departments of materials science and engineering, chemistry and bioengineering at the University of Illinois at Urbana-Champaign and a faculty member at the university's Beckman Institute of Advanced Science and Technology

Richard A. Webb, the Alford Ward Chaired Professor of Semiconductor Physics and a distinguished university professor at the University of Maryland, College Park

Rainer Weiss, a professor of physics at MIT

Carl Wieman, a fellow of the Joint Institute for Laboratory Astrophysics and a professor of physics at the University of Colorado at Boulder

Miguel Virasoro, director of the Abdus Salam International Centre for Theoretical Physics in Trieste, Italy

Jacob Ziv, a distinguished professor of electrical engineering at the Technion—Israel Institute of Technology

IN BRIEF

Venkatesh Narayanamurti has become the dean of the Division of Engineering and Applied Sciences and Gordon McKay Professor of Engineering and Applied Sciences at Harvard University. Since 1992, Narayanamurti had been dean of the college of engineering and the Richard A. Auhll Professor at the University of California, Santa Barbara. At Harvard, he succeeds **Paul C. Martin**, the John H. Van Vleck Professor of Pure and Applied Physics, who had headed the engineering division since 1977. Martin will remain at Harvard, pursuing teaching and research.

The 1998 Heinz R. Pagels Human Rights of Scientists Award, given by the New York Academy of Sciences, was presented last month to **Boris Altschuler** and **Morris Pripstein**. Altschuler is the director of the human rights program at the Moscow Human Rights Research Center and a physicist at the P. N. Lebedev Physics Institute in Moscow. He was cited for "his long history of leadership and moral and physical courage in the defense of human rights of scientists and others—previously in the former Soviet Union and now in the new Russia." Pripstein, a senior physicist at Lawrence Berkeley National Laboratory, was honored for his work as chairman of SOS— Scientists for Sakharov, Orlov and Sharansky—which was founded in 1978. According to the academy, "through moral suasion and well-timed publicity, he kept the issue before the world and contributed substantially to the ultimate release of all three."

Next month, **Robert L. Byer**, a professor of applied physics at Stanford University, will receive the 1998 Arthur L. Schawlow Award at the Laser Institute of America's International Congress on Applications of Lasers and Electro-Optics, to be held in Orlando, Florida. At the meeting, Byer also will be inducted as a fellow of LIA, along with **Henry E. Gauthier**, chairman of the board and director of Coherent Inc of Santa Clara, California.

The 1998 Körber Prize for European Science, which honors remarkable achievements in technology, science and medicine, was presented in September to researchers from France and Germany for successfully applying a technique for magnetic resonance imaging of the human lungs by use of polarized helium-3; their work built on demonstrations by Princeton University's William Happer and colleagues (see the news story in PHYSICS TODAY June 1995, page 17). The recipients are **Ernst Otten** of the physics department and **Manfred Thelen** of the Hospital for Radiology, both at the University of Mainz, Germany; **Werner Heil**, of the Institut Laue-Langevin in Grenoble, France; and **Michèle Leduc** of Ecole Normale Supérieur in Paris.

Philip Lacovara has been named vice president of the optical engineering services department of the Breault Research Organization in Tucson, Arizona, succeeding **Robert Pagano**, who will remain with the department. Previously, Lacovara was the director of program development at the Electro-Optics Development Center of Kaman Aerospace Corp, also in Tucson.

OBITUARIES

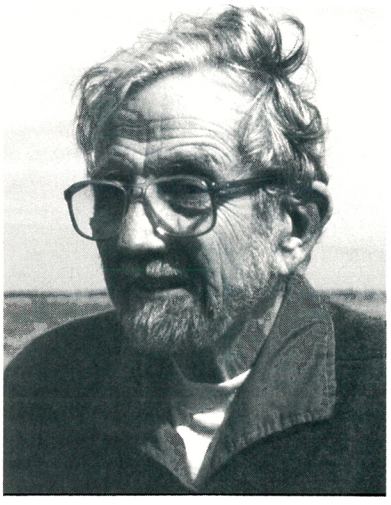
Henry Cutler Torrey

Henry Cutler Torrey, one of the first to study and apply nuclear magnetic resonance (NMR), died on 5 May 1998 in Bridgewater, New Jersey. He had retired in 1976 from Rutgers University, where he had been a physics professor for 30 years.

Born on 4 April 1911 in Yonkers, New York, Henry earned a BSc in 1932 from the University of Vermont and then entered the physics graduate program at Columbia University. His thesis project, under I. I. Rabi, was to add a third magnet between the deflecting and refocusing magnets of atomic beams. In this scheme—a precursor of the resonance method—atoms traversing the new center magnet experienced nonadiabatic transitions between states that revealed the sign of the atoms' nuclear magnetic moments. Using his apparatus, Henry determined the magnetic moment of potassium-39 to be positive—in conflict with results just published by respected hyperfine spectroscopists. After he put in two more years of effort, his method and result were fully vindicated.

