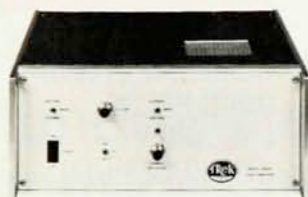


HIGH VOLTAGE OPERATIONAL AMPLIFIERS

- Up to $\pm 20,000V$
- Up to $200V/\mu sec.$
- Up to 200W output power



Model 620A:

- 0 to $\pm 20KV$ @ 1 mA
- Gain: $2000V/V$ or $100 \mu A/V$
- Slew: $12V/\mu sec.$



Model 609-5:

- 0 to 1 KV
- 200 mA continuous
- $20 V/\mu sec.$



Model 604A:

- 0 to $\pm 1 KV$ @ 20 mA
- $35 V/\mu sec.$
- Discrete amplifier and power supply mounted on separate P.C. boards

- Many other standard models available.
- Special design requirements considered.

Write or call
for more information.



P.O. Box 231 3932 Salt Works Road,
Medina, N.Y. 14103
Phone (716) 798-3140 Telex 752278

Numerous line drawings supplement the discussions. However, in contrast to Trautman's book, it does not isolate definitions sufficiently well from the discussion and the examples; therefore it lacks somewhat in precision. Because Burke gives a large number of applications to physics, the two books complement each other quite well.

EMIL KAZES

Pennsylvania State University

new books

Geophysics and planetary science

Recent Advances in Planetary Meteorology. Proc. Symp., Hamburg, August 1983. G. E. Hunt, ed. 161 pp. Cambridge U.P., New York, 1985. \$39.50

Student texts and popularizations

Energy: A Conceptual Approach. T. E. Van Koeveering, N. J. Sell. 271 pp. Prentice-Hall, Englewood Cliffs, N.J., 1986. \$15.95 paper. *Introductory text*

Fun with Maths and Physics. Y. I. Perelman. 373 pp. Mir, Moscow (US dist. Imported Publications, Chicago), 1985. \$9.95. *Young readers*

Physical Science, A Dynamic Approach. Second edition. R. T. Dixon. 474 pp. Prentice-Hall, Englewood Cliffs, N.J., 1986. \$29.95

Physics for Scientists & Engineers. Second edition. R. A. Serway. 942 pp. Saunders, Philadelphia, 1986. \$41.95

Physics for Scientists and Engineers with Modern Physics. Second edition. R. A. Serway. 1108 pp. Saunders, Philadelphia, 1986. \$44.95

Practical Physics. Third edition. G. L. Squires. 206 pp. Cambridge U.P., New York, 1985. \$44.50 hardcover; \$17.95 paper

Practical Physics. J. D. Wilson. 540 pp. Saunders, Philadelphia, 1986. \$30.95

The Living Sonars of the Ocean. B. F. Sergeev. 215 pp. Mir, Moscow (US dist. Imported Publications, Chicago), 1985. \$6.95. *Lay readers*

The Quantum World. J. C. Polkinghorne. 100 pp. Princeton U.P., Princeton, 1985. \$6.95 paper. *Lay readers*

The Special Theory of Relativity. J. Aharoni. 331 pp. Dover, New York, 1985. \$8.00. *Reprint*

Seven Ideas That Shook the Universe. N. Spielberg, B. D. Anderson. Wiley, New York, 1985. \$22.95. *Nonmathematical introduction to physics*

Theory and mathematical physics

Analytical Mechanics. Fourth edition. G. R. Fowles. 342 pp. Saunders, Philadelphia, 1986. \$39.95. *Undergraduate text*

Exactly Solvable Problems in Condensed Matter and Relativistic Field Theory. *Lecture Notes in Physics* 242. Proc. Int. Colloq., Panchgani, India. B. S. Shastri, S. S. Jha, V. Singh, eds. 315 pp. Springer-Verlag, New York, 1985. \$20.50

Maximum-Entropy and Bayesian Methods in Inverse Problems. Proc. Wksp., Laramie, Wyo., June and August 1982. C. R. Smith, W. T. Grandy Jr, eds. 492 pp. Reidel, Boston, 1985. \$44.50

