AAPT. Voss, chairman of the department of physics and astronomy at Arizona State University, was honored for the contributions he has made to "physics, physics teaching, AAPT, and the physics community."

The Excellence in Undergraduate Physics Teaching Award went to **Marvin Nelson**, head of the physics department at Green River Community College in Auburn, Washington. Nelson was cited for his "many and innovative contributions to physics and the teaching of physics."

Arthur Eisenkraft received the Award for Excellence in Pre-College Physics Teaching, which is given in recognition of outstanding contributions to precollege physics teaching that have had a national impact. Eisenkraft is a physics teacher and the science coordinator in the public school system of Bedford, New York.

IN BRIEF

In October, the Eduard Rhein Foundation, based in Hamburg, Germany, presented its 1999 Basic Research Award—together with DM 150 000 (about $80 000)—to **Vladimir A. Kotelnikov**. A former vice president of the Russian Academy of Sciences, Kotelnikov was cited "for the first theoretically exact formulation of the sampling theorem."

Pierre Villeneuve has left his position as a research scientist at MIT's Research Laboratory of Electronics to form his own Boston-based company, Clarendon Photonics, where he will be the chief technical officer and the interim chief executive officer.

In September, **Brian Schwartz** became vice president of research and sponsored programs at the Graduate School and University Center of the City University of New York. He had previously been a professor of physics at CUNY's Brooklyn College and, for the past four years, the director of centennial programs for the American Physical Society's March 1999 meeting in Atlanta.

John Kormendy, currently a professor of astronomy at the University of Hawaii at Manoa, will be moving next month to the University of Texas at Austin to assume the Curtis T. Vaughan Jr Centennial Chair in Astronomy.

OBITUARIES

Arthur Leonard Schawlow

Arthur Leonard Schawlow, who, with Charles H. Townes, invented the laser, succumbed to leukemia in Stanford, California, on 28 April.

Born in Mount Vernon, New York, on 5 May 1921, Art earned all his degrees, which were in physics, at the University of Toronto—a BA in 1941, an MA in 1942, and a PhD in 1949. Art's university education was interrupted by World War II, which Canada had joined in 1939. During the war, Art taught military personnel at Toronto and then spent the years 1944–45 working on a microwave project at a radar equipment factory. For his PhD, which was supervised by Malcolm Crawford, he studied the properties of nuclei by means of high-resolution spectroscopy of atomic beams.

Doctorate in hand, Art joined Townes at Columbia University as a postdoctoral fellow to work on the microwave spectroscopy of atoms and molecules. In 1951, he married Townes's younger sister, Aurelia, and accepted a position as a research physicist at Bell Telephone Laboratories, in Murray Hill, New Jersey, where he turned at first to superconductivity.

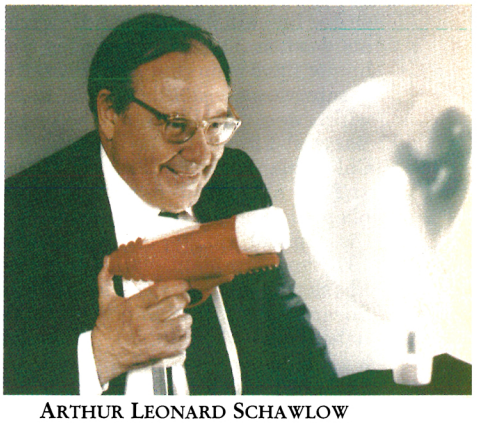
During his ten years at Bell Labs, he and Townes wrote the classic monograph *Microwave Spectroscopy* (McGraw-Hill, 1955). In 1957, the two of them recognized that the principles of the maser—that is, the generation and amplification of microwaves by stimulated emission of radiation, as first demonstrated by Townes in 1954—could be extended to optical wavelengths. Art had the ingenious insight that the laser resonator could be formed by just two mirrors, like the Fabry–Pérot interferometer that he had used as a graduate student. When published in 1958, their first paper on lasers, entitled "Optical and Infrared Masers" triggered an explosion of laser research that would revolutionize many areas of science and technology.

In 1961, Art left Bell Labs to become a physics professor at Stanford University. He served as chair of the physics department from 1966 to 1970, and held the J. G. Jackson and C. J. Wood Chair of Physics from 1978 until his retirement in 1991. At Stanford, Art set out to explore the potential of lasers for spectroscopy with his students and coworkers.

In 1970, I had the good fortune to join his laboratory as a NATO postdoctoral fellow and to begin a close collaboration and warm friendship with Art that lasted many years. The early years of this collaboration, when we found ourselves at the heart of a revolution in laser spectroscopy, were most exhilarating. With the first highly monochromatic and widely tunable dye lasers, we explored powerful new techniques for laser spectroscopy without Doppler broadening—such as saturation spectroscopy or polarization spectroscopy—and we applied those methods to precision spectroscopy of the simple hydrogen atom, which makes possible unique confrontations between experiment and fundamental theory. These contributions to laser spectroscopy were cited when Art received the Nobel Prize in Physics in 1981. Our discussions also led to the first proposal for laser cooling of atomic gases, which we published in early 1975.

Art combined a vast range of knowledge and interests with brilliant intuition. He could see the significance of new discoveries before most others, and he had a rare gift for solving puzzling problems. With his keen interest in clever inventions and fundamental physics and with his contagious enthusiasm, he had a special ability to inspire others to attain high levels of achievement. Art gave critical encouragement to his students when he emphasized that one does not have to study everything that is known about a subject to be able to discover something new. One only has to find one thing that was not known.

