give the reader some insight into the historical processes by which astronomy has reached its present level.

> D. Scott Birney Wellesley College

new books

Optics and Acoustics

Current Trends in Optics. Invited Papers from ICO Meeting, Graz, 1981. F.

Arecchi, F. Aussenegg, eds. 190 pp. Taylor & Francis, New York, 1981. \$34.95

Diffraction Physics: Second Edition. J. Cowley. 430 pp. North-Holland, New York, 1981. \$65.75. second-level text

Volume Holography and Volume Gratings. L. Solymar, D. Cooke. 466 pp. Academic, New York, 1981. \$95.50. second-level text

The Making and Evaluation of Holograms. N. Abramson. 326 pp. Academic, New York, 1981. \$48.00. introductory text

Theory and Mathematical Physics

Numerical Methods in the Study of Critical Phenomena. Proceedings of a Colloquium, Carry-le-Rouet, 1980. J. Della Dora, J. Demongeot, B. Lacolle, eds. 267 pp. Springer, New York, 1981. \$27.50

Gauge Field Theories: An Introduction.
J. Leite Lopes. 484 pp. Pergamon, New
York, 1981. \$37.00. second-level text

Developments in the Theory of Fundamental Interactions: Studies in High Energy Physics. Vol. 3. Winter School, Karpacz, 1980. L. Turko, A. Pekalski, eds. 588 pp. Harwood, New York, 1981. \$52.00

Structure and Approximation in Physical Theories. Colloquium, Osnabrück, 1980. A. Hartkämper, H. Schmidt, eds. Plenum, New York, 1981. \$39.50

Point Group Symmetry Applications: Methods and Tables. P. Butler. 566 pp. Plenum, New York, 1981. \$55.00

Quantum Mechanics in Mathematics, Chemistry, and Physics. Session at American Mathematical Society, Boulder, 1980. K. Gustafson, W. Reinhardt, eds. 506 pp. Plenum, New York, 1981. \$59.50

Mathematical Methods in Engineering and Physics. D. Johnson, J. Johnson. 273 pp. Prentice-Hall, Englewood Cliffs, N. J., 1982. \$28.50. second-level text

Numerical Analysis of Semiconductor Devices and Integrated Circuits. Proceedings, NASECODE 11 Conference, Dublin, 1981. B. Browne, J. Miller, eds. 288 pp. Boole, Dublin, 1981. \$60.00

An Introduction to the Numerical Analysis of Semiconductor Devices and Integrated Circuits. Lecture Notes on Short Course, Dublin, 1981. J. Miller, ed. 75 pp. Boole, Dublin, 1981. \$32.00

Entropy Minimax Sourcebook. Vol. 1. General Description. R. Christensen, 692 pp. Entropy Limited, Lincoln, Mass., 1981. \$39.50

The Science of Space-Time. D. Raine, M. Heller. 244 pp. Pachart, Tucson, Ariz., 1981. \$24.00. undergraduate text

Semi-Classical Approximation in Quantum Mechanics. V. Maslov, M. Fedoriuk. 301 pp. Reidel, Hingham, Mass., 1981. \$125.00. second-level text

Basic Quantum Mechanics. J. Martin. 241 pp. Oxford, New York, 1981. \$39.50 cloth, \$17.95 paper. undergraduate text

Non-Relativistic Quantum Dynamics. W. Amrein, 237 pp. Reidel, Hingham, Mass., 1981. \$70.00. second-level text

ULTRA HIGH VACUUN

OEM SPECIALISTS

Call us today for leaktested components made to YOUR specs!



10-10 TORR requirements surrounding UHV Monochromators and far UV to XRAY Spectrometers have taught us to be imaginative and reliable in the manufacture of vacuum systems and components. We would be happy to help you serve your markets better. Let us quote on some of your requirements.



IIIGPHERSUII, DIVISION OF SCHOEFFEL INTERNATIONAL CORP.

