

first of about 130 physics papers to be published over the next 40 years, was entitled "The Zeeman Effect in the Cerium Spectrum between 3000 and 5000 Å" and was published in the *Physical Review* in 1927. With a master's degree and a publication in hand, he was accepted as a graduate student in physics at Yale, where he was appointed instructor in 1928 and awarded his PhD in 1929. He remained at Yale throughout his career and retired in 1969 as Eugene Higgins Professor of Physics, after 41 years on the faculty.

After his first papers describing experimental work, Margenau worked primarily in theory. He was especially concerned with the phenomenology of atomic and molecular forces, nuclear forces, line broadening and plasma physics, though he did make a fairly significant fundamental calculation of the relativistic correction to the electron magnetic moment in 1939.

Physicist and philosopher, Henry Margenau was always very much a teacher; over the years, he taught most of Yale's elementary courses and many of its graduate courses in physics. This didactic bent led to a textbook on elementary physics (with William Watson and C. G. Montgomery) and one on quantum mechanics. With George Murphy, he wrote a compendium of theoretical techniques for the advanced student, *The Mathematics of Physics and Chemistry* (Van Nostrand, 1943), which was known to generations of younger physicists simply as "Margenau 'n' Murphy." And his book *The Nature of Physical Reality* (McGraw-Hill, 1950) was the touchstone of those students who wanted to understand the bases of the knowledge they sought.

By the late 1920s, after relativity and quantum mechanics had swept away much of the classical epistemology of physics, the deep questions of the character of reality raised by the new physics interested Margenau deeply. His second scholarly publication, entitled "The Problem of Physical Explanation" and published in the *Monist* in 1929, was but the first of his more than 70 articles concerned with the philosophy of science. Eventually, he found the explanation of reality more interesting than the specific calculations of pieces of that reality that he did so well. After 1965, until his health failed as he entered the tenth decade of his life, he worked wholly in philosophy.

Among his varied publications on the philosophy of science, Margenau's early technical work on the theory of measurement in quantum mechanics was especially notable. In his later years, Margenau, a deeply religious man and a member of the Commission of the World Council of Churches,

moved away from the mainstream of philosophy and the philosophy of science toward explorations of his position that there are characteristics of the mind (and spirit) that are fundamentally apart from known physical mechanisms. He emphasized this position in the last of his nine books (with psychologist Lawrence LeShan), *Einstein's Space and Van Gogh's Sky* (MacMillan, 1982).

His friends remember Henry Margenau especially for his kindness and courtesy. As Paul Roman said of Margenau's friend and sometime collaborator, Eugene Wigner, Henry Margenau was a gentleman.

ROBERT ADAIR

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Jean Weil Gallagher

Jean Weil Gallagher, an international leader in providing atomic, molecular and optical data, died in Baltimore on 5 October 1996 following a long fight with cancer. She was 59.

Born in Buffalo, New York, Jean received a BS in physics in 1958 from Purdue University, an MS in physics in 1960 from Columbia University and a PhD in physics from New York University in 1965.

In 1974, Jean joined the staff of the Atomic Collision Data Center at JILA in Boulder, Colorado, working there part-time while her children were young, then full-time and finally, in 1980, becoming its director. Jean's forte was identifying the most urgent requirements for data evaluation and persuading the most qualified people to do the job. Many distinguished scientists came to the center during her tenure and produced compilations that have served as benchmarks for many years.

In 1988, Jean moved to Gaithersburg, Maryland, to manage the National Institute of Standards and Technology's physics standard reference data programs. There, she critically evaluated data in atomic, molecular and optical physics (AMOP). In pulling together the vast AMOP literature, she developed remarkable insight into the many techniques used to generate these data and a masterful ability to assess their adequacy. Her compilations and evaluations represent some of the most authoritative sets of AMOP data and are *de facto* standards for the execution and reporting of such measurements.

At NIST, Jean was able to assemble and nurture perhaps the best group of AMO physicists ever put together to evaluate the data. Her emphasis on computerized databases has made the resulting evaluated data more widely

used than ever.

In 1992, Jean became editor of the *Journal of Physical and Chemical Reference Data* and immediately expanded its coverage to meet the needs of the scientific community. She enjoyed interacting with the authors and reviewers of the journal and worked assiduously to maintain the high standard of their contributions.

Jean was an extraordinary woman who experienced both the demands and satisfactions of being a mother and a successful scientist. She was a person with wide outside interests, especially in art and nature. She was also a person of unassailable integrity, intelligence and dedication, who undertook a demanding career in the service of the larger community. Just as her outstanding compilations of evaluated data served as benchmarks, so her courage, humor and wisdom inspired all who knew her. Her friends across the world miss her.

