yond physics. He held strong views on many subjects: science and technology; education and organization of research; philosophy and politics; international relations and the social impact of science.

Kapitza firmly believed in the unity of science and technology and was himself the best embodiment of that unity, always producing the tools for his fundamental research. He shared with Rutherford a predilection for simple approaches to problems. His favorite quotation was from the Ukrainian philosopher, Skovoroda: "We must be grateful to God that he created the world in such a way that everything simple is true, and everything complicated is untrue."

Kapitza was always conscious of the need to train new generations of scientists and devoted an immense effort to the education of young people and the encouragement of creative talent. A powerful figure in the Academy of Sciences—a member of its presidium—he often criticized its performance and bureaucracy. He was particularly scathing about the lack of debate at sessions of the Academy. In Cambridge he had established what became known as the Kapitza Club, where young physicists gathered to discuss over dinner the developments in science, and he wished to see more opportunities for open discussion in the Soviet Union.

Always outspoken, Kapitza found himself from time to time in conflict with ideological orthodoxy, but his spirits were undaunted. His independence of mind found many expressions, one of them being his refusal in 1973 to join other academicians in condemning Andrei Sakharov.

Kapitza was much concerned about the nuclear arms race and sought ways to stop it. This brought him to Pugwash; he was an active member of the Soviet Pugwash Group and participated in Pugwash Conferences in the USSR, Sweden, France, Finland and Austria. His interest in Pugwash also stemmed from his conviction that scientists are the most likely group to tackle successfully global problems. In the Bernal Lecture, given in the Royal Society in 1976, he said: "The future of civilization depends on whether existing governments are able to provide solutions to global problems. . . . But, for this, problems must be expressed clearly and convincingly and widely discussed. This can be done mainly by scientists, since they can talk with sufficient authority on the possible solution of global problems for the benefit of mankind. Thus, we should not stand aside from the solution of such problems but realize their connection with our scientific work." One hopes this call will be heeded by the scientific community in the East and West as its tribute to the memory of a great man, big enough to span the ideological divide.

JOSEPH ROTBLAT
University of London

Elliott Waters Montroll

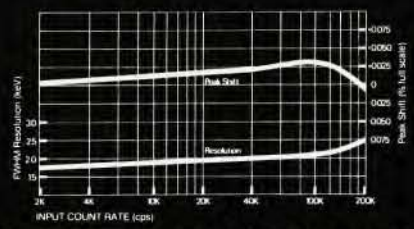
Elliott W. Montroll, distinguished professor in the Institute for Physical Science and Technology of the University of Maryland, died at age 67 on 3 December 1983.

Montroll received his BS in chemistry (1937) and PhD in mathematics (1940) from the University of Pittsburgh. He then embarked on a remarkably rich and varied scientific life. During World War II, as head of the mathematics group of the Kellex Corporation, he was involved with the separation performance of cascades used at the Oak Ridge uranium isotope separation plant. A joint paper with Gordon Newall (1952) deals with this nonlinear diffusion process. After some years as a peripatetic postdoctoral fellow with Joseph Mayer and Lars Onsager, he worked at the Office of Naval Research; he was head of the Physics Division (1948–1950) and Director of Physical Science (1953–1955). He was a professor in the Institute for Fluid Dynamics and Applied Mathematics of the University of Maryland (1950–1960 and 1963–1966); Director of General Sciences at IBM (1960–1963); Vice President for Research of the Institute for Defense Analyses (1963–1966); Einstein Professor and Director of the Institute for Fundamental Studies at the University of Rochester (1966–1981). He was also twice the Lorentz Professor at Leiden and the Gibbs Lecturer for the American Mathematical Society. He returned to the University of Maryland in 1981, following his retirement from the University of Rochester.