530 Main Street, Acton, Mass. 01720 (617) 263-7733

APS Show-Booth #7

Circle number 47 on Reader Service Card

Materials Science and Condensed Matter

IEEE Transactions on Magnetics. Conference, Grenoble, 1981. Vol. MAG-17, 1010 pp. IEEE Magnetics Society, 1981. no price stated

Recent Developments in Condensed-Matter Physics. Vol. 2. Metals, Disordered Systems, Surfaces and Interfaces. J. Devreese, L. Lemmens, V.Van Doren, J. Van Royen, eds. 477 pp. Plenum, New York, 1981. \$59.50 Recent Developments in Condensed-Matter Physics. Vol. 3. Impurities, Excitons, Polarons, and Polaritons. J. Devreese, L. Lemmens, V. Van Doren, J. Van Royen, eds. 420 pp. Plenum, NewYork, 1981. \$55.00

Recent Developments in Condensed-Matter Physics. Vol. 4. Low-Dimensional Systems, Phase Changes, and Experimental Techniques. J. Devreese, L. Lemmons, V. Van Doren, J. Van Royen, eds. 448 pp. Plenum, New York, 1981. \$57.50

Microscopy of Semiconducting Materials. Royal Microscopical Society Conference, St. Catherine's College, Oxford, 1981. A Cullis, D. Joy, eds. 464 pp. Institute of Physics, London, 1981. no price stated

Defects and Radiation Effects in Semiconductors. Eleventh International Conference Oiso, 1980. R. Hasiguti, ed. 571 pp. Institute of Physics, London, 1981. no price stated

Semiconductors and Semimetals. Vol. 16. Defects, (HgCd)Te. R. Willardson, A. Beer, eds. 266 pp. Academic, New York, 1981. \$37.50. compendium

Chemical Vapor Deposition, 1960-1980: A Bibliography. D. Hawkins, ed. 737 pp. Plenum, New York, 1981. \$115.00

Structure and Mobility in Molecular and Atomic Glasses. Conference, NYAS, 1980. J. O'Reilly, M. Goldstein, eds. 345 pp. New York Academy of Sciences, New York, 1981, \$74.00.

Selected Constants: Water Vapour Line Parameters from Microwave to Medium Infrared. J. Flaud, C. Camy-Peyret, R. Toth. 259 pp. Pergamon, New York, 1981. \$75.00

Physics Data: Optical Properties of Metals. Pt. I. The Transition Metals. J. Weaver, C. Krafka, D. Lynch, E. Koch. 302 pp. Fach-Informations-Zentrum, Karlsruhe, 1981. DM 33

Physics Data: Optical Properties of Metals. Pt. II. Noble Metals, Aluminum, Scandium, Yttrium, the Lanthanides and the Actinides. J. Weaver, C. Krafka, D. Lynch, E. Koch. Fach-Informations-Zentrum, Karlsruhe, 1981. DM 35

Emission and Scattering Techniques: Studies of Inorganic Molecules, Solids, and Surfaces. NATO Advanced Study Institute, Alghero, Sardinia, 1980. P. Day, ed. 390 pp. Reidel, Hingham, Mass., 1981. \$110.00

Glassy Semiconductors. Z. Borisova. 505 pp. Plenum, New York, 1981. \$69.50. monograph

Diffraction for Materials Scientists. J. Schultz. 287 pp. Prentice-Hall, Englewood Cliffs, N. J., 1982. \$34.95. introductory text

Structural Studies of Surfaces. K. Heinz, K. Muller, T. Engel, K. Reider. 180 pp. Springer, New York, 1982. \$29.50. two monographs

Metal Hydrides. Advanced Study Institute, Rhodes, 1980. G. Bambakidis, ed. 385 pp. Plenum, New York, 1981. \$49.50

Crystal Growth Bibliography Supplement. A. Keesee, T. Connolly, G. Battle Jr. Plenum, New York, 1981. \$75.00

Neutron-Transmutation-Doped Silicon. Third International Conference, Copenhagen, 1980. J. Gulberg, ed. 505 pp. Plenum, New York, 1981. \$59.50

Solid-State Physics and Electronics

Physics of Semiconductor Devices. Second Edition. S. Sze. 868 pp. Wiley, New York, 1981. \$45.00. reference

