Peter Meyer

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to nuclear physics. Rasetti's experimental skills proved of vital importance in work that led Fermi and his group, between March and October of 1934, to the discovery of neutron-induced radioactivity and of the unexpected properties of slow neutrons. Rasetti had become the group expert in the preparation of radioactive sources and, on another Rockefeller fellowship, spent 1931–32 learning radioactive techniques under Lise Meitner at the Kaiser Wilhelm Institute for Chemistry outside Berlin.

Rasetti traveled again in 1935 to spend a year at Columbia University, where he worked on slow neutron resonances and taught at Cornell University's summer school. On his return to Italy, he found a deteriorating environment; as he put it, "Fascism was rapidly turning from the nuisance it had represented up to that time to a tyranny affecting our everyday lives." When the racial laws promulgated in 1938 forced most of his friends and colleagues to emigrate, Rasetti could no longer find good reasons to stay in Italy and started looking for a position abroad.

In 1939, he accepted an invitation from the Université Laval in Quebec City, Canada, where a science faculty had just been created, to head the new physics department. In a matter of months, Rasetti transformed the two-room department into a modern laboratory. There, he resumed work on slow neutrons, and, in 1941, he turned to cosmic-ray research. He single-handedly built more than 60 Geiger–Müller counters and the electronic circuits by which he was the first to roughly measure the lifetime of the muon—what was then called the mesotron.

Like his spectroscopic work at Caltech, Rasetti's research on the lifetime of the muon illustrates his style of doing physics: a single, skilled researcher who performed experiments in splendid isolation, shunned large cooperative enterprises, and focused on one project until he had completely mastered it. Not surprisingly then, Rasetti did not look forward to the prospect of being involved in military research during World War II. His dislike for large, controlled enterprises coupled with his ethical objections to the use of science for destructive purposes led him to refuse an offer in early 1943 to take a position with a group of British scientists who had been transferred from England to Montreal and were working on the military use of nuclear energy. As Rasetti later noted, "There are few decisions I ever made in my life that I had less reason to regret."

Following the war, as physics moved toward the "big science" complex, Rasetti began seeking out work that would fit his styles and rhythms. While at Laval, he resumed his old interest in the Earth sciences, collecting trilobites. That interest soon evolved from a marginal pastime to a full-time endeavor, and he quickly became remarkably competent in paleontology. In 1947, he left Laval for a more attractive professorship in physics at Johns Hopkins University. However, his physics research was reduced to a minimum in the years that followed while he focused almost exclusively on geology and paleontology. His contributions to those fields earned him a reputation in scientific circles comparable to that already earned by his accomplishments in nuclear physics.

Rasetti kept doing fieldwork for a long time after retirement, climbing hills, collecting fossils and flowers, and contributing in various ways to different branches of the natural sciences. A born naturalist-turned-physicist almost by chance, he returned in his later years to that kind of scientific practice—individualistic, free from constraints, and feasible with limited means—that, as he said, could still be found in the natural sciences and that he felt physics had lost. Nonetheless, in the wake of Rasetti's relatively short trajectory in physics are some of the more remarkable experimental results of the 20th century. Rasetti's work is a splendid testimony of a style of research that, although by now may be lost, is so much more worth remembering.

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Peter Meyer

Peter Meyer, a distinguished cosmic-ray physicist, died in Chicago on 7 March 2002 from a stroke, following a long illness.

Peter was born in Berlin, Germany, on 6 January 1920 and grew up in the liberal environment of an educated, music-loving physician-family, attending an all-French–speaking high school. He studied physics at the Technical University in Berlin, with Hans Geiger as one of his teachers, and earned a degree as *Diplom-Ingenieur* in 1942. His partially Jewish origin put Peter in severe danger in Nazi Germany and excluded him from completing his doctoral studies.

After the war, Peter attended the University of Göttingen and received his PhD in physics in 1948 under the guidance of Wolfgang Paul. His thesis was on a precision measurement of the deuteron's binding energy.

Peter continued nuclear physics research at the University of Cambridge as a member of the university's staff and as a postdoctoral fellow. From 1950 to 1953, he worked as a staff scientist at the Max Planck Institute for Physics in Göttingen.

In 1953, Peter accepted an invitation from John Simpson to become a research associate at the University of Chicago's Institute for Nuclear Studies (now the Enrico Fermi Institute). With Simpson, he used detectors on military airplanes and high-altitude balloons to study global and time variations of cosmic rays. This work was essential to differentiating between galactic, solar, and terrestrial effects on the observed cosmic-ray intensities. From observations of a giant solar flare in February 1956, Simpson, Peter, and Eugene Parker concluded that interplanetary space contains a magnetic field embedded in a plasma; that idea later led to the concept of the solar wind.

Peter became an assistant professor in the physics department at Chicago and in the Institute for Nuclear Studies in 1956. He advanced to full professorship by 1965, served as the director of the Enrico Fermi Institute from 1978 to 1985, and was chair of the physics department from 1986 to 1989. He became a professor emeritus in 1990.

Peter collaborated with Simpson on some of the earliest cosmic-ray detectors flown in space. Simultaneously, he started an independent research program that would make use of increasingly sophisticated instrumentation on giant stratospheric balloons. Using purely electronic detectors, he succeeded in 1961, with his graduate student Rochus Vogt, in identifying the electron component in the cosmic rays, independently of the cloud chamber observations of James Earl at the University of Minnesota, made at the same time. A key question, whether these electrons were secondary debris from cosmic-ray collisions in interstellar space, or were mostly accelerated in primary cosmic ray sources, could be decided by measuring the proportions of negative electrons and positrons. Together with one of us (Hildebrand) and graduate students Jack Fanselow and Robert Hartman, Peter designed

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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.

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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