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PETER MEYER

the first balloon-borne magnet spectrometer for this measurement. They showed in 1964 that, indeed, the majority of the electron component is negative and, hence, must come from primary sources.

Further extensive studies on the electron component, including studies of electrons from the Sun and from Jupiter, were undertaken by Peter and his group (including Dietrich Hovestadt, Jacques L'Heureux, and Paul Evenson) for the next 20 years, using instruments on balloons and on space missions.

In another series of balloon experiments, Peter studied the elemental composition of cosmic rays at highly relativistic energies. Jointly with one of us (Müller) and graduate student Einar Juliusson, and at about the same time as observations of Luis Alvarez's group in Berkeley, Peter discovered in the early 1970s that the relative intensity of the secondary nuclei from spallation in interstellar space decreases continuously with increasing energy, as if the primary cosmic rays traversed a smaller and smaller galactic path length at higher energies. Therefore, the energy spectrum of cosmic rays at their sources must be different from that locally observed and must be quite hard—exactly as models of acceleration in strong supernova shocks would later predict. Those studies continued, and eventually led to a very large instrument, dubbed the "Chicago Egg," that was flown on the space shuttle Challenger in 1985. In that experiment, Peter and Müller, who were joined by L'Heureux and Simon Swordy, used transition radiation detectors for the first time to measure the energy of cosmic-ray nuclei in the TeV region.

There was a common thread to all of Peter's projects: He loved the challenge of applying new techniques to one-of-a-kind instrumentation flown above the atmosphere. To him, scientific discovery and experimental finesse belonged together, and he was extremely conservative in assessing the outcome of his work. Nothing irritated him more than far-fetched claims based on shaky data.

Peter was a devoted teacher. He became a foreign member of and frequent visitor to the Max Planck Institute for Extraterrestrial Physics in Garching, Germany. In 1984, he received the Alexander von Humboldt Award for Senior US Scientists, and in 1989, he was elected to the National Academy of Sciences. Many of his colleagues gratefully remember the open-mindedness and fair judgment he displayed as a member of numerous advisory boards and science policy committees.

Music was a serious passion in Peter's life; he was an accomplished cellist. Together with his first wife, nuclear physicist Louise Meyer-Schützmeister, who played the piano, he arranged for regular chamber-music evenings at his home. Those concerts, fondly remembered by all who had the privilege to listen, continued for nearly two decades after Meyer-Schützmeister's death in 1981. Peter married microbiologist Patricia Spear in 1983.

Peter was a Prussian of the old school: punctual, reliable, tolerant, and honest. He could be gregarious and had a wonderful sense of humor, traits that probably prevented him from talking with bitterness about his experiences during World War II. He was an outdoors enthusiast, and devoted to his family: Family vacations in the mountains, at his cottage on Lake Michigan, or in the Canadian wilderness, and regular ski trips were essentials in the yearly rhythm of his life.

Through firm guidance and unselfish advice, warm hospitality, or camaraderie at balloon-flight expeditions, Peter touched the lives and careers of the engineers and technicians who worked for him, professional colleagues, generations of college students, postdocs, and most of all, 17 graduate students who received their PhDs under his direction. To all of them, Peter's departure leaves fond and enduring memories.

ROGER HILDEBRAND
DIETRICH MÜLLER
University of Chicago
Chicago, Illinois

Richard Raymond Carlson

Richard Raymond Carlson, professor emeritus in the University of Iowa's department of physics and astronomy, died on 24 October 2001 in Iowa City of complications resulting from diabetes.

Dick was born on 15 September 1923 in Chicago, Illinois. He received his BS in physics in 1945 at the University of Chicago and conducted his MS and PhD research in what is now called the Enrico Fermi Institute for Nuclear Studies. He earned his MS in physics in 1949 and completed his physics PhD in 1951 under the direction of Sam Allison. Dick's thesis, "The Energy Release on the Break-up of ^{8}Be and the Energy Spectrum of the Alpha Particles Thus Released," was one of the first studies of the structure of intermediate-mass nuclei.

Dick joined the physics and astronomy department at Iowa in 1951 as an assistant professor. There, for the next 10 years, he carried out nuclear structure studies, mostly precision measurements of γ rays that were produced by proton beams from a 4-MV Van de Graaff accelerator and a high-current (100 μA), 500-kV Cockcroft–Walton accelerator. During the 1950s, he did research at Oak Ridge National Laboratory, Los Alamos Scientific Laboratory (now Los Alamos National Laboratory), and, as a Guggenheim fellow, Oxford University. In the course of his research at those labs, he learned new experimental techniques that he introduced to the nuclear program at Iowa.

In 1961, with a lithium-ion source in the old Van de Graaff at Iowa, Dick began research on the reactions of lithium ions on light nuclei. These

RICHARD RAYMOND CARLSON

studies were the first to use a general-purpose digital computer to record data from multiple detectors. Such multidimensional data acquisition was essential for effective use of position-sensitive silicon detectors, which were developed at Iowa for use with the lithium-beam experiments. Now, position-sensitive detectors are standard equipment in nuclear physics and elementary particle laboratories.

