John Beverley Oke

in astronomy in 1953 under Lyman Spitzer Jr. In his thesis, he constructed theoretical models of O stars. That same year, Oke joined the faculty of Toronto as a lecturer in astronomy and, in 1955, was appointed an assistant professor.

In 1958, Oke moved to Caltech to take an assistant professorship. He was the person most responsible for keeping the 5-meter Hale Telescope at the Caltech-operated Palomar Observatory a first-rate facility by building a sequence of progressively more complex, elegant instruments to improve the telescope's light-gathering power. He began with a single-channel scanner. Then, as photomultipliers became more widely available, he designed and built the multichannel scanner, which he completed in 1968. Its ability to measure the absolute energy distribution of extremely faint objects benefited many astronomers over the years.

In the late 1970s, Oke and James Gunn used the new technology of CCDs to design and build a double spectrograph—one of the first uses of those devices for astronomical spectroscopy. The instrument has been widely copied and, with upgraded detectors, is still in use at the Hale Telescope. That project was a prelude to Oke's masterpiece, the Low-Resolution Imaging Spectrometer (LRIS), which he built for the first light of the inaugural Keck 10-m telescope. LRIS made possible many of the early successes of the Keck telescopes.

Oke realized that the absolute calibration of astronomical measurements was not sufficiently precise and was introducing significant uncertainties into the detections his new instruments could achieve. To remedy those problems, he and his postdoctoral fellow Rudy Schild placed a crucible of molten platinum (that is, a blackbody cavity) on a high tower at Palomar and then, using a 4-inch telescope, observed the crucible and the very bright standard star Vega. At that time, the resulting improved absolute flux they determined for Vega as a function of frequency had an uncertainty whose major contribution came from Planck's constant.

All of the instruments Oke built were created under difficult financial constraints, yet in each case, he achieved essential functionality without excessive and expensive complexity. He was a skilled instrument designer, and it was my privilege and pleasure to work with him on several projects, including the LRIS.

In addition to instrument design and construction, Oke also carried out an active research program on understanding the spectra of galaxies and quasi-stellar objects, the evolution of clusters of galaxies, and the properties of x-ray binaries. He retired from Caltech in 1992 and returned to his native Canada, where he worked part time at the Dominion Astrophysical Observatory in Victoria.

With his small team and minimalist elegant approach, Oke was among the small number of serious and excellent astronomer–instrumentalists so crucial to the development of our science. Palomar and Keck users owe him an enormous debt of gratitude for the years of effort he put into his instrument work. Yet Oke did not win a prize, nor was he given an endowed chair at Caltech. He was not the director of an observatory, although he was the associate director of the Hale Observatories from 1970 to 1978. It is only now after his death that the Palomar and Keck communities fully sense the breadth of his contributions and the magnitude of our loss.

Judith Cohen
California Institute of Technology
Pasadena

Hugh Campbell Paxton

Hugh Campbell Paxton, who made pioneering contributions in experimental criticality and the specialty of criticality safety, died on 25 December 2003 in Albuquerque, New Mexico.

Born in Los Angeles on 29 April 1909, Hugh attended UCLA, where he studied physics and earned an AB degree in 1930. During the early 1930s, he worked in the development division of the Bell Telephone Laboratories in California. He began graduate studies at the University of California, Berkeley, in 1932 and received his

Hugh Campbell Paxton

PhD in physics in 1937 under the direction of Ernest Lawrence.

That same year, he joined Frédéric Joliot at the Laboratory of Nuclear Chemistry of the Collège de France in Paris and began work to design and build a cyclotron. However, his planned two-year stay was cut short in 1938, when he and his wife were advised to return to the US because of the perceived threat of war. For the next four years, Hugh was an instructor in physics at Columbia University in New York City and continued his work in nuclear physics. He shifted to wartime activity in gaseous diffusion technology at Columbia's Substitute Alloy Materials Laboratory and at the Oak Ridge Gaseous Diffusion Plant in Oak Ridge, Tennessee. Peacetime found him engaged in precision casting development at the Sharples Research Laboratories in Philadelphia.

In 1948, Hugh became leader of the criticality group at the Los Alamos Scientific Laboratory when the science of criticality was just beginning and the safety of operations with fissionable materials was not yet formalized. He and Dixon Callihan of Oak Ridge Laboratory organized and systematized the existing data in a series of Atomic Energy Commission, Los Alamos, and Oak Ridge documents. Those data provided a foundation for conducting experiments and calculational studies, whose results were the basis for safety in operations of fissionable materials.

Some especially important experiments carried out under Hugh's direction established the bare and reflected metallic critical masses of plutonium-239 and highly enriched uranium-235. Further experiments at

Los Alamos with various assemblies used to establish the bare critical mass of metallic ^{235}U led to the design of the Godiva Reactor. After the reactor's reactivity was quickly forced to prompt criticality, it safely provided, within a few microseconds, large bursts of neutrons. In the late 1950s, the program to find how to apply nuclear energy to rockets was begun. Facilities at Los Alamos provided the critical experiments necessary to design the graphite-moderated, hydrogen-cooled propulsion units. That program was terminated before operational rockets were achieved.

