Second Edition. D. Mihalas, J. Binney. 597 pp. Freeman, San Francisco, 1981. \$29.95

High-Energy Astrophysics. Proceedings from COSPAR 23rd Plenary Meeting, Budapest, 1980. Vol 1, No. 13. H. S. Hud-son, ed. 290 pp. Pergamon, New York, 1981. \$37.50

Webb Society Deep-Sky Observer's Handbook. Vol. 4. Galaxies. K. G. Jones, ed. 238 pp. Enslow, Hillside, N. J., 1981. \$15.95

X-Ray Astronomy with the Einstein Sat-ellite. Proceedings of the High-Energy Astrophysics Division of the AAS, Cam-bridge, 1980. R. Giacconi, ed. 330 pp. Reidel, Boston, 1981. \$44.50

Theory of Stellar Pulsation. J. P. Cox. 380 pp. Princeton U. P., Princeton, N. J., 1980. \$40.00 cloth, \$13.50 paper

Solar Flares: A Monograph from Skylab Solar Workshop II. P. A. Sturrock, ed. 513 pp. Colorado Associated U. P., Boulder, Colo., 1980. \$17.95

Solar Flare Magnetohydrodynamics. E. R. Priest, ed. 563 pp. Gordon and Breach, New York, 1981. \$89.50

The Structure and Evolution of Normal Galaxies. NATO Advanced Study Insti-tute, Cambridge, 1980. S. M. Fall, D. Lyn-den-Bell, eds. 272 pp. Cambridge, New York, 1981. \$29.95

Instrumentation and Techniques

Experimental Pulse NMR: A Nuts and Bolts Approach. E. Fukushima, S. B. W. Roeder. 539 pp. Addison-Wesley, Reading, Mass., 1981. \$34.50

Fouling of Heat Transfer Equipment. In-ternational Conference, Troy, 1979. E. F. C. Somerscales, J. G. Knudsen, eds. 743 pp. Hemisphere, New York, 1981. \$75.00

Advances in X-Ray Analysis. Vol. 24. Proceedings of the 29th Annual Confer-ence on Applications of X-Ray Analysis, Denver, 1980. D. K. Smith, C. S. Barrett, D. E. Leyden, P. K. Predecki, eds. 428 pp. Ple-num, New York, 1981. \$49.50

Kryo-Vakuumtechnik: Grundlagen und Anwendungen. R. A. Haefer. 313 pp. Springer, New York, 1981. \$46.70

Optoelectronics. R. G. Seippel. 354 pp. Prentice-Hall, Englewood Cliffs, N. J., 1981. \$21.95

Tube Type Dilatometers. Applications from Cryogenic to Elevated Tempera-tures. J. Valentich. 211 pp. Instrument Soci-ety of America, Research Triangle Park, N. C., 1981. \$35.00

Spaceborne Synthetic Aperture Radar for Oceanography. R. C. Beal, P. S. De-Leonibus, I. Katz, eds. 215 pp. Johns Hop-kins U. P., Baltimore, 1981. \$19.50

Electronics and Instrumentation for Sci-entists. H. V. Malmstadt, C. G. Enke, S. R. Crouch. 543 pp. Benjamin/Cummings, Reading, Mass., 1981. \$24.95

Mossbauer Spectroscopy II: The Exotic Side of the Method. U. Gonser, ed. 196 pp. Springer, New York, 1981. \$29.80

**Student Texts and
Popularizations**

Comets. J. C. Brandt. 92 pp. Freeman, San Francisco, 1981. no price stated

Daytime Star: The Story of Our Sun. S. Mitton. 191 pp. Scribner's, New York, 1981. \$14.95

Astronomie: Methodes et Calculs. A. Acker, C. Jaschek. 210 pp. Masson, New York, 1981. \$24.00

La Représentation des Phénomènes Physiques: Les Opérateurs Vectoriels Appliqués à la Physique. B. Grossetête. L. Pastor, A. Zeitoun-Fakiris. 152 pp. Masson, New York, 1981. \$22.50

Physics. D. C. Giancoli. 805 pp. Prentice-Hall, Englewood Cliffs, N. J., 1981. \$24.95