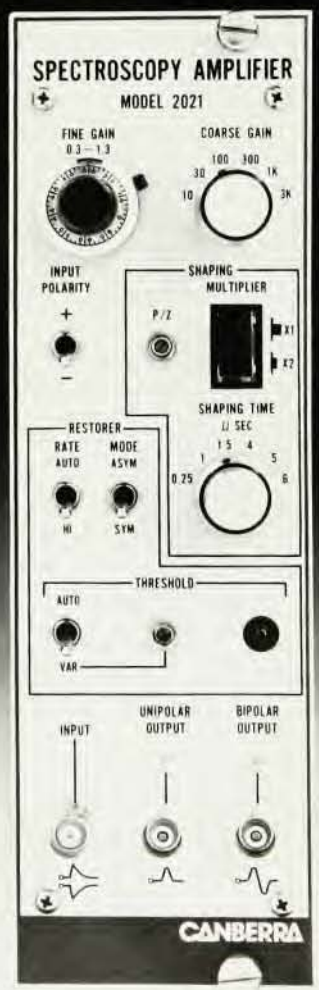
Among his many other activities, Montroll was founder and first editor of

MONTROLL

Safe at any Speed.



Minimal peak shift at high coun rates with the new 2021.



CANBERRA
Canberra Industries, Inc.
One State Street
Meriden, Connecticut 06450
(203) 238-2351

Circle number 54 on Reader Service Card

NEW BOOKS FROM WILEY... 15-DAY FREE EXAMINATION

FUSION ENERGY
Robert A. Gross

Written by an eminent fusion engineer, this state-of-the-art textbook covers the physics and technology upon which fusion power reactors will be based. It reviews the history of fusion, reaction physics, plasma physics, heating, and confinement. Includes descriptions of commercial plants and promising design concepts.

approx. 375 pp. (1-88470-7) **July 1984** $41.95

COMPUTATIONAL METHODS OF NEUTRON TRANSPORT
E. E. Lewis & W. F. Miller, Jr.

Presents a balanced overview of the major methods currently available for obtaining numerical solutions in neutron and gamma ray transport. It focuses on methods particularly applicable to the complex problems encountered in the analysis of reactors, fusion devices, radiation shielding, and other nuclear systems.

approx. 432 pp. (1-09245-2) **September 1984** $44.95

OPTICAL RADIATION DETECTORS
Eustace L. Dereniak & Devon G. Crowe

Offers a comprehensive, integrated treatment of optical radiation detectors, discussing their capabilities and limitations. Background material on radiometry, noise sources, and detector physics is introduced, followed by more detailed discussions of photon detectors, thermal detectors, and charge transfer arrays of detectors.

approx. 320 pp. (1-89797-3) **September 1984** $42.50

PATTERN RECOGNITION
Human and Mechanical
Satosi Watanabe

The first major work in the nascent discipline of "cognitive science". Provides a unified presentation of pattern recognition, introducing new mechanical methods as well as a wider humanistic perspective on the science. Included are some of the latest discoveries made by the author—most unknown to those in the field.

approx. 352 pp. (1-80815-6) **September 1984** In Press

STATISTICAL OPTICS
Joseph W. Goodman

A text and reference discussing the statistical methods necessary for treating almost all problems in optics. Includes problems for self-study.

approx. 575 pp. (1-01502-4) **December 1984** In Press

APPLIED NONLINEAR ANALYSIS
Jean-Pierre Aubin & Ivan Ekeland

The most complete, up-to-date treatment of nonlinear analysis available today. As the only modern book providing non-technical yet thorough coverage, it examines those areas which lend themselves most readily to applications such as smooth analysis, convex analysis, and nonsmooth analysis.

518 pp. (1-05998-6) **June 1984** $47.50

A GUIDE TO NUCLEAR POWER TECHNOLOGY
A Resource for Decision Making
Frank J. Rahn, Achilles G. Adamantiades, John E. Kenton & Chaim Braun

Brings the entire field of nuclear power production into focus, from the mining and production of reactor fuel materials, fuel utilization and waste disposal, to safety procedures, regulation, and proliferation. Coverage of the subject is comprehensive, with the technical aspects of the material geared to the non-specialist.

approx. 912 pp. (1-88914-8) **October 1984** In Press

MEDICAL IMAGES AND DISPLAYS
Comparisons of Nuclear Magnetic Resonance, Ultrasound, X-rays, and Other Modalities
R. Stuart Mackay

