Fletcher Guard Watson

Fletcher Guard Watson, a pioneer of precollege science education, died of heart failure on 7 May in Cambridge, Massachusetts.

Born in Baltimore on 27 April 1912, Watson graduated from Pomona College with an AB in astronomy in 1933 and earned a PhD in astronomy from Harvard University in 1938. He then became Harlow Shapley's research associate at the Harvard College Observatory. While at Harvard, he soon revealed his interest in the public understanding of science by publishing *Beyond the Planets* (Doubleday, 1941), a book on comets, meteors, asteroids and meteorites written for laymen. The book became a classic and was translated into several languages.

During World War II, Watson served in the US Navy, and played a major role in the development and installation of the Navy's long-range navigation system.

After completing his military service in 1946, Watson accepted Harvard president James Bryant Conant's daunting and professionally risky challenge to provide the university—and, it was hoped, the nation—with leadership in precollege science education. As a professor of science education in the graduate school of education, Watson successfully met that challenge for 31 years until his retirement, in the process creating what is now the prevailing model of the academic field of science education.

Among his many accomplishments, the best known is probably Harvard Project Physics, a new approach to high school physics that he codirected with Gerald Holton and me in the 1960s. His particular role was the development and oversight of the national field testing of the course. He pioneered the random selection of experimental and control schools and other advanced techniques of experimental design, which are still too rarely used in educational R&D.

But perhaps Watson's greatest contribution to science could be said to be his students. I think it is fair to say that no other scientist in this country has produced so many outstanding advocates for science literacy. He recruited doctoral students with both a strong grounding in science and an abiding commitment to education, and he prepared them for leadership. They can now be found, in this country and many others, carrying on his traditions in key positions in school districts, state departments of education, professional societies, museums, Federal sci-

ence agencies, colleges and universities and national and international committees. He treated all his students with great respect—which in his eyes included holding them to high standards—and closely followed their careers as long as he lived, helping them find good positions, criticizing their papers and books (when requested, which was often) and seeing that their work was known to others. No wonder he was so widely admired, professionally and personally.

F. James Rutherford
American Association for the Advancement of Science
Washington, DC

Ralph Andreas Höpfel

Ralph Andreas Höpfel, a leading Austrian solid-state physicist, passed away tragically in Innsbruck, Austria, on 9 May 1997, the day after his 42nd birthday.

A native of Innsbruck, Ralph completed his PhD in physics at Innsbruck University in 1983 under the guidance of Erich Gornik. His thesis work on the infrared emission from two-dimensional plasmons and hot electrons in silicon-based metal oxide semiconductor field-effect transistors led, in 1984, to a position as a postdoctoral research scientist with Jagdeep Shah at what was then AT&T Bell Laboratories in Holmdel, New Jersey. During those two years at Bell Labs, Ralph, together with his collaborators, studied the transport and optical properties of gallium arsenide–aluminum gallium arsenide heterostructures. His most important work at Bell Labs was probably the discovery that minority carriers in GaAs quantum wells can have a negative absolute mobility under an applied electric field. This discovery led to new insights into electron–hole scattering in semiconductors.

Ralph then returned to Innsbruck and completed his *Habilitation* in 1988, becoming a member of the physics faculty. After a four-month guest professorship at the University of Nagoya in Japan, Ralph became a full professor of physics in 1996 at Vienna University's Institut für Materialphysik.

Over the last ten years of his life, Ralph and his coworkers concentrated on femtosecond time-resolved measurements. His group in Innsbruck was the first to observe the relaxation of plasmon oscillations in a solid through second-harmonic generation in silver islands. In other work, the group was able to show that intraband inversion in proton-bombarded indium phosphide can be achieved when the trapping and recombination rate is faster than the rate of electron and hole thermalization. Ralph also studied modifications in photoluminescence spectra arising from the enhancement and inhibition of spontaneous emission in three-dimensional optical microcavities formed by semiconductor microcrystals.

Before Ralph died, his work had expanded to include the development of an ultrashort, tunable, THz pulsed light source and the direct observation of bulk plasmons in GaAs using very sensitive reflectivity measurements, as well as using a 13-femtosecond laser for medical imaging.

Ralph was a man full of energy and ideas who inspired students with his optimism. He was not only a motivational and creative physicist but also a family man and an accomplished pianist. His sudden death has taken a heavy toll on those who knew and worked with him. We all mourn his death.

Nancy Hecker
Anton Zeilinger
Innsbruck University
Innsbruck, Austria
Erich Gornik
Vienna Technical University
Vienna, Austria
Jagdeep Shah
Bell Laboratories, Lucent Technologies
Holmdel, New Jersey

Vance Sailor

Vance Sailor died of a sudden illness near his home in East Patchogue, New York, on 11 May 1997, in his 76th year. Working for most of his life at Brookhaven National Laboratory, Sailor was a pioneer in the use of diffracted neutron beams to explore the properties of neutron resonances of nuclei and the magnetic structure of crystalline media.

Sailor was born in Springfield, Missouri. He received his BA in physics at DePauw University in 1943 and his PhD in physics at Yale University in 1949. In the intervening years (1943–45) he was a meteorologist in the US Army Air Forces, serving in Africa and the Middle East. Soon after joining Brookhaven in 1950, he worked on experiments at the Brookhaven graphite reactor, the world's first nuclear reactor devoted entirely to peaceful research, which was just becoming operational in 1950.

He built and operated a crystal spectrometer for cross-section measurements and then added the ability to polarize the neutron beam in more refined studies. Around 1960, he added polarization of the targets for