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Robert Phillip Sharp

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Volovik, made fundamental contributions to that area. In particular, the two showed that the v-vortex, a nonaxisymmetric vortex, can be stable. That finding was important in resolving the nature of the vortex–core transition in superfluid ^{3}He, which had been discovered experimentally some years before. For that work, they received the Köorber Foundation's Award in 1987 for the Advancement of European Science. Their jointly written article published in *Reviews of Modern Physics* in 1987 is still a standard reference on the topic.

Salomaa became an associate professor in 1994 and, in 1996, was named both a full professor of theoretical materials physics at TKK and director of TKK's Materials Physics Laboratory. His tremendous energy and organizational skills made him an appropriate choice to direct the lab. He was determined to move the facility into new areas and did so successfully, and active collaborations with prominent scientists from the US, Japan, and European countries became a feature of the lab. Salomaa built a theoretical research group that worked in BEC, quantum computing, and nanotechnology. He also reorganized the curriculum to include those forefront topics. In nanotechnology, the group contributed to the theory of quantum dots, superconducting interfaces, scanning-tunneling-microscope spectroscopy, and other subfields. In BEC of alkali metal atoms, his research group studied the structure and stability of multiply quantized vortices at ultralow temperatures. In quantum computing, the group has been working on optimizing the computing resources both in holonomic quantum computing and in ordinary Hamiltonian quantum computing.

In 1996, Salomaa initiated a large, new area of theoretical and experimental research in the Materials Physics Lab: the propagation of surface and bulk acoustic waves (SAWs and BAWs). The group doing this research has become one of the largest and most active worldwide. Filters that use SAWs and BAWs are fundamental components of mobile phone systems and Bluetooth technology; consequently, they have been of great importance to the Finnish economy. The group's work on Green's-function theory of leaky SAWs, propagation of SAWs in reflecting structures, and laser probing (visualization) of gigahertz-range SAW devices are fundamental contributions. A remarkable paper on acoustic loss mechanisms in leaky SAW resonators earned Salomaa and his collaborators the 2002 Outstanding Paper Award, given by the Institute of Electrical and Electronics Engineers' Ultrasonics, Ferroelectrics, and Frequency Control Society.

Salomaa was a very patriotic Finn whose career was dedicated to ensuring that Finnish physics and technology meet the highest international standards. He succeeded, both in his personal scientific work and in the work of the material physics laboratory that he headed.

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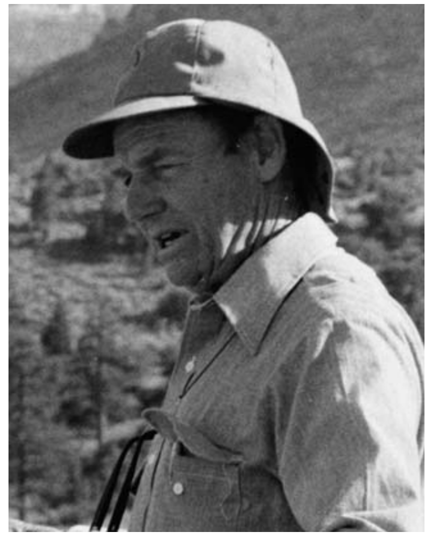

Robert Phillip Sharp

Robert Phillip Sharp, one of the leading figures of American geology, died peacefully in his home in Santa Barbara, California, on 25 May 2004. Bob's enormous contributions on the physical processes that have modified the surfaces of Earth and Mars are scientific classics that have substantially enhanced our understanding of the unique roles of water, wind, and ice in modifying planetary surfaces. Virtually an equal contribution was Bob's vision and leadership in geological academia, primarily at Caltech.