In 1964, Dick replaced the old Iowa Van de Graaff with a new 6-MV Van de Graaff (funded by NSF). He designed a carbon-foil mechanism that he inserted into the accelerating tube. As the singly charged lithium beams from the ion source passed through the carbon foil, one or two additional electrons were knocked off to produce Li^{2+} or Li^{3+} ions at a point about one-third of the way through the accelerating tube. With this feature, the 6-MV accelerator could put out beams of lithium ions with energies up to 13 MeV. For the next decade, Dick carried out a highly fruitful study of the reactions of lithium-ion beams.

For a number of years, Dick was the university's representative on the governing board of the Midwestern Universities Research Association, the precursor to Fermilab. Around 1980, health problems forced Dick to cut back on his experimental research activities. He then concentrated on finding optical-model potentials to describe lithium-ion scattering. He retained an active interest in the lithium-ion program until his retirement in 1994. He stayed in Iowa City after his retirement and remained available for consultation.

Dick also had broader concerns. For example, he was one of the eight University of Iowa physicists who, in 1961, signed a letter to the *Iowa City Press Citizen* that addressed the practicality of fallout shelters. The letter, written in response to a popular series of articles titled "You Can Survive Atomic Attack" (by Nobel laureate Willard Libby), played an important role in helping the public understand a complicated technical issue, and was reprinted in many newspapers.

Dick was an excellent and dedicated teacher. He designed a curriculum for engineering students that is still in use today. His students particularly remember his qualities as a teacher and mentor. His lectures were crisp and provided a lively entrée into nuclear physics. He encouraged his research students to be creative and independent, but offered just the right amount of guidance and wisdom so they could successfully complete their projects.

Edwin Norbeck
Gerald Payne
University of Iowa
Iowa City

Lawrence Nathan Hadley Jr

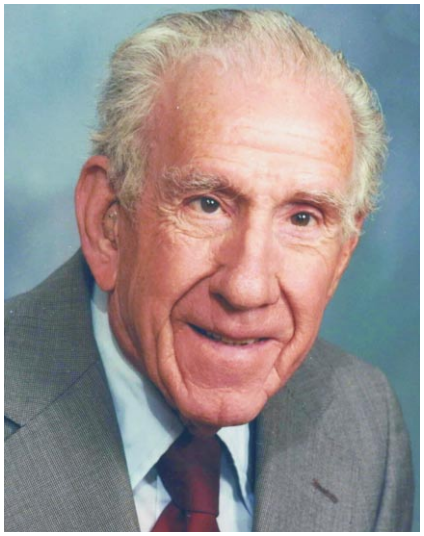
Lawrence Nathan Hadley Jr, a member of the physics faculty at Colorado State University for more than 45 years, died on 26 January 2002 in Fort Collins, Colorado, of age-related complications. His lifelong research interest was in optical properties of materials with an emphasis on thin films.

Lawrence was born on 14 October 1916 in Valley Center, Kansas. His skill at problem solving was first revealed when, as a boy, he and his father wired their home after electricity had first come to Kansas. They had holes beneath the floor in outside walls and at opposite sides of the house. The problem was to get wire from one side to the other. It was lunchtime, but Lawrence had an idea: He tied a piece of twine to the collar of one of the farm cats and tied the other end to a small board. He placed the cat in the space under the floor on one side and placed the board over the hole. After lunch they returned to find the cat on the other side of the house and it was then easy to pull the wire with the twine.

Lawrence received an AB degree in physics from Friends University in Wichita, Kansas, in 1937 and an MS in physics from the University of Oklahoma in Norman in 1939. His PhD dissertation, "Reflection and Transmission Interference Filters," was completed at the University of Michigan, Ann Arbor, in 1947 under the supervision of David Dennison.

While at Michigan in 1942, Lawrence worked on the proximity fuse project for the US Navy, which included firing test objects. On occasion, retrieval was complicated when the objects landed in patches of poison ivy.

After serving briefly as an assistant professor of physics at Colorado A&M (later Colorado State University) in the spring of 1947, he was appointed as an assistant professor of physics at Dartmouth College that same year. There, he enlisted a roomful of students using essentially all of Dartmouth's early mechanical calculators to compile the 147-page document "The Transmittance and Reflectance Versus Thickness/Wavelength for Thin Films."



Lawrence Nathan Hadley Jr

Lawrence returned to Colorado A&M as associate professor of physics in 1955, and was promoted to full professor in 1958. He served as the chair of Colorado's physics department for three years, beginning in 1965. Even after his official retirement in 1987, Lawrence continued to interact with faculty and students and was a regular attendee at the weekly physics colloquium.

In addition to teaching introductory physics to literally thousands of students in more than 10 000 lectures, Lawrence contributed in many other ways. He was active in the formation of the Colorado State University Research Foundation and served as both chairman of the board and as president from 1960 to 1964. Typical of Lawrence's dedication to physics and education were his enthusiasm and skill when he guided students through a new course called "Flying Circus of Physics." Students discussed topics ranging from "What is a water bell?" to "Why do sand dunes squeak?" In 2000, a new Foucault pendulum at Colorado State University was dedicated in Lawrence's honor.

In his spare time, Lawrence enjoyed carpentry and built several items for his house and yard. He played the organ, piano, and cello for relaxation. Lawrence will be remembered as an educator, scientist, gentleman, and gentle man.

David A. Krueger
Colorado State University
Fort Collins

Oliver Cecil Simpson

Oliver Cecil Simpson, a division director at Argonne National Laboratory (ANL) for many years,