After receiving his PhD from Columbia in 1937, he joined the faculty at Pennsylvania State College, where he indulged his fascination with Rabi's new resonance technique by working out related theoretical problems. Henry proved, for example, that transitions induced between any two levels by a sinusoidal perturbation follow the equation developed by Rabi for the simple case of spin-½.

In May 1942, Henry was called to



HENRY CUTLER TORREY

contribute to the war effort at the MIT Radiation Laboratory, where Rabi and several of his other collaborators were already working. At the Rad Lab, he took over the development of semiconductor crystal rectifiers, which were critical to the performance of microwave radar receivers. He supervised not only his own group's research, but also that of outside subcontractors who were also studying semiconductors and rectifiers.

After VJ Day, he stayed on at MIT to write, with his colleague Charles Whitmer, *Crystal Rectifiers*, the 15th volume of the Radiation Laboratory Series, which records the progress in crystal rectifiers and semiconductor research.

During that book writing period, Henry was asked by Edward Purcell

whether nuclear magnetic resonance could be detected as an absorption of radio frequency energy by nuclei in condensed matter. After some thought and calculation, Henry decided it should be possible, whereupon Purcell proposed that he, Henry and their Rad Lab colleague Robert Pound, should attempt the experiment at Harvard University in their spare time. They were successful: On 15 December 1945, the resonant absorption of protons in paraffin wax was detected, and a new field of research with a then unimaginably vast domain of applications ensued.

In July 1946, Henry moved to Rutgers, where he promptly established a research program in NMR. Henry's notes from his pioneering seminar that summer contained what is believed to be the first application to NMR of the well-known formula for the motion of a vector in a rotating frame. The notes also revealed how the Rabi formula for the case of spin-½ could be derived classically.

At this same time, Henry and some of his Rutgers colleagues (who included other Rad Lab alumni) designed the first electromagnet purposely developed for NMR. Requiring unusually high homogeneity at large fields, this magnet, which was constructed by the General Electric Corp in 1947, gave excellent service for over 35 years.

Henry was the first to use pulses in NMR. In 1948, he observed forced precession of nuclear moments while the radio pulses were applied. His efforts preceded the work of Erwin Hahn, who, in 1949, first observed the free precession in the static magnetic field after the radio pulses were turned off. Henry used his nutational resonance to measure long relaxation times, the forerunner of the free-precession spin–echo techniques now used extensively.

Among Henry's other salient contributions to NMR are his generalization of the Bloch equations with terms accounting for the transfer of magnetization by diffusion, and his use of the observed density-proportional local magnetic field shift in xenon gas to calibrate the spin-rotational coupling existing in a diatomic xenon system during atomic collisions.

Henry was at home not only in academia as a teacher, researcher and administrator, but also in industry as a consultant. For California Research Corp, he developed NMR methods for locating underground oil deposits. He was equally at ease and enjoyed participating in a national science–theology discussion group and sailing on Long Island's Great South Bay.

Henry is remembered as a distinguished scholar, who generously shared his time listening to and dis-

cussing the inquiries of his colleagues, young students and longtime associates alike.

Herman Y. Carr
Rutgers University
New Brunswick, New Jersey
Robert V. Pound
Harvard University
Cambridge, Massachusetts

Marcel Bardon

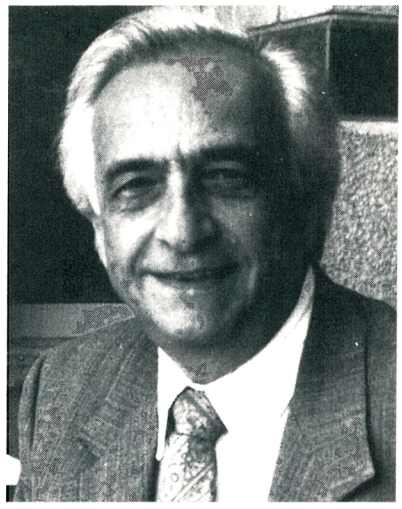
Marcel Bardon, who directed the physics division at the National Science Foundation (NSF) for more than 20 years and also served as an international science administrator in the 1980s, died in Washington, DC, on 20 May 1998 after a valiant battle with lymphoma.

Born in Paris on 16 September 1927, Marcel left France for the US with his family in 1939, shortly before Germany invaded Poland. He joined the US Army in 1944, where he gained his first experience "taking pictures," as he later insisted, since he did not believe he was proficient enough to be called a photographer. Years later, he won international acclaim as a photographer.