Memory Function Approaches to Stochastic Problems in Condensed Matter. M. W. Evans, P. Grigolini, G. Pastori Parravicini, eds. 556 pp. Wiley, New York, 1985. \$84.95. *Compendium*

Number Theory in Science and Communication: With Applications in Cryptography, Physics, Digital Information, Computing, and Self-Similarity. *Springer Series in Information Sciences* 7. M. R. Schroeder. 374 pp. Springer-Verlag, New York, 1986. \$24.50. *Monograph*

Numerical Methods in Fluid Dynamics: Advances in Science and Technology in the USSR. N. N. Yanenko, Y. I. Shokin, eds. Mir, Moscow (US dist. Imported Publications, Chicago), 1984. \$8.95. *Compendium*

Quantum Mechanics. A. A. Sokolov, I. M. Ternov, V. Ch. Zhukovskii. 496 pp. Mir, Moscow (US dist. Imported Publications, Chicago), 1984. \$10.95. *Text*

Quantum Theory of Many-Variable Systems and Fields. *World Scientific Lecture Notes in Physics* 1. B. Sakita. 220 pp. World Scientific, Singapore (US dist. Taylor and Francis, Philadelphia), 1985. \$33.00 hardcover; \$19.00 paper

Supercomputers in Theoretical and Experimental Science. Proc. Int. Wksp., Antwerp, July-August 1984. J. T. Devreese, P. Van Camp, eds. 225 pp. Plenum, New York, 1985. \$59.50

Trends and Developments in the Eighties. *Bielefeld Encounters in Mathematics and Physics IV and V.* Proc. Mtgs., Bielefeld, FRG, July 1982 and September 1983. S. Alberverio, P. Blanchard, eds. 424 pp. World Scientific, Singapore (US dist. Taylor and Francis, Philadelphia), 1985. \$44.00

Multiple Time Scales. J. U. Brackbill, B. I. Cohen, eds. 442 pp. Academic, New York, 1985. \$75.00. *Compendium*

On Relativity Theory, Vol. 2. Proc. Sir Arthur Eddington Centenary Symp., Nagpur, India, January 1984. Y. Choquet-Bruhat, T. M. Karade, eds. 274 pp. World Scientific, Singapore (US dist. Taylor and Francis, Philadelphia), 1985. \$41.00

Quantum Field Theory. L. H. Ryder. 443 pp. Cambridge U.P., New York, 1985. \$74.50. *Text*

Quantum Mechanics. V. K. Thankappan. 516 pp. Wiley, New York, 1985. \$44.95. *Text*

Quantum Mechanics: A Modern Introduction. A. Das, A. C. Melissinos. 640 pp. Gordon and Breach, New York, 1986. \$65.00 hardcover; \$29.50 paper

Rotating Fields in General Relativity. J. N. Islam. 122 pp. Cambridge U.P., New York, 1985. \$34.50. *Text*

Selective Computation. *Series in Modern Applied Mathematics 4.* R. E. Bellman. 222 pp. World Scientific, Singapore (US dist. Taylor and Francis, Philadelphia), 1985. \$28.00. *Text*

Spontaneous Symmetry Breakdown and Related Subjects. Proc. XXI Wint. Sch. Theor. Phys., Karpacz, Poland, February-March 1985. L. Michel, J. Mozrzymas, A. Pękalski, eds. 493 pp. World Scientific, Singapore (US dist. Taylor and Francis, Philadelphia), 1985. \$49.00

Symposium on Anomalies, Geometry, Topology. Proc. Symp., Chicago, March 1985. W. A. Bardeen, A. R. White, eds. 558 pp. World Scientific, Singapore (US dist. Taylor and Francis, Philadelphia), 1985. \$65.00

The Theory of Classical Dynamics. J. B. Griffiths. 315 pp. Cambridge U.P., New York, 1985. \$39.50. *Text*

Theoretical Approaches to Turbulence. *Applied Mathematical Sciences 58.* D. L. Dwyer, M. Y. Hussaini, R. G. Voigt, eds. 373 pp. Springer-Verlag, New York, 1985. \$36.00. *Compendium*

History and philosophy

Kapitza: Life and Discoveries. F. B. Kedrov. 199 pp. Mir, Moscow (US dist. Imported Publications, Chicago), 1985. \$6.95