KLINGER

The Affordable Positioning Solution

**Liberate Tight Budgets With New Savings On
Klinger's Precision Stages. . . Standards of Excellence**



frames facilitate easy mating. There are 25 **Type MR Translation Stages** which have 5 to 75 kg load carrying capacities and 1mm to 80mm travel ranges, depending on model. Sensitivity is 1 μ m. Differential equipped models have 0.1 μ m sensitivity. **Type TR Rotation Stages** are offered in 14 models with load carrying capacities from 10 to 80 kg, depending on size. Each features Klinger's world famous durability and close tolerance quality design. Each is

Translation . . . Rotation . . . Vertical Motion . . . these linear, ball-bearing equipped positioners offer second-to-none accuracy and durability at competitive prices. Micrometer control assures accurate positioning. Spring-loaded carriages and pre-loaded ball bearings guarantee zero backlash and play. Ball races are made of hardened (63Rc) tool steel. Pre-drilled stainless steel mounting



rotatable over a 360° range and has a fine reading Vernier scale - 0.5 to 1 min. of arc, based on module size. Fine adjustment range is $\pm 2^\circ$. **Type MV Vertical Motion Stages** are offered in 3 models, with 40 to 190 kg load carrying capacities and 8mm to 20mm travel ranges, depending upon module. For these, a single unit micrometer reading corresponds to a vertical displacement of 5 μ m. Klinger also offers other manually driven positioning devices. OEM quantity prices are available.

For a complete selection of our manual and motorized positioners send for Catalog 481 on your corporate letterhead—or call (212) 846-3700 for details.



110-20 Jamaica Avenue
Richmond Hill, NY 11418 (212) 846-3700

In Canada: Optikon Corporation Ltd.
410 Conestogo Rd.
Waterloo, Ontario N2L 4E2 (519) 885-2251

Booth #21 — Plasma/Fusion Show
Circle No. 53 on Reader Service Card

NORTH-HOLLAND ANNOUNCES

NORTH-HOLLAND PUBLISHING COMPANY

52 Vanderbilt Ave., New York, N.Y. 10017 / P.O. Box 211, 1000 AE Amsterdam, The Netherlands

Statistical Mechanics of Quarks and Hadrons

Proceedings of an International Symposium held at the University of Bielefeld, F.R.G., August 24-31, 1980

edited by HELMUT SATZ, *Fakultät für Physik, Universität Bielefeld, F.R.G.*

1981 xii + 480 pages

Price: US \$68.00/Dfl. 160.00

ISBN 0-444-86227-7

The aim of this international symposium was to bring together theorists working on various aspects and problems of quantum-chromodynamic and quantum-electrodynamical systems with many degrees of freedom. The statistical mechanics of strongly interacting systems is at present rapidly gaining interest and importance. It is basic to the study of phase transitions from nuclear to quark matter as well as to many features of the confinement problem. In view of contemplated relativistic heavy ion projects, it may very well also play a fundamental role in future terrestrial experiments. It seems, to the editor, useful to provide more comprehensive information on this subject than is generally found in single articles, even articles of a review character. It is hoped that the proceedings of this symposium may fill this role, since eminent representatives of the various directions, approaches and methods of the field survey here their own and related work. Particularly in the last year or two, progress has been rapid in this area of physics, talks at the symposium were therefore of a more general nature as well as reporting on specific approaches. To facilitate the use of these proceedings, the articles have been grouped into a more general first section followed by further detailed sections on the various directions of research.

CONTENTS: Preface. **I. General Reports and Surveys.** Papers by: T. D. Lee; G. Baym; C. Itzykson; L. McLerran; H. Miyazawa; J. Rafelski. **II. Lattice Studies.** Papers by: F. Green and S. Samuel; G. Munster; J. Poionyi; L. McLerran and B. Svetitsky; B. C. McCoy and T. T. Wu; G. Immirzi; A. Krzywicki. **III. Instantons.** Papers by: R. D. Pisarski; C. Aragão de Carvalho; N. Bilic and D. E. Miller. **IV. Hadrons and Quarks.** Papers by: R. Hagedorn and J. Rafelski; J. Rafelski and R. Hagedorn; P. D. Morley, D. Pursey and S. Williams; S. Kagiya, S. Hirooka, H. Kikukawa and J. Kikukawa; D. E. Miller; K. Redlick and L. Turko. **V. Neutron Stars.** Papers by: P. D. Morely; C.-G. Källman. **VI. Condensation.** Papers by: D. Pottinger; A. B. Migdal; P. T. Landsberg. **VII. Further Aspects.** Papers by: A. D. Linde; J. O. Kapusta; J. Maharana; J. I. Kapusta; H. A. Kastrup; R. Hakim.