Under Hugh's leadership of the criticality group, the experimental facility, designated Technical Area 18, in Pajarito Canyon, New Mexico, became world famous. During Hugh's tenure, no criticality experiment harmed any person—a remarkable record considering the number of experimental assemblies that have achieved criticality.

Hugh provided criticality and safety advice to the government on a number of occasions. He was active in the American Nuclear Society and associated organizations. A member of numerous and various committees, he also served on the board of directors of the American Nuclear Society (1966–69). Hugh retired from Los Alamos in 1976 and moved with his wife to Albuquerque in 2001.

Hugh's interests ranged from his work with colleagues in the field of nuclear physics to bird watching, excursions with friends, observations of wildlife, writing, photography, and treasured reunions with his brothers and sister and their extended families.

Norman L. Pruvost
William R. Stratton
Los Alamos National Laboratory
Los Alamos, New Mexico

Richard Thomas Robiscoe

Richard Thomas Robiscoe

Richard Thomas Robiscoe, an outstanding professor of theoretical physics at Montana State University (MSU) in Bozeman, died on 26 November 2003 in Bozeman as a result of congenital heart disease.

Dick was born in Detroit, Michigan, on 9 July 1938. As a child, he showed unusual talent at the piano, a love he pursued his entire life. He attended the University of Chicago to study theoretical physics and completed his master's work in 1961. He earned his PhD, under the direction of William Lichten, in 1965 for his dissertation on the Balmer series of hydrogen, particularly the study of level crossings in the excited states. Following postdoctoral work at Yale University, he joined the University of Michigan, Ann Arbor, in 1966 as an assistant professor of physics.

His early work was in experimental atomic and molecular physics using high-precision atomic beam spectroscopy, fundamental transition and decay processes, beam velocity distributions, and production of polarized beams. In that work, he continued to focus on hydrogen, specifically to study the Lamb shift. Dick was the first person, after Willis Lamb, to measure the Lamb shift, and did so by an original and ingenious method. Whereas Lamb used an RF field to induce transitions, Dick used a static electric field. And the hyperfine components went unresolved in Lamb's original work, but Dick could measure an isolated hyperfine component thanks to a special trick called the Majorana flop.

Dick's experimental skill was accompanied by a good understanding of theory. He collaborated with W. L. Williams of the University of Michigan to measure once more the hydrogen fine structure. As sole author of the papers derived from his PhD thesis work, Dick had published results that deviated slightly but significantly from conventional wisdom. The pressure was on him to confirm his published work with a new and improved experiment that he and Williams, as young assistant professors, had devised after much consultation with their senior colleague Robert Lewis.

In 1967, Dick first saw the town of Bozeman while on a fishing vacation. He returned for a family vacation in 1968, which subsequently led to the family's relocation there in 1969, when Dick accepted a position in MSU's physics department. Except for a few years as a visiting professor of physics at ETH Zürich and as a visiting professor and consultant at Los Alamos National Laboratory (LANL), Dick remained at MSU for the rest of his career.

From the late 1960s to the mid-1980s, Dick's interests turned mostly to theory, especially in atomic physics and applied quantum mechanics. His work included analyses of experimental systematics, basic transition mechanisms and rates, and perturbation calculations. In addition, he spent time on energy conservation and exponential decay. He continued theoretical modeling and, in the late 1980s, began a collaboration with LANL on electromagnetic pulse phenomena, including pulse generation, propagation, and detection. During that period, he also became an expert witness on automobile accident reconstruction.

Dick's love of language and his wonderful sense of the ridiculous were especially evident when he wrote the classic letters on the "chicken accelerator" (see PHYSICS TODAY, April 1971, page 9) and the "John Quincy atom" (PHYSICS TODAY, January 1973, page 101). He retired from MSU in 1996.

Dick loved camping, fishing, and enjoying the Montana wilderness. He loved classical music, as both a performer and an audience member. He was an avid reader, a devoted fan of the Detroit Tigers, and a correspondent par excellence.

Perhaps Dick's most enduring legacy is the influence he had on his graduate students, who remember him as a devoted, organized, and caring teacher. If there was something he knew and you didn't, he could find a way of helping you understand. He was commonly described as witty and dedicated, or as "the best teacher I ever met." His class notes were legendary: meticulous, thorough, and better than a textbook. He once told his electromagnetism class that if he got his way when he died, he would ask God to show him an electron. He was universally adored and revered as a teacher, and, despite his health problems, students profited from his "beautiful mind." Not surprisingly, he chose as his epitaph, "Time flies like an arrow, fruit flies like a banana." To quote his son Richard, "He had passion."

John E. Drumheller
William A. Hiscock
Montana State University
Bozeman