Mikhail Vasilievich Lomonosov: His Life and Work. G. E. Pavlova, A. S. Fedorov. 312 pp. Mir, Moscow (US dist. Imported Publications, Chicago), 1985. \$7.95

Rem Khokhlov. V. I. Grigoryev. 109 pp. Mir, Moscow (US dist. Imported Publications, Chicago), 1985. \$2.95

The Prolegomena to a 1985 Philosophiae Naturalis Principia Mathematica. F. S. C. Northrop. 73 pp. Ox Bow, Woodbridge, Conn., 1985. \$30.00

The Royal Institution: An Informal History. G. Caroe. 180 pp. John Murray, London, 1985. £13.95

Une incertaine réalité: Le monde quantique, la connaissance et la dureté. B. d'Espagnat. 310 pp. Gauthier-Villars, Paris, 1985. 98 FF. *Lay readers*

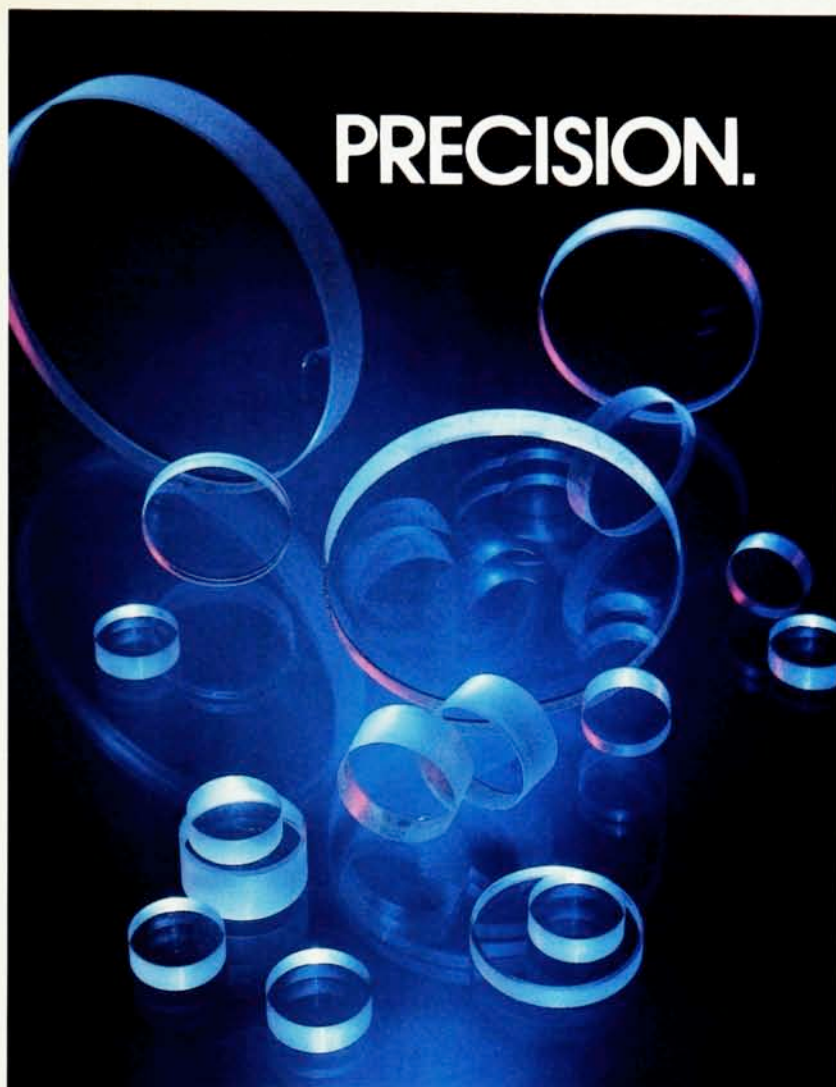
Wranglers and Physicists: Studies on Cambridge Mathematical Physics in the Nineteenth Century. P. M. Harman, ed. 261 pp. Manchester U.P., Manchester, England, 1985. £27.50. *Compendium*

Instrumentation and techniques

Applications of Circularly Polarized Radiation Using Synchrotron and Ordinary Sources. Proc. Mtg., Albuquerque, N.M., May 1984. F. Allen, C. Bustamante, eds. 193 pp. Plenum, New York, 1985. \$45.00

Principles of Electron Tunneling Spectroscopy. *International Series of Monographs on Physics 71.* E. L. Wolf. 576 pp. Oxford U.P., New York, 1985. \$80.00. *Text*

The Dosimetry of Ionizing Radiation, Vol. 1. K. R. Kase, B. E. Bjärngard, F. H. Attix, eds. 416 pp. Academic, New York, 1985. \$69.50. *Compendium*



Harshaw/Filtrol crystal optics are built on one word.