Volume 2 in the Series MATERIALS PROCESSING THEORY AND PRACTICES

Impurity Doping Processes in Silicon

edited by FRANKLIN F. Y. WANG, *State University of New York at Stony Brook, Stony Brook, NY, U.S.A.*

1981 viii + 641 pages

Price: US \$119.25/Dfl. 280.00

Sub. Price: US \$101.25/Dfl. 238.00

ISBN 0-444-86095-9

This book introduces to non-experts several important processes of impurity doping in silicon and goes on to discuss the methods of determination of the concentration of dopants in silicon. The conventional method used is the diffusion process, but, since it has been sufficiently covered in many texts, this work describes the double-diffusion method. Ion implantation is currently becoming more useful and is therefore more extensively discussed in this volume, including methods, equipment, source feed materials and the impurity profiles of ion implantation processes. This very comprehensive section on the impurity profiles of implanted ions provides a theoretical background to the profiling method and is useful for all profiling methods regardless of the method of impurity doping. Another method introduced here and also gaining ground, especially in the field of rectifiers, is the neutron transmutation method. Because of its popularity in the integrated circuit processes, the chemical vapour deposition method is covered. Finally, the methods of molecular beam epitaxy whose applications will surely grow in the future, are also covered.

CONTENTS: Introduction to the Series. Preface to volume 2. **Chapters:** 1. Double-Diffusion Processes in Silicon (A. F. W. Willoughby) 2. Ion Implantation Processes in Silicon (J. L. Stone and J. C. Plunkett) 3. Source Feed Materials in Ion Beam Technology (A. Axmann) 4. Growth of Doped Silicon Layers by Molecular Beam Epitaxy (J. E. Bean) 5. Neutron Transmutation Doping of Silicon (B. D. Stone) 6. CVD Doping of Silicon (McDonald Robinson) 7. Concentration Profiles of Diffused Dopants in Silicon (R. B. Fair) 8. Impurity Profile of Implanted Ions in Silicon (H. Macs, W. Vandervorst and R. van Overstraeten) Subject Index.

Current Topics in Materials Science, Volume 7

edited by E. KALDIS, *Laboratorium für Festkörperphysik ETH, Zürich, Switzerland*

1981 about 730 pages

Price: US \$127.75/Dfl. 300.00

Sub. Price: US \$95.75/Dfl. 255.00

ISBN 0-444-86024-x

One of the main fields of current interest in Materials Science is the fundamental aspects and applications of epitaxy. Many reviews in this field concerning theory and applications have been published in this series. In chapter 1 of this volume, a review is presented on the "Fundamental Aspects of Molecular Beam Epitaxy". The authors are among the first scientists to study the epitaxy of important electronic materials under ultra-high vacuum conditions.

In chapter 2, a state of the art review on Thin Film Nucleation and Growth Theories is presented.

In the sequence of large reviews on electronic materials published in this series Prof. W. Hirschwald et al. and M. Grunze et al. add a new chapter. In close collaboration they wrote a review of more than 300 pages describing the most important properties of the electronic material Zinc Oxide (chapter 3 of this volume).

In chapter 4 the authors give a review of the Current State of the Art of Hydrothermal Crystal Synthesis. Another important field for the science of electronic materials is the preparation of thin films by thermal cracking of organometallic compounds. A review on Thin Films from Organometallic Compounds is presented in chapter 5. In chapter 6, the Thermodynamics and Imperfections in Lead Chalcogenides is reviewed. These important, infrared-sensitive materials and particularly their ternary compounds, are the basis of the infrared physics and their applications today.