Marcel returned to France to earn a diploma in literature from the University of Paris in 1952. He earned a PhD in experimental physics from Columbia University in 1961. Leon Lederman, who served as Marcel's Columbia adviser, recalls that Marcel was the only student he had ever heard of who completed two fully acceptable PhD theses. After one thesis, Marcel felt that he had not learned enough.

Because of his dedication to perfection, Marcel's productivity in physics was intense. He worked on a 1958 Cosmotron experiment at Brookhaven National Laboratory, a follow-up to the 1956 discovery of the long-lived neutral kaons. And, as his first thesis problem, he used the Columbia cloud chamber to obtain an estimate of the lifetime of the K^0_L. Further data on decay modes were obtained, and the first limit was placed on the two-body decay, which was later seen in the famous and much more sensitive Fitch–Cronin *CP* violation experiment.

Marcel's second thesis made use of muon beams from the 400 MeV synchrocyclotron and electronic detection devices at Columbia's Nevis Laboratories. He worked with David Berley and Juliet Lee to find an upper limit to the process $\mu \rightarrow e + \gamma$, whose absence foreshadowed the later discovery of the muon neutrino. In 1961, he measured the parity-violating asymmetry parameter in the decay of positive muons and, yielding to Lederman's pleas, agreed to make this work the topic of the thesis he submitted for graduation.



Marcel Bardon

After he developed a keen interest in the management of research, Marcel accepted a position as a lecturer in Columbia's physics department and as an assistant director of the Nevis labs. In 1966, he became deputy director of Nevis under Lederman. In 1970, Marcel moved to the Washington, DC, area to join the NSF's physics division. He became its director a year later—a position that, with three breaks, he occupied until his death.

The first hiatus occurred in 1979–81, when he served as science officer with the US delegation to the United Nations Educational, Scientific and Cultural Organization (UNESCO). The second hiatus was in 1986–88, when he served as NATO's deputy assistant secretary-general for scientific affairs.

From December 1991 until his return to the physics division in September 1997, Marcel directed NSF's division of international programs. He successfully reorganized the division's goals and structure, with emphasis on the startup of new international collaborations and the promotion of international experiences for US scientists and engineers early in their careers.

In honoring Marcel with the NSF Distinguished Service Award earlier this year, the foundation's director, Neal Lane cited Marcel's "superb scientific judgement and vision," and recalled Marcel's championing efforts that had led NSF to create such facilities as the Cornell Electron Storage Ring, the Institute for Theoretical Physics at Santa Barbara, the first generation of NSF Supercomputer Centers, the National Superconducting Cyclotron Laboratory and the Laser Interferometer Gravitational Wave Observatory.

Robert Eisenstein, NSF's assistant director for mathematical and physical science and who, like Neal, was recruited to the foundation by Marcel, emphasized at a memorial service on 29 May, "while physics was his love in science, Marcel's vision was much broader. It extended . . . into the education of young people and into the social responsibility of scientists on an international scale. And his vision of the world carried him into photography, where he was an acclaimed master of international reputation."

Indeed, Marcel was one of the first photographers to work extensively in both black and white and color, and was one of the very few photographers proficient in Cibachrome photography and printing. His work was exhibited in galleries and museums in the US and abroad, including two one-man shows at the Corcoran Gallery of Art in Washington, DC.

Marcel will be remembered for his brilliant, imaginative scientific leadership, for his exuberance and wit, and because he was an inspiration to all who worked with him.

Leon M. Lederman
Fermi National Accelerator Laboratory
Batavia, Illinois
Laura P. Bautz
David Berley
John W. Lightbody
National Science Foundation
Arlington, Virginia

Judah Moshe Eisenberg

Judah Moshe Eisenberg died in Tel Aviv, Israel, on 17 March 1998, after a brief illness. A prominent nuclear theorist, he was serving as vice rector of Tel Aviv University, where he had been teaching since 1975 and where he had held the Yuval Ne'eman Chair in Theoretical Nuclear Physics since 1983.

Judah, whose father was a well-known scholar of Hebrew and a leader in Jewish education, was born in Cincinnati on 17 December 1938. He studied at Columbia University, where he earned an AB in 1958 and at MIT, where he earned his PhD in theoretical physics in 1962 under Kerson Huang.

That same year, Judah joined the University of Virginia's physics department as an assistant professor. Later, he chaired the department from 1970 to 1974. His contributions to nuclear theory began at Virginia with work on electro- and photoexcitation of nuclei.

He soon became interested in the proposal to study nuclei using pion interactions at the newly planned meson factories. (The 1964 Bethe report had recommended such high-flux meson facilities; three were built: LAMPF at Los Alamos, TRIUMF in Vancouver, British Columbia, and SIN