Precision control. Exacting material synthesis for optical purity. Advanced design growth furnaces. Special equipment and techniques for laser window fabrication. Harshaw/Filtrol combines these factors with on-line process control to guarantee precise quality control from starting material through finished optics.

Precision performance. Accurately cut, carefully polished and evaluated, pure Harshaw/Filtrol-grown crystals assure a low absorption coefficient and uniform index of refraction. Depend on Harshaw/Filtrol for undistorted transmission for UV, near IR and IR wavelengths.

Precision design for precise results. Harshaw/Filtrol guarantees cost-effective solutions for every size, surface finish and power-handling requirement. Each Harshaw/Filtrol laser window benefits from the same total technology that produces 18" Polytran® NaCl windows for the LASL laser fusion program.

Talk with The Specialists and learn why most users of transmission crystal optics, including laser applications, choose Harshaw/Filtrol. Harshaw/Filtrol Partnership, Crystal and Electronic Products, 6801 Cochran Road, Solon, Ohio 44139. (216) 248-7400.

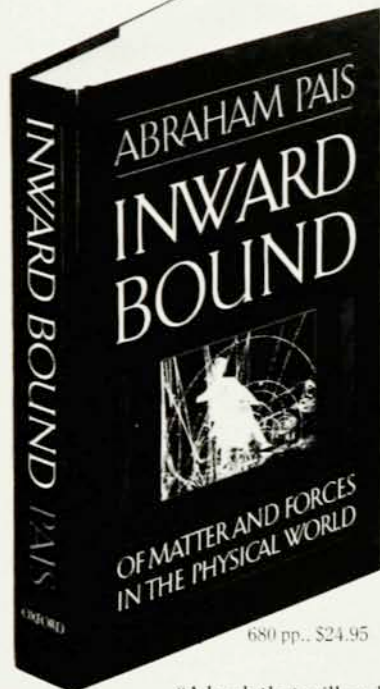
HARSHAW/FILTROL

The Specialists

See us at the CLEO Show, Booth #1418.

Circle number 41 on Reader Service Card

From the prizewinning biographer of Einstein comes "this majestic tour de force."*



Oppenheimer, Dirac, and Pais (photo by Eisenstadt)

Only a working physicist personally involved in the developments he describes could have written this history of physics. Like Pais's prizewinning biography of Einstein, *Subtle Is the Lord*, *Inward Bound* can be appreciated on many levels. In alternating technical and nontechnical sections, this magisterial survey richly conveys what has been discovered about the constituents of matter from the discovery of x-rays to the present day, putting into perspective the achievements of the Curies, Rutherford, Roentgen, Becquerel, Bohr, Heisenberg, Dirac, and many others.

"A book that will endure." C.N. Yang

"A truly worthy successor to *Subtle Is the Lord*." Roger Penrose

"A book that soars... superphysics." *Kirkus Review**

680 pp., \$24.95

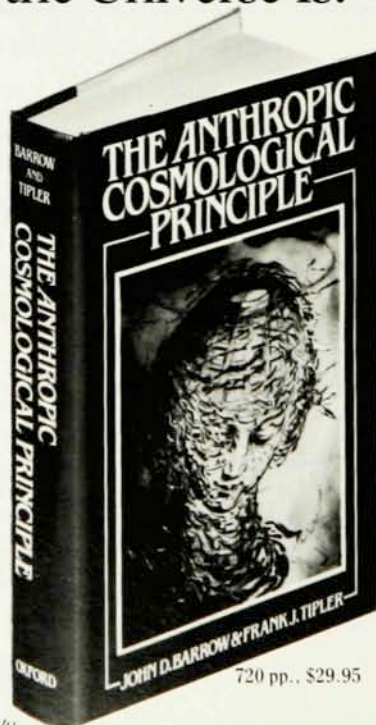
"I think, therefore the Universe Is."*

Is there any connection between the vastness of the universe of stars and galaxies and the existence of life within it on a small planet out in the suburbs of the Milky Way? This book shows that there is. The modern heir to centuries of philosophic thought concerning the question of mankind's place in the universe, the Anthropic Cosmological Principle leads to an eclectic study of many scientific disciplines, with fascinating insights into such issues as the nature of life, the search for extraterrestrial intelligence, and the interpretation of quantum theory in relation to the existence of observers.

