

tion in the field, designing prototypes to confirm the theory and then transferring the technology to manufacturing use.

Paek received a PhD in applied physics from the University of California, Berkeley, in 1969. He then joined AT&T Bell Labs in Princeton, New Jersey. In 1991 he became executive vice president of the Korea Academy of Industrial Technology, in Seoul.

Raymond L. Taylor, Jitendra S. Goela and Michael A. Pickering, an engineering team at Morton International of Woburn, Massachusetts, were recognized for "contributions to the development of chemical-vapor-deposited polycrystalline SiC and Si and their applications in large lightweight Si/SiC mirrors." This work has led to optics that can withstand extreme environmental stresses and produce more precise, lower cost data.

Taylor, who is Morton International's vice president for research and engineering, earned a PhD in chemistry from Caltech in 1960. From 1959 to 1973 he was a researcher with the Avco Everett Research Lab, and from 1973 to 1980 he was with Physical Science Inc in Andover, Massachusetts. He joined Morton International in 1982.

Goela received a PhD in mechanical engineering from Brown University in 1976 and then worked for Physical Science Inc. From 1978 to 1984 he was on the mechanical engineering faculty at the Indian Institute of Technology. He joined Morton Thiokol-CVD (now Morton International) in 1984 as a principal research scientist.

Pickering, also a principal research scientist at Morton International, received a PhD in physical chemistry from Brown in 1982. He joined CVD International the following year.

OBITUARIES

Robert Karplus

After an eight-year illness following a heart attack, theoretical physicist Robert Karplus died on 20 March 1990. Since 1954 he had been a faculty member of the physics department of the University of California, Berkeley.

Karplus, born in Vienna in 1927, received both his undergraduate and graduate education at Harvard University. His early interest was in chemical physics: His 1945 BS degree was in chemistry and physics, his 1946 MA in chemistry and his 1948 PhD thesis in microwave spectroscopy.



Robert Karplus

py. During a two-year postdoctoral stint at the Institute for Advanced Study in Princeton, Karplus's interest shifted to high-precision quantum electrodynamics, whose development at that point lay at the frontier of science. Karplus's focus on QED continued throughout his next four years as a junior faculty member at Harvard. He collaborated with Norman Kroll, Abraham Klein and Julian Schwinger, among others, in a golden period of theoretical development. Karplus's contributions to precise QED predictions included Feynman-graph calculations of the electron's magnetic moment, scattering of light by light and the fine structure of positronium as well as of atoms. Especially attention getting was his graph-based work with Kroll on the fourth-order correction to the electron's magnetic moment; the complexity of this calculation was then unprecedented at the frontiers of physics. In 1954 Karplus moved to the University of California as a tenured faculty member.

In the mid-1950s Karplus's interests broadened to include strong interactions, where even though perturbation theory was invalid, Feynman graphs had become recognized as somehow relevant. Landau eventually formalized the relevance in 1959 through his rules associating S -matrix singularities with graphs, from which work analytic S -matrix theory emerged. Karplus's work with collaborators such as Charles Sommerfield and Eyvind Wichmann was a precursor to Landau's insight.

Karplus entered a totally different career in the early 1960s. He became fascinated by the process of science learning in young children (Karplus himself had seven children), and he

commenced research in this area, which had largely been ignored in the US. His Elementary School Science Project led to the 15-year, NSF-funded Science Curriculum Improvement Study. The SCIS was centered at the Lawrence Hall of Science in Berkeley, where Karplus served as associate and then acting director during the 1970s. What Karplus and colleagues uncovered through the SCIS is used today in developing almost all experience-based elementary-science curriculums.

Karplus was himself a talented teacher, an attribute related to his cheerful, generous personality and his sense of humor. He made important contributions to self-paced teaching at the college level, and he served a term as president of the American Association of Physics Teachers in 1977-78.

GEOFFREY F. CHEW
University of California, Berkeley

W. Carlisle Barber

Walter Carlisle Barber, emeritus professor of physics at MIT, died on 11 November 1990 in Fort Myers, Florida. He was 71.

Born in Logan, Utah, Barber graduated from Utah State College in 1940 and received a PhD in physics from the University of California, Berkeley, in 1948. During World War II he worked at Berkeley's Radiation Laboratory and then at the Naval Ordnance Research Plant in Indiana. He joined the physics department at Stanford University in 1948 and from 1962 to 1968 was the director of the Stanford High Energy Physics Laboratory. In 1968 he joined the faculty at MIT, where he taught and did nuclear physics research at the MIT-Bates Linear Accelerator Center. He retired in 1984.

Carl skillfully guided the Stanford HEPL through a difficult transition period: Stanford's more powerful SLAC machine was under construction during that time, and difficult decisions had to be made on the HEPL program, which by then had acquired a major cryogenic component. Carl handled conflicting demands on the use and program of HEPL with professional competence tempered by patience and understanding.

Barber was probably best known for his photonuclear and electron-scattering studies using the low-energy Mark II accelerator at Stanford in the 1950s and 1960s. His pioneering work in the inelastic electron scattering from nuclei provided an incentive for several domestic and foreign labo-