Superconductor Materials Science: Metallurgy, Fabrication, and Applications. Proceedings of a NATO Advanced Study Institute, Sintra, 1980. S. Foner, B. Schwartz, eds. 969 pp. Plenum, New York, 1981. \$85.00

Superionic Solids: Principles and Applications. S. Chandra. 404 pp. North-Holland, New York, 1981. \$78.00. second-level text and reference

Single-Particle Rotations in Molecular Crystals W. Press. 129 pp. Springer, New York, 1981. \$25.50. monograph

Preparation and Properties of Solid-State Materials, Vol. 6. Lead Tin Tellu-

KLINGER

The Affordable **Positioning Solution**

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

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. Springloaded carriages and pre-loaded ball bearings guarantee zero backlash and play. Ball races are made of Model MR 80 25 hardened (63Rc) tool steel. Predrilled stainless steel mounting

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 µm. Differential equipped models have 0.1 µm 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



Model TR 80

SEEE Model MV 80

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

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 ±2°. 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 µm. 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 corpo-rate letterhead—or call (212) 846-3700 for details.

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

Circle number 48 on Reader Service Card

ride, Silver Halides, and Czochralski Growth. W. Wilcox, ed. 265 pp. Dekker, New York, 1981. \$39.50. compendium

Energy and Environment

Energy Research, Development and Demonstration in the IEA Countries. D. Kerr, chairman. 169 pp. IAE, Paris, 1981. no price stated

Radioactive Decay Data Tables: A Handbook of Decay Data for Application to Radiation Dosimetry and Radiological Assessments, J. Smith, ed. 221 pp. Technical Information Center, US DOE, Washington, D. C., 1981. \$13.75

The Physical Principles of Thermonuclear Explosive Devices. F. Winterberg. 145 pp. Fusion Energy Foundation, New York, 1981. \$9.95. monograph

A New Prosperity: Building a Sustainable Energy Future: The Seri Solar/Conservation Study. 454 pp. Brick House, Andover, Mass. 1981. \$39.50 cloth, \$19.95, paper

Photovoltaic and Photoelectrochemical Solar Energy Conversion. NATO Advanced Study Institute, Gent, 1980. F. Cardon, W. Gomes, W. Dekeyser, eds. 422 pp. Plenum, New York, 1981. \$49.50

Electric Power from Orbit: A Critique of a Satellite Power System. D. Corson, chairman. 332 pp. National Academy P., Washington, D. C., 1981. \$12.75

The Coal Era in the United States: A Study of Our Viable Alternatives. C. B. Reed. 92 pp. Butterworths, Woburn, Mass., 1981. \$9.95

Biological and Medical Physics

Nonlinear Phenomena in Physics and Biology. Advanced Study Institute, Banff, 1980. R. Enns, B. Jones, R. Miura, S. Rangnekar, eds. 609 pp. Plenum, New York, 1981. \$75.00

Computers in Radiotherapy Planning. R. Wood. 171 pp. Wiley, New York, 1981. monograph

Biomagnetism. Proceedings, Third International Workshop, Berlin (West), 1980. S. Erné, H. Hahlbohm, H. Lübbig, eds. 558 pp. de Gruyter, New York, 1981. \$72.00

Geophysics and Planetary Science

Introduction to Groundwater Modeling: Finite Difference and Finite Element Methods. H. Wang, M. Anderson. 237 pp. Freeman, San Francisco, 1982. \$29.95. second-level text

Physical Principles of Exploration Methods. A. Beck. 234 pp. Wiley, New York, 1981. \$34.95. undergraduate text

Particles, Nuclei and High-Energy Physics

Neutrino 81. International Conference on Neutrino Physics and Astrophysics, Maui, Hawaii, 1981. Vols. 1 and 2. R. Cence, E. Ma, A. Roberts, eds. 509 pp., 512 pp. University of Hawaii, 1981. no price stated

Nuclear Structure. Netherlands Physical Society Summer School, Dronten, 1980. K. Abrahams, K. Allaart, A. Dieperink, eds. 432 pp. Plenum, New York, 1981. \$49.50

Interacting Bose-Fermi Systems in Nuclei. Seminar, Erice, Sicily, 1980. F. Iachello, ed. 406 pp. Plenum, New York, 1981.