Offers up-to-date, unified comparisons of major non-invasive methods including: CAT scans, computed tomography, digital radiography, flow measurement, and special displays. The coverage is broad and comprehensive, treating visualization of internal structures and their abnormalities from the *outside*.

approx. 384 pp. (1-89617-9) **August 1984** $44.95

THE PHYSICS AND TECHNOLOGY OF XEROGRAPHIC PROCESSES
Edgar M. Williams

Furnishes a complete review of the processess used in high-speed xerographic document copiers and laser printers and explains the six steps used to create xerographic images: photoconductor charging, image exposure, development, transfer to paper, image fusing, and photoconductor cleaning or restoration.

approx. 304 pp. (1-88080-9) **July 1984** $39.95

MAGNETO-SOLID MECHANICS
Francis C. Moon

Provides a thoroughly modern examination of the stresses, dynamics, and stability of magneto-mechanical devices such as superconducting magnets, levitated vehicles, magnetic mass drivers, electromagnets, and actuators. Over 60 specific coupled-magneto-mechanical problems are discussed and analyzed and well over 200 illustrations are included.

approx. 448 pp. (1-88536-3) **July 1984** $59.95

THE PRINCIPLES OF NONLINEAR OPTICS
Y.R. Shen

A comprehensive treatment of nonlinear optics emphasizing physical concepts and the relationship between theory and experiment. Systematically describes a number of sub-topics in the field. Up-to-date references and numerous illustrations will help both beginners and practitioners interested in gaining a more thorough understanding of the subject.

563 pp. (1-88998-9) **1984** $49.95

MATTER AT LOW TEMPERATURES
P. V. E. McClintock, D. J. Meredith & J. K. Wigmore

The first single textbook comprehensively covering the behavior of matter at low temperatures. Offers a clear, unified introduction discussing the diverse phenomena that occur under these conditions and indicates the fundamental significance that many of them carry for basic physics.

approx. 264 pp. (1-81315-X) **July 1984** $29.95

THE LABORATORY MICROCOMPUTER
Programming in Pascal and MC68000 Assembly Language on the IBM CS/9000
James W. Cooper

The first guide to Pascal programming on the new IBM CS/9000 computer system and assembly language programming on the MC68000 microprocessor. Assuming no prior knowledge of Pascal or assembly language, it explains how Pascal works, how to edit and compile programs, and how to apply it in the lab.

approx. 384 pp. (1-81036-3) **October 1984** In Press

Order through your bookstore or write to Nat Bodian, Dept. 5-1356

TO ORDER FOR 15-DAY FREE EXAMINATION

CALL TOLL FREE 1 800 526-5368

In New Jersey, call collect (201) 342-6707 Order code #5-1356

WILEY-INTERSCIENCE
a division of John Wiley & Sons, Inc.
605 Third Avenue, New York, N.Y. 10158
In Canada: 22 Worcester Road, Rexdale, Ontario M9W 1L1

Prices subject to change and higher in Canada

092-5-1356

Circle number 55 on Reader Service Card

the *Journal of Mathematical Physics*, chairman of the Section of Applied Mathematical and Physical Sciences of the National Academy of Sciences and a valued consultant to many corporations—including GE, GM, Physical Dynamics, and Xerox—and to many governmental organizations.

Montroll's scientific contributions started at the University of Pittsburgh, when Gregory Wannier asked him to talk to the physics seminar about Mayer's theory of imperfect gases. Montroll discovered that a class of cluster integrals, now known as the ring diagrams, could be summed analytically. This work, published with Mayer in 1941, was the earliest of the diagrammatic resummation procedures that are now so prevalent in theoretical physics. In 1958 he and John Ward extended the diagrammatic approach to the study of finite-temperature Green's functions in quantum statistical mechanics.

Montroll's next major contribution to physics (while he was a post-doctoral fellow at Yale) was the invention of the transfer matrix method for calculating the partition function of an interacting lattice system. He used the method to work out the one-dimensional Ising lattice (another subject he got from Wannier). Onsager learned about the Ising lattice problem from Montroll, and used the transfer matrix method in his famous treatment of the two-dimensional problem. Years later, Montroll, Renfrey Potts and John Ward (1963) made an exact calculation of the spin–spin correlation functions of the two-dimensional Ising lattice using the Pfaffian method.