CONTENTS: Preface. **Chapters:** 1. Fundamental Aspects of Molecular Beam Epitaxy (B. A. Joyce and C. T. Foxon). 2. Thin-Film Nucleation and Growth Theories; a Confrontation with the Experiment (S. Stoyanov and D. Kashchiev). 3. Zinc Oxide, Properties and Behaviour of the Bulk, the Solid/Vacuum and Solid/Gas Interface (W. Hirschwald et al.). 4. Current State of the Art of Hydrothermal Crystal Synthesis (L. N. Demianets and A. N. Lobachev). 5. Thin Films from Organometallic Compounds (L. A. Ryabova). 6. Thermodynamics and Imperfections in LEED Chalcogenides (A. V. Novoselova and V. P. Zlomanov). Subject Index. Materials Index. Cumulative Title Index Vols. 1-7.

Mountains & Man. L. W. Price. 506 pp. U. of California P., Berkeley, 1981. \$35.00

Project Identification: The First Scientific Field Study of UFO Phenomena. H. D. Rutledge. 265 pp. Prentice-Hall, Englewood Cliffs, N. J., 1981. \$10.95

Physics: A General Course. Vol. III. I. V. Savelyev. 318 pp. Imported, Chicago, 1981. \$12.00

Physics for Everyone: Electrons. A. I. Kitaigorodsky. 248 pp. Imported, Chicago, 1981. \$6.60

Optics. Second Edition. W. T. Welford. 150 pp. Oxford U. P., New York, 1981. \$37.50 cloth, \$17.95 paper

Exercices et Problèmes de Mécanique des Milieux Continus. J. Obala. 211 pp. Masson, New York, 1981. \$24.90

Physics: Foundations and Applications. Vol. II. R. M. Eisberg, L. S. Lerner. 829 pp. McGraw-Hill, New York, 1981. \$22.95

Cosmic Discovery: The Search, Scope & Heritage of Astronomy. M. Harwit. 334 pp. Basic Books, New York, 1981. \$25.00

Facets of Light: Colors, Images and Things That Glow in the Dark. K. C. Cole. 169 pp. Exploratorium, San Francisco, 1980. no price stated

Bound for the Stars. S. J. Adelman, B. Adelman. 335 pp. Prentice-Hall, Englewood Cliffs, N. J., 1981.

The Comet is Coming. N. Calder. 160 pp. Viking, New York, 1981. \$12.95

Mathematics Tomorrow. L. A. Steen, ed. 250 pp. Springer, New York, 1981. \$18.00

Voyager: The Story of a Space Mission. M. Poynter, A. L. Lane. 152 pp. Atheneum, New York, 1981. \$9.95

History, Philosophy, Society and Government

The Investigation of the Physical World. G. Toraldo di Francia. 466 pp. Cambridge, New York, 1981. \$59.50 cloth, \$19.95 paper

Dialectics in Modern Physics. M. E. Ome-lyanovsky. 383 pp. Progress, Moscow, 1979 (US dist.: Imported, Chicago, 1981). \$8.25

The Fermenting Universe: Myths of Eternal Change. J. M. Malville. 113 pp. Seabury, New York, 1981. \$6.95

Nuclear War: The Facts on Our Survival. P. Goodwin. 128 pp. Ash and Grant, New York, 1981. \$5.95

MX: Prescription for Disaster. H. Scoville Jr. 231 pp. MIT P., Cambridge, Mass., 1981. \$6.95

The Social Context of Soviet Science. L. L. Lubrano, S. G. Solomon, eds. 240 pp. Westview, Boulder, Colo. 1980. \$24.50

Public Science—Private View. D. W. Budworth. 200 pp. Hilger, Bristol, 1981 (US dist.: Heyden, Philadelphia, 1981). \$24.75 cloth, \$14.75 paper

Born Secret: The H-Bomb, the Progressive Case and National Security. A. DeVolpi, G. E. Marsh, T. A. Postol, G. S. Stanford. 320 pp. Pergamon, New York, 1981. \$17.50

Science at the White House: A Political Liability. E. J. Burger Jr. 180 pp. Johns Hopkins U. P., Baltimore, 1980. \$14.95

Energy and Environment

Nuclear Reactor Safety Heat Transfer. O. C. Jones Jr., ed. 959 pp. McGraw-Hill, New York, 1981. \$99.00

Decay Heat Removal and Natural Convection in Fast Breeder Reactors. A. K. Agrawal, J. G. Guppy, eds. 423 pp. McGraw-Hill, New York, 1981. \$55.00