Proceeding of the Johns Hopkins Workshop on Current Problems in Particle Theory 5, Baltimore, 1981: Unified Field Theories and Beyond. 330 pp. Dept. of Physics, Johns Hopkins University, Baltimore, 1981. no price stated

Heavy Ion Reactions: Lecture Notes. Vol. I. Elastic and Inelastic Reactions. R. Broglia, A. Winther, 291 pp. Benjamin/ Cummings, Reading, Mass., 1981. \$29.50

Partons in Soft-Hadronic Processes. Proceedings of the Europhysics Study



PRA arc lamp systems emit up to six times more usable light than conventional systems.

It's all in our elliptical mirror design (see diagram).

The elliptical mirror simply gathers more light. And focuses it. Our lamp housing has no lenses and, therefore, no reflective losses.

With six times more light output from our housings, our arc lamp



systems deliver the lowest cost per watt of any system on the market.

And it's not only the housing. With our arc lamp system, there's "no weak link in the chain". For example, our systems are remarkably stable. Because the housings are water cooled, there's no beam jitter from fan vibration. And for even more stability, you can order an optional optical feedback system that keeps ripple and drift as low as 0.1% and 2% respectively.

Our systems offer the most sophisticated power supplies and ignitors available. And output modulation—your choice of sine wave, ramp or square wave. All useful for signal processing.

For more about our arc lamp systems, call or write for our free brochure. PRA, 100 Tulsa Road, Oak Ridge, Tennessee 37830, (615) 483-3433.

BBT INSTRUMENTER, Ballerup, Denmark, 02/60 02 08; INSTRUMAT S.A.R.L. Orsay, France (6)928 27 34; AMKO GmbH, Tornesch, Germany, 0.41 22-51061; THE G.G. FORUM, Thessaloniki, Greece, 031 527,039; ISR AMEX, Tel Aviv, 248213-4-5, DAINI SEIKOSHA, Tokyo, (03)682-1111; ELCHEM, Den Haag, Netherlands, (070)837675; ROFIN. Egham, UK. (07843)75414.

Circle number 49 on Reader Service Card

Conference, Erice, Italy, 1981. R. Van de Walle, ed. 331 pp. World Scientific, Singapore, 1981. \$26.00

Inner-Shell and X-Ray Physics of Atoms and Solids. International Conference, Sterling, 1980. D. Fabian, H. Kleinpoppen, L. Watson, eds. 1949 pp. Plenum, New York, 1981. \$95.00

Atomic, Molecular and Chemical Physics

Fast Reactions in Energetic Systems. NATO Advanced Study Institute, Preveza, Greece, 1980. C. Capellos, R. Walker, eds. 759 pp. Reidel, Hingham, Mass., 1981. \$89.50

Chemical Applications of Nonlinear Raman Spectroscopy. A Harvey, ed. 383 pp. Academic, New York, 1981. \$48.00. compendium

A Bibliography of Ab Initio Molecular Wave Functions: Supplement 1978–1980. W. Richards, P. Scott, V. Sackwild. S. Robins. 463 pp. Clarendon, Oxford, New York, 1981. \$78.00

Fourier Transform Infrared Spectroscopy: Applications to Chemical Systems, Vol. 1. J. Ferraro, L. Basile, eds. 311 pp. Academic, New York, 1981. \$34.00. compendium

Astronomy, Cosmology and Space Physics

Revealing the Universe: Prediction and Proof in Astronomy. J. Cornell, A. Lightman, eds. 246 pp. MIT P., Cambridge, Mass., 1982. \$17.50. general readership

Whitney's Star Finder: A Field Guide to the Heavens, Third Edition. C. Whitney. 102 pp. Knopf, New York, 1981. \$8.95

Solar Active Regions: A Monograph from Skylab Solar Workshop III. F. Orrall, ed. 350 pp. Colorado Associated, U. P., Boulder, Colo., 1981. \$17.50. compendium

High Energy Astrophysics: An Informal Introduction for Students of Physics and Astronomy. M. Longair. 412 pp. Cambridge U. P., New York, 1981. \$49.95 cloth, \$19.95 paper. introductory text

