

and millions of dollars in ships and equipment."

At the end of World War II Vine used his contacts in the Navy and the submarine forces and his part-time job in the Bureau of Ships to foster the use of submarines in oceanic research. In due course his persistence resulted in the acquisition by the Scripps Institution of Oceanography of an upended submarine known as Flip for use as a stable, quiet sonar platform, and the construction—funded by the Navy—of ALVIN at the Woods Hole Oceanographic Institution. ALVIN is still operated by Woods Hole for use by the oceanographic community.

Vine also was one of a group of oceanographers who measured waves created by the atomic-bomb test at Bikini.

Allyn Vine contributed innovative ideas and instruments to the fields of underwater acoustics, seagoing platforms, marine geology and marine engineering equipment. Perhaps his greatest impact was in stimulating young scientists to work and excel in those fields. As an emeritus scientist at Woods Hole he continued to impart his enthusiasm, counsel and inspiration to emerging scientists by his many lectures and discussions with them.

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Josef Meixner

Josef Meixner died on 19 March 1994 in Aachen, Germany, after a hospital stay of several months and some serious operations. During his final illness he did not lose his intellectual interests and his vivid concern for family and friends.

Meixner was born on 24 April 1908 in Percha, Bavaria. He studied mathematics, physics and physical chemistry at the University of Munich and received the Dr. Phil. in 1931 with a thesis in physics. Subsequently he taught in secondary schools in Munich for two years. From 1934 to 1939 he was an assistant to Arnold Sommerfeld, also in Munich. In the next several years Meixner lectured at the Universities of Giessen and Berlin and at the Technical University of Aachen. His academic activities were interrupted during the war, when he was a soldier at the Russian front, serving in polar regions under very hard conditions. In 1948 he became a full professor of theoretical physics at Aachen, where he stayed despite several attractive

offers from other universities in Germany and abroad. He was on the faculties of both natural science and electrical engineering. After his official retirement he remained active in science and was a visiting professor at universities in the US and Japan.

Meixner's early work on topics such as quantum spectroscopy, the scattering matrix in Kepler theory, the diffraction of electromagnetic waves and the Green's function of the Dirac equation led to his intense preoccupation with mathematical physics. A major part of Meixner's research work concerned the thermodynamics of irreversible processes, and he is counted as one of the founding fathers of that field. He pointed out that Onsager's symmetry laws had important consequences, many of which he reported on in a famous article with Helmut G. Reik in *Encyclopedia of Physics III* (Springer, 1959). On a slightly different tack Meixner and Heinz König proved a very general theorem on the connection between energy dissipation and the causality condition. Together with Gottfried Falk he studied fundamental principles of the theory of irreversible processes.

In addition to research, academic teaching was a great concern of Meixner's, and he had a strong influence on his students. Several papers he wrote on connections between thermodynamics and the theory of electrical networks were suggested by his teaching of electrical engineering.

Josef Meixner applied severe but just standards in both research and teaching. His well-founded, not-always-comfortable judgments were highly respected by his colleagues. His pointed and laconic way of speaking could sometimes be mistaken as impersonal, but in nearer contact one realized his broad-minded and warm interest. All who knew him closely know that he had a fulfilled life, one that will have a rich and lasting effect.

FRIEDRICH SCHLÖGL
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Ramabhadra Vasudevan

Ramabhadra Vasudevan died of cardiac arrest on 3 January 1994 in Madras, India. He was 67 years old and was retired from his position as a senior professor at the Institute of Mathematical Sciences in Madras, which he had joined as its first permanent member in 1963.

Vasudevan's research career

started with applications of stochastic theory to physical problems. He made significant contributions in theoretical physics, applied mathematics and biomathematics. His single-minded devotion to scientific research led him to publish more than 150 research papers in probability, stochastic processes, radiative transfer, radiation dosimetry, neural nets, cell growth, blood flow problems, generalized Clifford algebra and theoretical physics, all of which stand as testimony to his erudition and creativity.

Vasudevan obtained his MA in physics (1947) from Madras University and lectured at several government colleges in Madras for a decade. During that period he also got his MSc in theoretical physics (1954) and his PhD (1960) in stochastic theory from the same school, under the guidance of Alladi Ramakrishnan. He was a senior research physicist at the Universities of California in San Diego (1959–61) and Berkeley (1961–63 and 1965–66) and had visiting appointments over the years at a number of institutions.

In 1959 at the Rand Corporation in Santa Monica, California, he met Richard Bellman, with whom he was to develop a lifelong collaborative effort. Together they wrote a series of publications in applied mathematics, culminating in their book *Wave Equations—An Imbedding Approach* (Reidel, 1986), completed after Bellman's death in 1984.

His joint research with S. K. Srinivasan, mostly in queuing theory and quantum optics, resulted in several papers and a book: *Introduction to Random Differential Equations and Their Applications* (Elsevier, 1971).

Vasudevan was a voracious reader and a scholar in Tamil literature. He was modest and led a simple life, enjoying discussions in physics with his academic friends, for whom his absence is a great loss.

K. SRINIVASA RAO
R. SRIDHAR
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Joseph Morgan

Joseph Morgan, emeritus professor of physics at Texas Christian University in Fort Worth, Texas, died on 30 April 1994 at his home in Oakton, Virginia. He was 85.

Morgan received his PhD in physics from MIT in 1937. He was an instructor and assistant professor of physics at Texas A&M University from 1938 to 1941, when he became an assistant professor of physics at TCU. He re-