**KATHARINE B. GEBBIE
JOHN R. RUMBLE**

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Rolf Wideröe

Rolf Wideröe, who was born in Oslo, Norway, on 11 July 1902, died on 11 October 1996 in Nussbaumen-Baden, Switzerland. At the age of 20, while studying electrical engineering at the Technische Hochschule Karlsruhe in Germany, he conceived the idea of an "electron beam transformer" (later called a betatron). Like many others at that time, he was inspired by Ernest Rutherford's first observations of artificial nuclear transmutations three years earlier. When Wideröe tried to make the electron beam transformer the topic of his PhD thesis at Karlsruhe, he was turned down.

Moving to the Technische Hochschule Aachen, he found the necessary support for the construction of such a machine, but his accelerator did not work. During his studies, however, Wideröe realized for the first time that the magnetic field strength at the beam orbit had to have a certain relationship to the magnetic flux inside of the orbit (the famous Wideröe 1:2 condition).

To get his PhD he quickly had to invent another new accelerator idea: He turned to the acceleration of heavy ions on a straight path, making use of an idea that a Swede, Gustav Ising, had published in 1924. But in place of Ising's shock wave excitation of drift tubes by way of delay lines, Wideröe applied RF voltages on drift tubes of appropriate lengths. He showed theoretically as well as experimentally that,

with the ion source and final beam catcher both at ground potential, the voltage gain of the particles in this first linear accelerator could be much larger than the applied RF voltage! The idea of particle acceleration through RF fields was born, and Wideröe earned his PhD from Aachen in 1927. Ernest Lawrence acknowledged later that Wideröe's 1928 publication in *Archiv für Elektrotechnik* had inspired in him the idea of the cyclotron. The synchrocyclotrons, synchrotrons and high-energy linear accelerators that followed were all based on the principle of RF acceleration.

After graduation, Wideröe left the field of accelerators and worked at Allgemeine Elektrizitäts Gesellschaft (AEG) in Berlin. In 1932, he returned to Norway and worked at N. Jacobsen in Oslo on electrical high power distribution systems. Only after Donald Kerst published results of the first working betatron did Wideröe resume work on accelerators and build a 15 MeV betatron. In 1943, while working on his betatron, Wideröe had an idea that was amazing for its time, the idea of colliding high-energy beams in storage rings instead of bombarding stationary targets. He was awarded a patent for this concept in 1943, although it was not published until 1953. That was only one of some 200 patents he was awarded during his career.

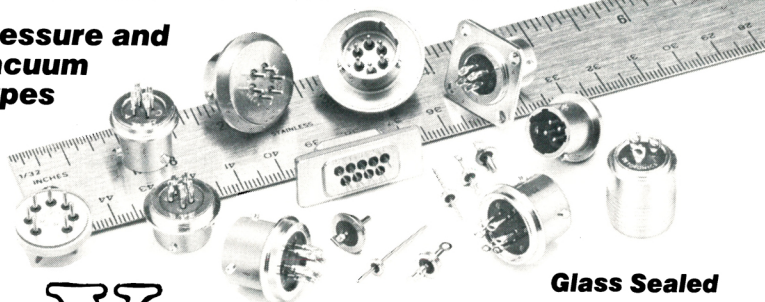
In 1949, Wideröe moved with his family to Zurich, Switzerland, to work at Brown-Boveri Corp on the development of betatrons for medical purposes and to teach at the Swiss Federal Institute of Technology, Zurich (ETH). He continued to work at Brown-Boveri after his retirement in 1969 and gave his last lecture at ETH in 1972. His main interest was the effects of radiation on biological cells. At the same time, he also followed closely the evolution of high-energy accelerators and served as consultant to various laboratories, among them (in the 1950s) the then newly founded laboratory called the German Electron-Synchrotron (DESY) in Hamburg. A member of the Norwegian Academy of Science, he received several honorary degrees in physics and medicine as well as the American Physical Society's Robert Wilson Prize in 1992.

Next to his science, Wideröe loved mountaineering and swimming. At the age of 92, when he could no longer walk, he had himself carried to the water, so that he could swim. To all accelerator builders, Wideröe will always be remembered as the founding father of modern accelerator science and technology.

GUSTAV-ADOLF VOSS
German Electron-Synchrotron
Hamburg, Germany ■

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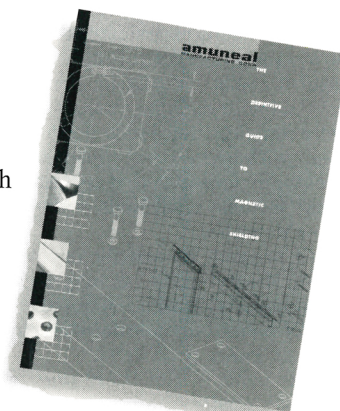
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