Photovoltaics: Sunlight to Electricity in One Step. P. D. Maycock, E. N. Stirewalt. 222 pp. Brick House, Andover, Mass., 1981. \$9.95

Energy Policies and Programmes of IEA Countries: 1980 Review. 334 pp. IAE, Paris, 1981. no price stated

Energy in a Finite World: Executive Summary. Report by the Energy Systems Program Group of the IASA. A. McDonald. 68 pp. International Institute for Applied Systems Analysis, Laxenbur, Austria, 1981. no price stated



ISI/ISTP&B™ (Index to Scientific & Technical Proceedings & Books)

ISI/ISTP&B solves the difficult problem of locating articles published in proceedings and multi-authored books. The only multidisciplinary online data base to scientific proceedings and books, it will cover over 10,000 proceedings (from books and journals) which appear in the printed *Index to Scientific & Technical Proceedings*®, plus over 2,000 books (including annual review series). And all items will be indexed at the chapter level. Publications from 1978 to the present will be covered, and each month the items from 300 new proceedings and books will be added.

ISI/ISTP&B may be searched by article title; author/editor; author's corporate affiliation; conference title; location, date; sponsor; book and series title; journal title; publisher; and subject—to name a few. Covering virtually every scientific and technical discipline, ISI/ISTP&B will make your retrospective and current awareness searching, bibliographic verifications, and acquisitions fast, easy, and comprehensive.

ISI/CompuMath™

ISI/CompuMath provides access to the core literature in the fields of mathematics, statistics, computer science, and operations research. Nearly 300 journals and multi-authored books will be covered from 1976 to the present. The user-friendly ISI/CompuMath system will provide users with a unique new search capability—research front specialties. Research front specialty searching permits you to enter a code number (found in the thesaurus) for a highly specific research front, and you'll receive a bibliography of relevant articles which cite the core papers of the specialty.

And ISI/CompuMath is only a part of a comprehensive package of information services for these disciplines. Also included in the ISI/CompuMath subscription are a monthly current awareness edition of *Current Contents*®, which reproduces tables of contents from recently-published journals and books; and an annual index featuring author, subject, and citation indexes.

For more information about these unique new ISI data bases, simply complete the coupon and mail it today.

Please send me your FREE brochure(s) describing:

☐ ISI/ISTP&B™

☐ ISI/CompuMath™

NAME/TITLE

ORGANIZATION/DEPT

ADDRESS

CITY

STATE/PROVINCE

COUNTRY

ZIP/POSTAL CODE

PHONE

ISI®

Institute for Scientific Information®

3501 Market Street, University City Science Center, Philadelphia, Pennsylvania 19104 U.S.A.

Telephone: (215) 386-0100

Circle No. 55 on Reader Service Card

AVS SYMPOSIUM AND SHOW

28th Annual Symposium of the American Vacuum Society

November 3-5, 1981

Disneyland Hotel, Anaheim

EXHIBITORS

(as of 6/1/81)

AIR PRODUCTS & CHEMICALS
AIRCO TEMESCAL
ALCATEL
AMPLIFIER RESEARCH
ATOMIKA
BALZERS
BAY VOLTEX
BI-BRAZE
CERAMASEAL
CHA
CIRCUITS PROCESSING
APPARATUS
COMMONWEALTH SCIENTIFIC
COMPTech
CRAWFORD FITTING
CREST ULTRASONICS
CTI-CRYOGENICS
CVC PRODUCTS
DATAMETRICS
DELTA ULTRA SENSE
DENTON VACUUM
DIDS
DUPONT
DYN-OPTICS
EDWARDS HIGH VACUUM
EG&G PARC
FERROFLUIDICS
GAERTNER SCIENTIFIC
GAST MFG.
GCA/PRECISION SCIENTIFIC
GH SYSTEMS
GENERAL IONEX
GRANVILLE-PHILLIPS
HARRIS MFG.
HELICOFLEX
HIGH VACUUM APPARATUS MFG.
HPS CORP.
HUNTINGTON
INFICON LEYBOLD-HERAEUS
INLAND VACUUM INDUSTRIES
INSTRUMENTS SA
INTERNATIONAL ADVANCED
MATERIALS
ION TECH
JEOL USA
KIMBALL PHYSICS
KRATOS
KURT J. LESKER
LEYBOLD-HERAEUS
R. D. MATHIS
MDC MFG.
MATERIALS BY METRON
MKS INSTRUMENTS
MOLYTEK
NOR-CAL
PERKIN ELMER PEI
PERKIN ELMER VACUUM
PRODUCTS
PHYSICON
PLASMA THERM
POLYCOLD
QUAD GROUP
SAES GETTERS USA
L. M. SIMARD
SLOAN TECHNOLOGY
SPUTTERED FILMS
TECHNICS
TELEDYNE HASTINGS RAYDIST
THERMIONICS LABORATORY
THIN FILM TECHNOLOGY
UHV INSTRUMENTS
ULVAC NORTH AMERICA
UTI
VAC-TEC SYSTEMS
VACOA
VACUUM GENERAL
VACUUM INSTRUMENTS
VACUUM RESEARCH MFG
VARIAN
VEECO
VG INSTRUMENTS
WATKINS-JOHNSON