"I was infuriated by it, disagreed with it and loved reading it... It is a book that impels the reader to think, and it may alter the terms of discourse upon which it will be judged."

Timothy Ferris

*New York Times Book Review**



720 pp., \$29.95

At better bookstores or to order direct, send your check to

Oxford University Press Box 900, 200 Madison Ave., New York, NY 10016

Thermodynamics and statistical physics

Elements of Thermodynamics. M. C. Martin. 225 pp. Prentice-Hall, Englewood Cliffs, N.J., 1986. \$35.95

Entropy in Relation to Incomplete Knowledge. K. G. Denbigh, J. S. Denbigh. 164 pp. Cambridge U.P., New York, 1985. \$34.50. *Monograph*

Phenomenological Thermodynamics: With Applications to Chemistry. J. de Heer. 406 pp. Prentice-Hall, Englewood Cliffs, N.J., 1986. \$44.95. *Text*

Materials science and condensed matter

Amorphous Semiconductors. Second edition. *Topics in Applied Physics* 36. M. H. Brodsky, ed. 347 pp. Springer-Verlag, New York, 1985. \$24.50. *Compendium*

Applied Superconductivity, Metallurgy, and Physics of Titanium Alloys, Vol. 1: Fundamentals. E. W. Collings. 808 pp. Plenum, New York, 1986. \$97.50. *Monograph*

Mechanics of Continua and Wave Dynamics. *Springer Series on Wave Phenomena* 1. L. Brekhovskikh, V. Goncharov. 342 pp. Springer-Verlag, New York, 1985. \$49.00. *Text*

Optics

Coherence of Light. Second edition. J. Peřina. 350 pp. Reidel, Boston, 1985. \$64.00. *Text*

Polarized Light in Nature. G. P. Können. 172 pp. Cambridge U.P., New York, 1985. \$32.50. *Lay readers*

Seeing the Light: Optics in Nature, Photography, Color, Vision, and Holography. D. Falk, D. Brill, D. Stork. 446 pp. Harper and Row, New York, 1985. \$35.50. *Introductory text*

Solid-state physics and electronics

Theory of Heavy Fermions and Valence Fluctuations. *Springer Series in Solid-State Sciences* 62. Proc. 8th Taniguchi Symp., Shima Kanko, Japan, April 1985. T. Kasuya, T. Saso, eds. 287 pp. Springer-Verlag, New York, 1985. \$27.50

Thermoluminescence of Solids. S. W. S. McKeever. 376 pp. Cambridge U.P., New York, 1985. \$69.50. *Monograph*

VLSI Electronics: Microstructure Science, Vol. 12. N. G. Einspruch, H. Huff, eds. 463 pp. Academic, New York, 1985. \$75.00. *Compendium*

Quantum electronics and lasers

Laser Beam Scanning: Opto-mechanical Devices, Systems, and Data Storage Optics. *Optical Engineering* 8. G. G. Marshall. 448 pp. Marcel Dekker, New York, 1985. \$65.00. *Compendium*

Lasers and Non-Linear Optics. B. B. Laud. 247 pp. Wiley, New York, 1986. \$14.95. *Text*

Circle number 42 on Reader Service Card

Particles, nuclei and high-energy physics

Advances in Nuclear Physics, Vol. 16. J. W. Negele, E. Vogt, eds. 327 pp. Plenum, New York, 1986. \$49.50. *Compendium*

Hadronic Probes and Nuclear Interactions. *AIP Conference Proceedings 133.* Proc. Conf., Tempe, Arizona, March 1984. J. R. Comfort, W. R. Gibbs, B. G. Ritchie, eds. 408 pp. AIP, New York, 1985. \$47.25