As a public speaker and science writer, Art made immense contributions to the public understanding of lasers and optical science. He could explain complex ideas in the most simple and lucid terms, using his



ARTHUR LEONARD SCHAWLOW

witty humor and well-honed comedic skills to capture the hearts and minds of his audience. One of his most popular demonstrations ran as follows. Rummaging in a huge briefcase he pulled out his famous red toy laser gun into which his technician Ken Sherwin had skillfully installed a real small ruby laser. Next, he noisily began to inflate a large clear balloon. But when his audience looked at the balloon, they saw that something inside it—a blue balloon, with big ears like Mickey Mouse, was also inflating. "There's a mouse inside the balloon!," Art would say at that point, continuing: "You know it's terrible the way mice get into everything. We have to get our more or less trusty laser and dispose of it." And with a pull of the trigger, the ray gun flashed and the inner mouse-shaped balloon burst with a loud pop while the outer balloon remained unharmed. To his audience he then explained: "Now this is a very serious experiment. It illustrates how, with lasers, light is no longer something to look with, it is something you can do things with, and you can do them in places where you can see but not touch as, for instance, at the retina of the eye. One of the very first applications of the laser was for surgery inside the eye, to prevent blindness from either a detached retina or leaky blood vessels." Art liked to add that he had never heard of these diseases when he started his work on lasers, and if he had set out to find a treatment, he certainly would not have been fooling around with atoms and stimulated emission of radiation!

Many accounts of Art's research and of his warm and inspiring relationship with his students and coworkers were compiled in a book *Lasers, Spectroscopy, and New Ideas*, which Marc Levenson and William Yen edited for Springer Verlag as a tribute to Art on his 65th birthday. Art's illness in later years, alas, did not leave him with the strength to write his autobiography. However, his wisdom, insights, memories, and humor have been captured in a series of interviews with Suzanne B. Riess, which were published in 1998 by the Bancroft Library of the University of California, Berkeley.

Art's abilities were recognized by his peers. He was elected president of the Optical Society of America in 1975 and president of the American Physical Society in 1985. In 1982 the Laser Institute of America established the Arthur L. Schawlow Medal, to be awarded annually. In 1991, APS started to award each year the prestigious Arthur L. Schawlow Prize in Laser Science. That same year, Art received the National Medal of Science from President George Bush. In 1996, for his invention of the laser, he was inducted into the National Inventors Hall of Fame.

Despite his incredibly busy schedule as a researcher, teacher, and academic statesman, Art also found the time and energy for some personal passions. Starting even while at high school, he assembled a remarkable collection of jazz recordings, he played the clarinet, and he enjoyed recording live jazz music with increasingly sophisticated equipment.

Art also carried out research on communicating with autistic people. He and Aurelia shared the burden of caring for their autistic and mute son Artie. They helped to organize a nonprofit corporation, California Vocations, as a group home near Sacramento for autistic people. The main building was donated by Art and named after his wife, who died in 1991 in a tragic automobile accident while on her way to visit Artie.

With the death of Art, the world has lost one of the most influential inventor-scientists of the 20th century, and many of us are mourning the loss of a most compassionate and caring friend.

THEODOR W. HÄNSCH
Max Planck Institute for Quantum Optics and University of Munich
Munich, Germany

Daniel William Martin

Daniel William Martin, whose career in acoustics spanned 60 years, died of cancer in Cincinnati on 7 January. At the time of his death, he was the editor in chief of the *Journal of the Acoustical Society of America* (*JASA*), a position he had held since 1985.

Born in Georgetown, Kentucky, on 18 November 1918, Dan earned an AB from Georgetown College in 1937. He earned an MS in 1939 from the University of Illinois, where he also did his doctoral work under the direction of the noted acoustician Floyd Watson, who sparked Dan's lifelong passion for acoustics. For his PhD, which he earned in physics in 1941, Dan studied brass musical instruments. He did a stroboscopic analysis of the vibrations of the player's lips, and made anechoic measurements of the radiation patterns for the brass family of instruments.

Starting in 1941, Dan worked for the Radio Corp of America (RCA) on acoustical aspects of military communications, particularly on the development of throat microphones, for which he received the first of his 26 US patents.

DANIEL WILLIAM MARTIN

In 1949, he joined the Baldwin Co (later Baldwin Piano and Organ), which allowed him to continue to pursue his favorite topic, musical acoustics. In 1957, he became Baldwin's director of research, a position he was to hold for a quarter of a century. He did extensive research on the decay of piano tones, tone color in electronic organs, musical scales, and the effects of room environments on piano and organ sounds. He also reviewed acoustical patents.

Starting in 1951, Dan also worked as a member of a team of patent reviewers for *JASA*, and his reviews regularly appeared in the pages of that journal for the next 48 years, a period that encompassed the explosive development of electronic and electroacoustic musical instruments. He served as *JASA*'s associate editor for patent reviews and in a similar capacity for the *Journal of the Audio Engineering Society*. Over time, he wound up reviewing nearly 4000 patents!

Dan's career was notable for service to scientific and technical organizations. He was chairman of the IRE (later IEEE) Professional Group on Audio (1955–57), president of the Audio Engineering Society (1964–65), and president of the Acoustical Society of America (1984–85). In addition, he played a continuing role in the development of acoustical standards.

In 1983, after retiring from Baldwin, Dan began a second career as an independent acoustical consultant. He had actually been introduced to consulting in architectural acoustics during his graduate studies at Illi-