Bob was born in Oxnard, California, on 24 June 1911. As an undergraduate at Caltech in the 1930s, he was quarterback of the football team in his senior year and an outstanding student. He chose to do his doctoral work at Harvard University and prepared a thesis, under Kirk Bryan, on the geology of the Ruby–East Humboldt Range area of northeastern Nevada, where his discovery of Pleistocene glacial landforms in the summit area sparked an interest in glaciers and glaciation that persisted throughout his career. He also participated in a two-month geological expedition boating down the Grand Canyon, the inner gorge of which was, at the time, essentially terra incognita in terms of its geology.

Jobs were scarce in 1938, when Bob obtained his doctorate, and he felt lucky to land an academic position at the University of Illinois. He was called into military service with the US Army Air Corps five years later and researched and wrote survival manuals for downed fliers in the North Pacific–Alaska region. His personal survival experiences in the westernmost Aleutians and on the slopes of Mt. McKinley further stimulated his interest in a variety of geological topics, particularly glaciology.

After a brief postwar period at the University of Minnesota, he returned in 1947 to Caltech, where he spent the remainder of his academic career. His teaching was legendary, particularly his introductory geology course. On nomination by a group of undergraduates, he was named by *Life* magazine in 1950 as one of the top 10 US college teachers of the year. In 1952, he was appointed chairman of the division of geological sciences and, during the ensuing 16 years, played a central role in building Caltech into a leader in innovative efforts in geochemistry and planetary science.

In his research, Bob embarked on a major drilling program on the Malaspina Glacier in southeastern Alaska in an attempt to better understand the physics of glacier flow. He subsequently shifted that effort to the Blue Glacier on Mt. Olympus in northwest Washington. His collaboration with geochemist Sam Epstein led to pioneering efforts in climate change. Bob also studied the role of wind as a geological agent; his work on dune formation is particularly well known. Around 1961, another important chapter in his scientific career began with attempts to understand geological surface processes on Mars. Bob and Caltech colleagues formed the team to evaluate the *Mariner* TV imaging of Mars and contributed to the recognition of the role water played in Martian evolution, still a central theme in our growing understanding of that planet.

Bob's leadership at Caltech was punctuated by two major developments. The first was the phasing out of the vertebrate paleontology program and a major thrust, supported by Linus Pauling and others, into the emerging area of geochemistry. Many classical geology colleagues around the country, who literally accused Caltech of "selling out" geology to the geochemists, initially did not look favorably on the new emphasis on geochemistry. However, they subsequently recognized it as a forward-looking and daring move. The second new thrust in the 1960s required a choice between ocean-floor geophysics and planetary science. The presence in Pasadena of the Jet Propulsion Laboratory was a strong argument in favor of planetary science, and Bob even received the blessing of the Caltech astronomers, who were deeply engrossed in far-out space and were quite willing to "give away" our solar system to the geologists.

Numerous national honors were bestowed on Bob during his career. But the two in which he took the most pride were the 1977 Penrose Medal of the Geological Society of America—its highest honor—and NSF's National Medal of Science, presented to him in 1989. When awarded the Penrose Medal, he commented that "few scientists in other professional fields seem to enjoy and savor their work as fully as do Earth scientists." If there was one activity Bob enjoyed above all, it was the planning and leading of geological field trips for students, alumni, and others. Those included yearly trips to Hawaii for graduating students.

It is an intriguing enigma that Bob, with his profoundly rigid self-discipline and basically conservative ways, would nevertheless leave a lasting legacy of truly forward-looking innovation in his scientific and academic ventures. He is remembered so fondly by a multitude of friends from all walks of life as an immensely warm and generous individual.

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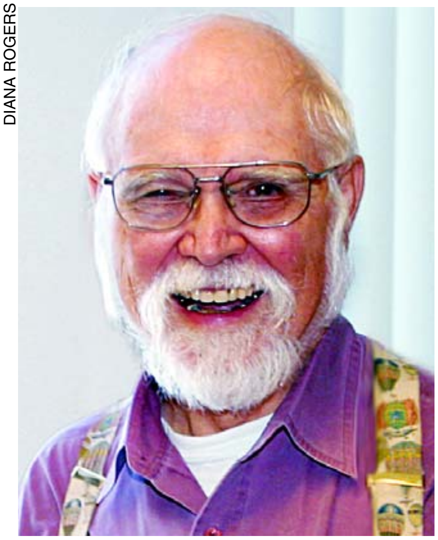
William Edward Spicer



DIANA ROGERS

William Edward Spicer

William Edward Spicer, a pioneer in the field of photoelectron spectroscopy, teacher, mentor, and inventor, died of heart failure on 6 June 2004 while vacationing with his family in London, England.

