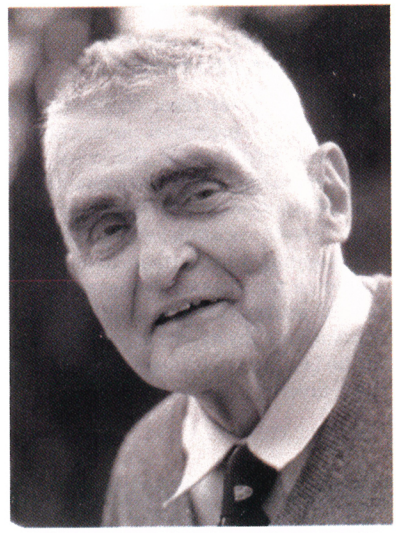
Ivan was born in Vienna on 17 June 1918; he was graduated from the University of Ljubljana in 1941 with majors in mathematics and chemistry, and a minor in physics. In 1951 after completing his PhD dissertation on the diffusion of light, he became a docent. He was appointed professor in 1959 and professor in 1963.

As World War II ended, Ivan and his colleagues began the process of building the physics program at Ljubljana to the point where, today, many of its faculty members and students are scientists of international renown. Two generations of Slovenian physicists are indebted to him for publishing textbooks and lecture notes in their native language.

Through the late 1950s, he was driven to improve the physics department at Ljubljana. Then his interests turned to research, and he began a series of visiting appointments: the University of Birmingham, England (1952), a Fulbright–Hays fellow at the University of Michigan (1963), Brookhaven National Laboratory (1964–65), London's Queen Mary College (1966), Cornell University (1968–69), a Sherman Fairchild scholar at Caltech (1974), and the University of Kaiserslautern (1977–78). For a decade and a half after these travels, he had a series of short-term appointments at the University of Leiden and at Kaiserslautern. In 1996 Ivan was awarded an honorary DSc by the University of Waterloo in Canada.

Ivan's research was devoted to kinetic theory and nonequilibrium statistical mechanics, and to the transport theory of neutral particles. Not only was his physical insight first-rate, but his mathematical skills were exceptional, having been honed by his close association with the distinguished Slovenian mathematician J. Plemelj. Because Ivan was a fine raconteur as well, he was in considerable demand as a speaker at conferences: He finally had to adopt a policy of polite "no thank you" because the obligation began to spoil the pleasure he took in encounters with fellow scientists and friends.

From the mid-1950s to the mid-1970s, Ivan's research provided fundamental advances in the solution of the linear Boltzmann equation. His 1959 paper on the scattering of polarized light is regarded as seminal, and his work on the method of singular eigenfunctions facilitated greatly the method's use in the solution of linear transport problems. In the 1970s Ivan published extensively on the kinetic theory of rarefied gases and



Ivan Kuščer

clarified the interpretation of accommodation coefficients for gas–surface interactions.

For devotees of nonequilibrium statistical mechanics, the 1970s was a lively decade, during which new and powerful theoretical formalisms appeared ready to confront new experiments. Ivan immersed himself in these developments, which resonated with his interests—in particular the kinetic theory of molecules—and opened the next and final chapter of his career. His several successes in this field culminated with a study of diffusion in zeolites. Being published in a respected journal at age 80 is an achievement many of us would envy.

In addition to remaining active in research, Ivan continued to run the educational seminar program in Ljubljana's physics department and to improve his textbooks. He was passionate about hiking, which he tried to do every Sunday. His love of the mountains was matched by his enthusiasm for diving in the Adriatic. He and his brother Dusan experimented with underwater breathing systems as early as 1937, cutting diving masks from the inner tubes of truck tires, and building a manually operated pumping system that could be used at depths of up to 20 meters. His infectious enthusiasm for underwater exploration, along with a book that he wrote on the subject, led many young Slovenes to diving. Although most divers eschewed the manual pump in favor of the scuba tank, Ivan never abandoned his invention.

Ivan's friends were many and permanent. They considered it a privilege and a pleasure to have known such a keen and delightful gentleman and scholar.

NOEL CORNGOLD
California Institute of Technology
Pasadena, California
NORMAN MCCORMICK
University of Washington
Seattle, Washington

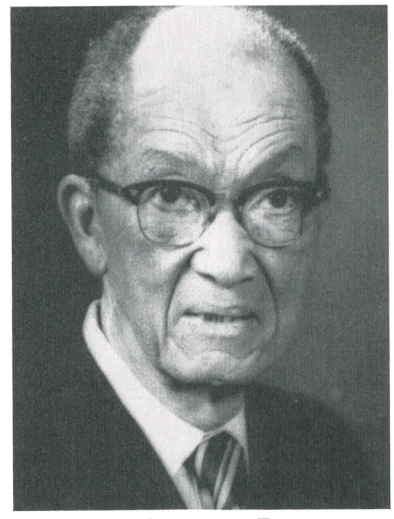
Donald Anderson Edwards

Donald Anderson Edwards, renowned physics educator and researcher, passed away on 19 December 1999 in Greensboro, North Carolina.

Edwards was born in Calhoun, Alabama, on 5 January 1905. His father, Edward Early Edwards, was a minister and his mother, Mary Maud Edwards, was a schoolteacher. He earned a bachelor's degree in mathematics (with a minor in physics) from Talladega College in Talladega, Alabama, in 1926 and a master's degree in physical sciences in 1931 from the University of Chicago.