History, Philosophy, Society & Government

The Final Epidemic: Physicians and Scientists on Nuclear War. R. Adams, S. Cullen, eds. 254 pp. Educational Foundation for Nuclear Science, Chicago, 1981. \$4.95

Current Research in the Netherlands. Physical Sciences 1979-1980. 497 pp. Netherlands Organization for the Advancement of Pure Research, The Hague, 1981. no price stated

Salaries of Scientists, Engineers and Technicians: A Summary of Salary Surveys. E. Babco. 140 pp. Scientific Manpower Commission, Washington, D. C. 1981. \$25.00

Dictionary of the History of Science. W. Bynum, E. Browne, R. Porter, eds. 494 pp. Princeton U. P., New Jersey, 1982. \$40.00

Research Department Fluid Mechanics. Scientific Report. H. Holtz, 105 pp. DFVLR, Köln, 1980. no price stated

From Art to Science: Seventy-Two Objects Illustrating the Nature of Discovery. C. Smith, 118 pp. MIT P., Cambridge, Mass., 1980. \$25.00

Search for Structure: Selected Essays on Science, Art, and History. C. Smith. 410 pp. MIT P., Cambridge, Mass., 1981. \$30.00

Scientific Journals in the United States: Their Production, Use, and Economics. D. King, D. McDonald, N. Roderer. 319 pp. Hutchinson Ross, Stroudsburg, Pa., 1981. \$34.00

Science Technology and the Future: Soviet Scientists' Analysis of the Problems of and Prospects for the Development of Science and Technology and Their Role in Society. E. Velikhov, J. Gvishiani, S. Mikulinsky, eds. 480 pp. Pergamon, New York, 1980. \$36.00. compendium

At the Crossroads of the Earth and the Sky: An Andean Cosmology. G. Urton. 248 pp. University of Texas P., Austin, 1981. \$30.00. monograph

AAAS Workshop Report. Human Rights and Scientific Cooperation: Problems and Opportunities in the Americas. E. Stover, K. McClesky. 161 pp. AAAS Committee on Freedom & Responsibility, Washington, D. C., 1981. no price stated

Between Science and Values. L. Graham. 449 pp. Columbia U. P., New York, 1981. \$19.95. monograph

Patterns of Technological Innovation. D. Sahal. 381 pp. Addison-Wesley, Reading, Mass., 1981. \$34.50. monograph

Colour Vision in the Nineteenth Century: The Young-Helmholtz-Maxwell Theory. P. Sherman. 233 pp. Hilger, Bristol, 1981. \$77.00

Thermodynamics and Statistical Physics

Methods of Statistical Physics. A. Akhiezer, S. Peletminskii. 450 pp. Pergamon, New York, 1981. \$54.00. monograph

Student Texts and Popularizations

Design Notes Log: General Operations Director. R. Compton. 340 pp. Pi-Rho Press, Palo Alto, Cal., 1981. \$9.95. undergraduate

Physics for Career Education. Second Edition. D. Ewen, R. Nelson, N. Schurter. 399 pp. Prentice-Hall, Englewood Cliffs, N. J., 1981. \$17.95 cloth, \$9.95 paper. undergraduate text

Aujourd' hui l'Univers. J. Audouze. 343 pp. Belfond, Paris, 1981. no price stated.

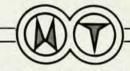
Miscellaneous

AIP 50th Anniversary Physics Vade Mecum. H. Anderson, ed. 330 pp. AIP, New York, 1981. \$25.00

50 MHz PHOTON DISCRIMINATOR



Model 511 \$525.00



- Fast Amp-Disc for Single Photon Counting Applications
- 18 Nanosecond Resolving Time at all Sensitivities
- Unique Gain/Threshold Control provide 30 microvolt to 20 millivolt Threshold Range
- NIM Fast Negative and Slow Positive Outputs provided

Mech-Tronics

NUCLEAR

430A Kay Ave., Addison, II. 80101

For more information WRITE OR CALL COLLECT (312) 543-9304

APS Show—Booth #60
Circle number 50 on Reader Service Card
PHYSICS TODAY / FEBRUARY 1982 85