

within the atom.

The MIT–SLAC experiment was a watershed. In combination with the neutrino experiments at CERN, it gave an experimental confirmation of the quark model, which is a major cornerstone of the Standard Model. In addition, it established the experimental foundations of asymptotic freedom, a basic feature of quantum chromodynamics, in that the observed scaling implied a weakening of the strong force at short distances. In 1990, Henry and his two colleagues Friedman and Taylor were awarded the Nobel Prize for this achievement. Subsequently, Henry participated in experiments at Fermilab and most recently was a member of the SLD collaboration at SLAC.

Henry was as impressed as anyone with the benefits of science, but came to harbor concerns about the risks that technological innovations can create and a growing commitment to address those risks. As with many physicists of his generation, he first focused on nuclear weapons. In the 1960s, troubled by the massive buildup of the superpowers' nuclear arsenals, he joined the Jason panel, a group of academic scientists that advised the US Defense Department. He eventually withdrew from this classified work and joined close colleagues who had founded the Union of Concerned Scientists (UCS). On 4 March 1969, UCS mounted a nationwide protest by scientists against government policies that, in the view of UCS, presented a major threat to the existence of mankind.

UCS, which at that time had no staff or office, would have been a one-day wonder but for the leadership that Henry then assumed. His critique of nuclear power plant safety brought UCS into high-profile conflict with the Atomic Energy Commission, and contributed to the establishment of the Nuclear Regulatory Commission. In the 1980s, UCS was a major player in the national controversy over the government's Strategic Defense Initiative ("Star Wars").

During the last decade, Henry's efforts were guided by his belief that "human beings and the natural world are on a collision course," as he put it in the opening words in his 1992 declaration "World Scientists' Warning to Humanity." That statement, signed by some 1700 leading scientists from 70 countries, including over 100 Nobel laureates, was a synoptic assessment of the factors pointing toward this collision and what must be done to stave it off. In addition to

ceaselessly seeking support for this endeavor, Henry devoted his own attention to the global availability of food and water resources, then to climate change, and, most recently, to species extinction.

In recent years, Henry served on a number of prestigious government panels, and, just four days before he died, he signed off on the report of the Congressional Commission on Maintaining United States Nuclear Weapons Expertise. When printed, the report carried a prologue that included the following dedication:

Henry Kendall was a brilliant scientist who worked unceasingly on public causes, including this Commission where his contributions dot every page. In signing this report, Henry accomplished the last official act of his life and it thus is only fitting that the report be dedicated to his memory. As Rilke wrote shortly before you were born, "Silent friend of many distances, feel how your breath is still expanding space."

Henry had never been on a rope when he went to Stanford in 1956, but within two years he became a topflight climber in Yosemite National Park, and a member of expeditions to the Andes. Perhaps his greatest climb was that of the notorious Walker Spur on the Grandes Jorasses (a 4208-meter-high peak in the Mont Blanc massif) with Gary Hemming in 1962, the first such ascent by Americans and the swiftest by far up to that time. For 50 years he was a serious diver—summer and winter off the New England coast, and as far afield as the Falkland Islands and South Georgia.

Henry will be remembered as a man who always strove to scale the greatest and most formidable heights, whether in science, in the mountains, or in the pursuit of human welfare, with a warm smile for his companions and indomitable courage.

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Stanley Geschwind

Stanley Geschwind, long associated with Bell Labs and recently a physics professor at Clark University, died on 8 February 1999.



STANLEY GESCHWIND

Born in Brooklyn, New York, on 22 November 1921, Stan earned a BS in physics at the City College of New York in 1943. After service in the US Army, for which he installed radar stations in the Pacific theater, he earned an MS at the University of Illinois in 1947. He continued his graduate studies at Columbia University, where, under the guidance of Charles Townes, he earned a PhD in 1951.

In 1952, Stan began a stay at Bell Labs, where he remained until his retirement in 1991. Throughout this period, he was actively doing experimental work, despite his responsibilities as head of the quantum and solid-state physics department (1965–82) and his extensive involvement in outside committees and editorial affairs.

After he left Bell Labs, his energy sparked a new career at Clark as a true academic—creating courses, guiding graduate students, setting up a laboratory, and writing grant proposals—all with resounding success.

Stan's research contributions were numerous and considerable.

Stan worked with Townes on several applications of wartime microwave techniques. On one of these, the precision measurement of atomic masses, he wrote the first of his substantial review articles. In his early years at Bell Labs, when ferrites and rare earth iron garnets were rejuvenating the field of magnetism, Stan, after contributing to ferromagnetic resonance, turned to electron paramagnetic resonance (EPR). In this field, Stan made extensive studies of magnetic ions in crystal environments. In 1959 (with Jacques Brossel, Arthur Schawlow, and Bob Collins), he used optical detection

techniques to look at EPR in an excited ion. Here, if one microwave photon is absorbed and one associated photon is emitted, detecting the second event is much easier. With Frank Imbusch, Stan showed that EPR could be observed in fine detail on weakly populated excited states, where microwave absorption was inaccessible, by observing changes in optical properties. He then exploited the great sensitivity of optical detection in various other contexts. For example (with Bill Brya), he directly observed the hot photons involved in a microwave-induced bottleneck by means of Brillouin scattering. Later, he became interested in the magnetic properties of the doped semiconductor *n*-cadmium sulfide. With Robert Romestain, Patrick Hu, and others, he investigated these properties extensively, using spin-flip Raman scattering (SFRS) as a tool. In addition to showing that this antiferromagnetic system showed no ordering in the millidegree range, they observed coherent states induced by the microwave field, confirmed the predicted existence of a linear momentum term in the band energy, and found an SFRS echo. Stan also used elastic light scattering to measure spin correlation length in a spin glass.

Stan enjoyed great respect both as person for his modesty and integrity and as a very fine experimenter. He always began to address a problem by talking to other people until he understood it fully. He had a justified confidence in his equipment and colleagues, he treated his data with respect (and skepticism), and, at the end of an experiment, he knew what had been achieved and could communicate the results clearly. His thorough and meticulous methods and his obvious love of the game made a lasting impression on the younger people who worked with him. He enjoyed extending his wide knowledge of physics by talking to other physicists.

His desire to be clear about things and his respect and sympathy for others made him a natural teacher. When, in his seventies, he put together his courses at Clark, they turned out to be impressive in their breadth and presentation. And they were very popular. His years at Clark were a deserved success and a splendid close to lifetime doing physics.

LARRY WALKER

Bedminster, New Jersey

YAKO YAFET

Maplewood, New Jersey ■