In 1947, Montroll did the first exact evaluation of the vibrational frequency spectrum of a two-dimensional lattice; he found a logarithmic singularity in the spectrum (nowadays referred to as a Van Hove singularity). Later, with Alex A. Maradudin and George H. Weiss, he wrote the classic "Theory of Lattice Dynamics in the Harmonic Approximation." The first of his celebrated lattice random walk papers, "A Note on Bessel Functions of Purely Imaginary Arguments," appeared in 1946. It evolved from his analysis of a discrete nonlinear diffusion equation governing the flow of an enriched component of a mixture through the levels in a cascade separation. In 1957, Montroll and Kurt Shuler treated the dissociation of a diatomic molecule as a random walk on the "vibrational ladder." Montroll, an omnivorous reader of the mathematical literature, recognized that the hitherto obscure "Gottlieb polynomials" could be used to effect an elegant solution of the random walk problem. In 1964, Montroll found the exact solution to a problem posed by George Polya—to find the probability of return to the origin of a random walk on a three-dimensional lattice. (Previously, only upper and lower bounds were known.) In 1965, Montroll and George Weiss introduced the powerful notion of a continuous-time random walk and the associated pausing-time distribution. This was the key ingredient in his work with Harvey Scher on dispersive transport in xerographic films and with Michael Shlesinger on the foundations of the Williams–Watts dielectric relaxation function.

Montroll's interests were extraordinarily broad. His papers on the mathematical theory of traffic flow were instrumental in helping to establish the subject as a new area of inquiry. In addition he worked on the melting of DNA, $1/f$ noise, and many aspects of the dynamics of complex social phenomena. (Some of the latter work can be found in the delightful book, co-authored with Wade Badger, *An Introduction to the Quantitative Analysis of Social Phenomena*.)

Montroll had a profound influence on the development of mathematical and chemical physics. His exceptionally lucid articles and lectures combined common sense and beautiful mathematics. He treated younger scientists with kindness and helpfulness and his vast knowledge of the historical development of physical concepts never failed to elicit interest and enthusiasm. He will be sorely missed by all who knew him.

MICHAEL F. SHLESINGER
Office of Naval Research
HUGH M. VAN HORN
University of Rochester
ROBERT W. ZWANZIG
University of Maryland

Richard Georg Ivars Allas

Richard Georg Ivars Allas, a physicist with the Naval Research Laboratory in Washington, D.C., died 19 March 1983 after suffering a massive stroke. He was 48 years old.

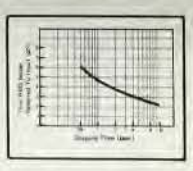
Allas was born in Riga, Latvia, on 14 September 1934. He spent his later childhood going from town to town in Germany, Austria and Czechoslovakia—one of the millions of displaced persons in war-torn Europe. Fate, luck and a lot of perseverance brought him and his family to Münster, where he entered the University in 1951. Immigrating with his family to the US in 1952, Allas enrolled at Washington University in St. Louis. He finished his undergraduate and graduate studies there, earning his doctoral degree in physics in 1961. His doctoral dissertation was on the study of proton polarization from deuteron-induced reactions on C^{12} and Be^{9}.

No More Noise.

Extraordinary resolution in a single-width Spectroscopy Amp.

Announcing the 2022.

- 6 shaping time constants
- Less than 0.024% peak shift from 2 to 100 KHz for 2 μs shaping
- Less than 14% change in FWHM from 2 to 100 KHz for 2 μs shaping
- Bipolar and unipolar (prompt or delayed) output
- Unique automatic baseline restorer
- Wide gain range (× 3 to × 3900)
- Drift less than ± 10 μv/°C



CANBERRA

Canberra Industries, Inc.
One State Street
Meriden, Connecticut 06450
(203) 238-2351

Circle number 56 on Reader Service Card