ELECTRONIC MATERIALS & PROCESSES FILMS SURFACES VACUUMS

AVS National
Symposium,
Anaheim

370 refereed
papers

A "must" meeting
for scientists and
engineers in
semiconductor &
fusion science
& technology

TOPICS INCLUDE:

(tentative)

Electronic Materials and Processing

Epitaxial Growth and Interfacial
Structures
Atomic and Electronic Structure of
Semiconductor Surfaces
Oxide-Semiconductor Interfaces
Schottky Barrier and Silicide
Formation
Microlithography and Device
Processing
Laser and Electron Beam Annealing

Surface Science

Chemisorption and Catalysis
Solid and Solid-Liquid Interfaces
Surface Electronic Structure
Surface Reactions and
Spectroscopic Probes
Surface Vibrational Spectroscopy
Molecule-Surface Interaction
Dynamics

Thin Films

Coatings for Wear Passivation and
Corrosion
Photovoltaics and Energy-Related
Coatings
Film Adhesion and Characterization
Effects of Ion Bombardment
Grain Boundary Processes
Deposition and Etching Processes
for Devices

Vacuum Technology

Pumps and Pumping Fluids
Vacuum Handling of Dangerous
Gases
Vacuum Materials

Fusion Technology

Neutral and Ion Beam Injection
Fueling Plasma and Fusion Devices
Reactor Construction Maintenance
and Diagnostics
Target Fabrication
Inertial Confinement Driver Systems
Systems and Materials for Reactors

Short Courses

Show Hours:

Tuesday	Noon to 7pm
Wednesday	10am to 5pm
Thursday	8am to 2pm

Free Admission to the Show

For more information, contact:
Show manager,
American Institute of Physics
335 East 45, New York, NY 10017

Comprehensive Treatise of Electrochemistry. Vol. 3: Electrochemical Energy Conversion and Storage. J. O'M. Bockris, B. E. Conway, E. Yeager, R. E. White, eds. 540 pp. Plenum, New York, 1981. \$55.00

Geophysics and Planetary Science

Mechanical Behavior of Crustal Rocks. N. L. Carter, M. Friedman, J. M. Logan, D. W. Stearns, eds. 326 pp. American Geophysical Union, Washington, D. C., 1981. No price given

First FGEE Results from Satellites. Proceedings from the COSPAR 23rd Plenary Meeting, Budapest, 1980. Vol. 1, No. 4. T. Tanczer, G. Götz, G. Major, eds. 332 pp. Pergamon, New York, 1981. \$40.00

The Mesosphere and Thermosphere. Proceedings from the COSPAR 23rd Plenary Meeting, Budapest, 1980. Vol. 1, No. 12. G. Schmidtke, K. S. W. Champion, eds. 238 pp. Pergamon, New York, 1981. \$30.00

Sessions on Remote Sensing 1980. Proceedings from the COSPAR 23rd Plenary Meeting, Budapest, 1980. Vol. 1, No. 10. A. B. Kahle, G. Weill, W. D. Carter, eds. 314 pp. Pergamon, New York, 1981. \$40.00