Medium Energy Nucleon and Antinucleon Scattering. *Lecture Notes in Physics 243.* Proc. Conf., Bad Honnef, FRG, June 1985. H. V. von Geramb, ed. 573 pp. Springer-Verlag, New York, 1985. \$33.00

Nuclear Shell Models. Proc. Symp., Philadelphia, October–November 1984. M. Valieres, B. H. Wildenthal, eds. 700 pp. World Scientific, Singapore (US dist. Taylor and Francis, Philadelphia), 1985. \$79.00

Simulation for Nuclear Reactor Technology. Proc. Int. Conf., Cambridge, England, April 1984. D. G. Walton, ed. 444 pp. Cambridge U.P., New York, 1985. \$69.50

Techniques and Concepts of High-Energy Physics III. Proc. NATO Advanced Study Inst., St. Croix, Virgin Islands, August 1984. T. Ferbel, ed. 436 pp. Plenum, New York, 1985. \$75.00

Society and government

Nuclear Arms Race: Technology and Society. P. P. Craig, J. A. Jungerman. 461 pp. McGraw-Hill, New York, 1985. \$23.95. *Text*

Siliconconnections: Coming of Age in the Electronic Era. F. M. Mims III. 208 pp. McGraw-Hill, New York, 1986. \$16.95

To Engineer Is Human: The Role of Failure in Successful Design. H. Petroski. 247 pp. St. Martin's, New York, 1985. \$16.95

Biological and medical physics

Techniques of Radiation Dosimetry. K. Mahesh, D. R. Vij, eds. 516 pp. Wiley, New York, 1985. \$29.95. *Compendium*

Atomic, molecular and chemical physics

Advances in Chemical Physics, Vol. LXI. I. Prigogine, S. A. Rice, eds. 461 pp. Wiley, New York, 1985. \$75.00. *Compendium*

Atomic Inner-Shell Physics. B. Crasemann. 754 pp. Plenum, New York, 1985. \$97.50. *Compendium*

Atomic Theory Workshop on Relativistic and QED Effects in Heavy Atoms. *AIP Conference Proceedings 136.* H. P. Kelly, Y.-K. Kim, eds. 338 pp. AIP, New York, 1985. \$55.50

Molecular Orbitals and Their Energies, Studied by the Semiempirical HAM Method. *Lecture Notes in Chemistry 38.* E. Lindholm, L. Asbrink. 288 pp. Springer-Verlag, New York, 1985. \$29.90. *Text*

Transport in Nonstoichiometric Compounds. Proc. Conf., University Park, Pa., June 1984. G. Simkovich, V. S. Stubican, eds. 563 pp. Plenum, New York, 1985. \$85.00

CRYOGENIC TEMPERATURE SENSORS

to meet your needs.

Silicon Diodes. Wide 1.4K to 380K range with sensitivity to 50mV/K below 30K. Available calibrated, uncalibrated, or matched to standard curves. Over 14 configurations.



Germanium. Repeatability better than 0.5mK. LHe resistances from 50 to 2500 ohms. Available calibrated or uncalibrated in two sizes.



Carbon Glass. Monotonic over 1K to 300K range. Extremely low and predictable magnetic field dependence. Eight values allow temperature response to be optimized for a given use range.



Complete Line. Gallium-Arsenide Diodes. Platinum and Rhodium-Iron RTD's, Capacitance Sensors, plus a completely-equipped standards lab for calibrations from 0.05K to 380K. Sensors shown are enlarged to 1.5X to show detail.



The reliability of Lake Shore's cryogenic temperature sensors is the foundation of our reputation. Careful research into design, construction, and use assures predictable performance users can count on. So when you need sensors that make sense, come to Lake Shore . . . we know cryogenics COLD!

Cryogenic Thermometry • Instrumentation • Calibrations

 Lake Shore
Cryotronics, Inc.

64 E. Walnut St., Westerville, OH 43081 • (614) 891-2243

In Europe: Cryophysics: Witney, England • Jouy en Josas, France
Darmstadt, W. Germany • Geneva, Switzerland

In Japan: Niki Glass Co., Shiba Tokyo

Circle number 43 on Reader Service Card