Born in Baton Rouge, Louisiana, on 7 September 1929, Spicer overcame learning and speech difficulties to obtain a bachelor's degree in physics in 1949 from the College of William and Mary in Williamsburg, Virginia. He earned a second bachelor's degree in physics from MIT in 1951. He then attended the University of Missouri–Columbia, where he received his master's and doctoral degrees, both in physics, in 1953 and 1955, respectively. His doctoral thesis, prepared under the guidance of Eugene B. Hensley, was on luminescence from sodium chloride.

For the next seven years, Spicer worked at RCA Research Laboratories in Princeton, New Jersey, where he studied photocathodes. In doing so, he developed a keen understanding of the photoemission process. That work ultimately developed into his career. In the late 1950s, he used the studies of specific photocathode materials to develop a general model of photoemission, which led to the later use of photoemission as a scientific tool.

After coming to Stanford University in the early 1960s, Spicer pioneered the use of photoemission spectroscopy to study the band structure of solids. He introduced the so-called three-step model to interpret the results and connect the measured photoemission spectra to the electronic band structure. According to the model, the photoemission process occurs in three independent steps: photoexcitation, transport to the surface, and escape of the electron into vacuum. Spicer's pioneering work opened up a new field that over the years has become the main line of research for hundreds of scientists worldwide. During his more than 40 years at Stanford, he was instrumental in further developing the technique and its application to a broad range of problems in condensed matter physics.

Spicer's interest in photocathodes extended to industrial applications, including early development of the medical x-ray image intensifier tube and the night-vision tube. The US military today uses night-vision devices based on those developments. On learning of Spicer's death, John Pollard, a scientist at the US Army's Night Vision Laboratory, left a note that stated, "Our night-vision capability today stems from his efforts, and our soldiers owe a debt of gratitude to Professor Spicer for his vision, insight, and deep understanding. We have lost a true giant."

Spicer recognized, though, that the light sources he was using for his research were limited and that synchrotron radiation would provide a superior excitation source. As soon as he learned that SLAC was building such an accelerator, he wrote a letter to Wolfgang Panofsky, then director of SLAC, and explored the possibility of accommodating a port on the new accelerator for use in solid-state physics. As a result of that letter, a port was added to the SPEAR storage ring, and in the early 1970s, Spicer and Seb Doniach cofounded what is now the Stanford Synchrotron Radiation Laboratory. Spicer immediately started using synchrotron radiation along with his laboratory sources.

Spicer published more than 700 papers in refereed journals, and during his long career at Stanford, he supervised more than 80 doctoral students. He also worked hard to recruit women and minorities into his group. One of the honors he treasured most was the American Association for the Advancement of Science's Lifetime Mentor Award, which, in 2000, recognized his contributions to that effort. Spicer received other prestigious awards, including the American Physical Society's Oliver E. Buckley Prize in 1980, Scientist of the Year by *R&D Magazine* in 1981, and the Medard W. Welch Medal of the American Vacuum Society (now AVS Science & Technology Society) in 1984.

Spicer was an avid reader of books in a variety of fields. He had a deep love for history in general, and over the years, he amassed a remarkable stamp collection that focused mostly on military and postal history. He was also an accomplished tennis and bridge player.

Colleagues at Stanford and worldwide sorely miss Spicer for his pioneering work and high professional standards. His many students remember him as a caring and understanding mentor who was supportive not only during their scientific training, but also personally. For those of