Earthquakes. G. A. Eiby. 209 pp. Van Nostrand, New York, 1980. \$14.95

Materials Science and Condensed Matter

Ferromagnetodynamics: The Dynamics of Magnetic Bubbles, Domains & Domain Walls. T. H. O'Dell. 230 pp. Wiley, New York, 1981. \$54.95

Photoelastic and Electro-Optic Properties of Crystals. T. S. Narasimhamurthy. 514 pp. Plenum, New York, 1981. \$37.50

Magnetic Garnets. Vol. 5. G. Winkler. 735 pp. Vieweg, Braunschweig, 1981. \$76.00

Ternary Superconductors. Proceedings of the International Conference, Lake Geneva, Wisconsin, 1980. G. K. Shenoy, B. D. Dunlap, F. Y. Fradin, eds. 322 pp. North-Holland, New York, 1981. \$49.50

Glassy Metals I: Ionic Structure, Electronic Transport, and Crystallization. H. J. Güntherodt, H. Beck, eds. 267 pp. Springer, New York, 1981. \$39.80

The Electron-Photon Interaction in Metals. Vol. 16. G. Grimvall. 304 pp. North-Holland, New York, 1981. \$61.00

Biological and Medical Physics

Radionuclide Technology: An Introduction to Quantitative Nuclear Medicine. K. F. Chackett. 426 pp. Van Nostrand, New York, 1981. \$17.00 cloth, \$8.50 paper

Life Sciences and Space Research XIX. Proceedings from the COSPAR 23rd Plenary Meeting, Budapest, 1980. Vol. I, No. 14. W. R. Holmquist, ed. 232 pp. Pergamon, New York, 1981. \$29.00

Miscellaneous

A Perspective of Physics. Vol. 4: Selections from 1979 Comments on Modern Physics. S. H. Massey, ed. 349 pp. Gordon and Breach, New York, 1980. \$45.00

Pattern Analysis. H. Niemann. 302 pp. Springer, New York, 1981. \$39.00

The Role of Consciousness in the Physical World. Symposium, 1979 AAAS National Annual Meeting, Texas. 136 pp. Westview, Boulder, Colo., 1981. \$18.50

Catalogue: English Translations of German Standards. Deutsches Institut für Normung, 36 pp. Beuth, Berlin, 1981. price not stated

Exploratorium Cookbook II (A Construction Manual for Exploratorium Exhibits). R. Hipschman. Exploratorium, San Francisco, 1980. price not stated

Antique Scientific Instruments. G. L'E. Turner. 168 pp. Blandford, Dorset, 1980. \$12.95 cloth, \$6.95 paper

Phase facts with X-ray diffraction. Quickly. Accurately.

Total characterization of igneous, sedimentary and metamorphic rocks—critical to a whole array of geological tasks—comes from only one source: X-ray diffraction. Raw data was always easy to come by; extracting useful information was another matter. With the Philips APD 3600 and its wide-ranging interactive software routines, the job of geological characterization has become a lot easier and faster. Now, for example, you can quickly determine what is a peak and what isn't; you can tell whether your compound is crystalline or amorphous through a unique peak-hunting routine. You can utilize mineral subfiles for matching—subfiles developed by you or the JCPDS subfile. You can process samples continuously, store raw data, and analyze earlier runs—all at the same time. You can clean up raw data, remove background intensities, subtract peaks in seconds—all of which helps eliminate confusion and promote accurate sample identification. The Philips APD 3600 is probably one of the best things that has happened to geology in years. It's not just another pretty phase; let us tell you more.

Call or write
Philips Electronic Instruments
85 McKee Drive, Mahwah, N.J. 07430
(201) 529-3800
A North American Philips Company.



Titled "Sky and Water", this work is typical of the genius of M. C. Escher, an early 20th century Dutchman. Escher was also an architect, a mathematician, and an amateur crystallographer. His lifelong concern with the anomalies of nature and matter led him to develop a particular metamorphic approach to his drawings. His was an individual genius; the genius that resides in the Philips APD 3600 is collective, an accumulation of 35 years of experience in the scientific investigation of the anomalies of matter by X-ray diffraction. The differences between these approaches are a lot smaller than you might think.

X-ray, the Philips way —may be your way.



PHILIPS

Circle No. 56 on Reader Service Card