Edwards spent the next 17 years teaching at a number of historically black colleges and universities (HBCUs), including Prairie View A&M University, Louisville Municipal College, Virginia State University, and Lincoln University–Missouri. During his years at Lincoln, Edwards served as physics professor and as chair of the physics department.

In 1948 while he was on the faculty at Lincoln, Edwards decided to return to graduate school to pursue his doctoral degree. However, due to racial segregation, the universities that Edwards preferred to attend in his native South would not admit him. Looking northward, Edwards decided



DONALD ANDERSON EDWARDS

instead to attend the University of Pittsburgh, where he earned his PhD in physics in 1952. His doctoral thesis was entitled "The Structural Characteristics of Some Magnesium–Cadmium Alloys between 25 °C and 300 °C as Determined by X-ray Diffraction."

Throughout his career, Edwards's research was mainly in the field of x-ray crystallography. He performed research at a number of institutions, including Oak Ridge National Laboratory, US Naval Ordnance Laboratory, University of Pittsburgh, and the HBCUs at which he taught. One of his earliest accomplishments was the determination in 1931 of the complete crystal structure of potassium nitrate.

In 1953 Edwards moved to Greensboro, North Carolina, where he became professor and founding chair of the physics department at North Carolina A&T State University. He chaired the department until 1971, during which period he inspired many young students to pursue careers in physics. Four of his most famous students were Joseph McNeill, David Richmond, Dwight Davis, and Ronald McNair.

McNeill and Richmond won worldwide acclaim in 1960 when, as freshmen on 1 February 1960, they were two of the four students who staged the first sit-in protest of the 1960s national student sit-in movement (at Woolworth's lunch counter in Greensboro). McNeill still values the years that he studied under Edwards.

Davis achieved worldwide fame as the chief cardiologist with the Penn State heart transplant team, when it became one of the first to use an artificial heart to keep a pre-transplant patient alive.

On many occasions, McNair publicly thanked Edwards for providing him with the academic foundation for his PhD in laser physics from MIT, and supporting him through NASA's astronaut selection process. Astronaut McNair perished in the 1986 explosion of the space shuttle *Challenger*.

To accomplish all that Edwards did, in spite of the racial barriers of his time, was truly phenomenal. Even more impressive is the statement recently made by his wife, Ruth: "Out of all the 65 years of our marriage, Donald never once complained about racial discrimination."

Edwards will surely be missed by all who knew him.

SEKAZI K. MTINGWA
North Carolina A&T State University
Greensboro, North Carolina

Richard Alexander Beth

Richard Alexander Beth, the first physicist to establish experimentally the angular momentum of light, died on 26 December 1999 at a nursing home in Princeton, Massachusetts. He had been hospitalized since suffering a stroke in October 1996.

Dick was born in lower Manhattan on 14 January 1906, the only child of German immigrant parents. He studied electrical engineering at Worcester Polytechnic Institute (WPI), where he earned a BS in 1927 and an MS in 1929.

He continued his education in Germany as an American Exchange fellow at the University of Frankfurt, which in 1932 awarded him a doctorate in mathematics for a dissertation under Hellinger on the spectral representation of J-forms. Dick's time in Germany coincided with the emergence of the Nazi party, which left a lasting impression on him.

When Dick returned to the US, his mentor at WPI, Alexander Duff, helped him obtain an assistant professorship there, which he held until 1939. In 1935 he published his best known work: the demonstration of the angular momentum of circularly polarized light, which he achieved as a research associate at the Palmer Physical Laboratory at Princeton University with the help and encouragement of Albert Einstein.

Dick returned to Princeton in the early 1940s to participate in war research on projectile penetration and other projects for the National Defense Research Committee's committee on passive protection against bombing. He worked under Walker Bleakney and became a department head in the National Defense Council, which was headed by John Burchard. For his war work, Dick received the Certificate of Merit from President Truman.

Although Dick was not involved with the Manhattan Project, he was selected for the Alsos mission. Led by General Leslie Groves and Samuel Goudsmit, Alsos sought to ascertain the extent of Nazi atomic research in the immediate aftermath of Germany's defeat.

In 1946 Dick was appointed chair of the physics department at Case Western Reserve University, but in 1954 he left that institution to work on the development of high-energy particle accelerators at Brookhaven National Laboratory. This work resulted in several published papers on the evaluation of electromagnetic fields and the production of current sheets of arbitrary cross section. He remained at Brookhaven until he retired in 1971.

RICHARD ALEXANDER BETH

Before taking up his position at Brookhaven, Dick served as a Fulbright exchange professor at the University of Innsbruck, and in 1963–64 he held a similar appointment at the University of Bonn.

After his retirement and until his stroke, he continued working at Brookhaven part-time as a consultant on various projects, including preliminary designs for the magnets of the ill-fated superconducting supercollider. During this phase of his life, he also occupied himself with gardening and recreations in projective geometry, as well as with his own modifications to the theory of quaternions and their applications to problems in relativistic physics.

A fellow of the American Physical Society and a member of Sigma Xi honor society, Dick strongly identified with his role as a scientist. He maintained an acute interest in the history and philosophy of science, and his heroes were Archimedes, Gauss, and Einstein. He also retained a deep affinity for literature and history, especially those relating to his German heritage.

For many of us—his younger colleagues—Dick was not only a mentor, but also an abiding friend with a sincere interest in our careers and aspirations. He is remembered with great affection and is sorely missed by his friends and colleagues.

PER F. DAHL
Emeryville, California ■