John C. Dainty has joined the faculty of the University of Rochester as associate professor of optics in the Institute of Optics. He was previously a lecturer in physics at Queen Elizabeth College, University of London.

Jay C. Young has been elected vice president of Stafco, Inc., a consulting team of engineers and scientists in the energy field. Since 1975 Young had been managing Stafco's Portland, Oregon division.

obituaries

Samuel A. Goudsmit

Samuel A. Goudsmit died on 4 December on the campus of the University of Nevada, Reno, where he had been a Distinguished Visiting Professor since 1974. Sam—as he was called by his friends—was a man of many parts and possessed an interesting and complex personality.

He was born in The Hague, Netherlands on 11 July 1902. He studied physics at the University of Leiden and received his PhD in 1927. As a beginning student, only nineteen years old, Goudsmit published his first paper (Naturwiss. 9, 995, 1921); he pointed out that the relativistic Sommerfeld formula for x-ray doublets was also valid for the alkali doublets. As George Uhlenbeck wrote to me: "It showed his remarkable instinct for finding empirical regularities. At that time because of the 'Rumpf-Modell,' Sam's paper was a kind of heresy, so that he never got the proper credit for it. Still, I think, it foreshadows the spin!"

After his first examination, he became a kind of "house theoretician" of Zeeman at the University of Amsterdam. While both Goudsmit and Uhlenbeck were still students they realized that the fourth quantum number introduced by Pauli in formulating his exclusion principle could be interpreted as a new degree of freedom of the electron. They found that a spin $\frac{1}{2}$ and a magnetic moment of one Bohr magneton could explain the spectroscopic results (Naturwiss. **13**, 953, 1925). Goudsmit and Uhlenbeck charmingly and instructively told of their outstanding discovery at the American Physical Society Annual Meeting in January 1976 (PHYSICS TODAY, June 1976, page 40). After some resistance—as any important new idea is likely to meet—and especially after Llewellyn H. Thomas had explained a missing factor of two in the doublet splitting as a relativistic effect, the electron spin was generally accepted and its role in atomic and solid-state physics recognized as basic. The generalization to protons and neutrons ensures its role also in nuclear and elementary particle physics. It is now generally believed that all matter contains spin-$\frac{1}{2}$ constituents, leptons and quarks (fermions), which communicate with each other via particles of integer spin (bosons). For electrons, Dirac's relativistic theory (1928) "predicts" the spin $\frac{1}{2}$.

GOUDSMIT

Among Goudsmit's many other spectroscopic contributions was the determination with Ernst Back of the first nuclear spin and its Zeeman effect in Bi^{209} from an analysis of its hyperfine structure (1927–28). Sam said that he was more thrilled by this discovery than by the electron spin.

In 1927 Goudsmit and Uhlenbeck joined the physics department of the University of Michigan at Ann Arbor. This was the first place in the United States to have a Physics Summer School, an idea inspired by Harrison M. Randall which has since spread all over the world. Goudsmit helped greatly in the running of the summer school. While at Ann Arbor, he had a number of PhD students, including Robert F. Bacher, R. A. Fischer, David R. Inglis, and Ta-Yau Wu. With Bacher he introduced fractional parentage coefficients for the treatment of many-electron problems, an idea which Racah and his students later applied fruitfully to nuclear physics. Bacher and Goudsmit published a book, *Atomic Energy States* (McGraw-Hill, New York 1932), an important source book for many years. Sam also published a lucid introduction to atomic physics with Linus Pauling (*The Structure of Line Spectra*, McGraw-Hill, 1930) for which Goudsmit's Leiden PhD thesis supplied important background. Besides spectroscopy his main scientific interest was in statistical problems.

After World War II broke out, Sam joined the MIT Radiation Laboratory to work on radar and was detailed to the Army on a scientific intelligence mission for which he was uniquely qualified: To find out where the German scientists stood in the race for the atomic bomb. He found that they were far behind the American–British effort—not to the surprise of every nuclear physicist but to the relief of all. He reported on his mission by its code name in a widely-read (and now sold-out) book, *Alsos*, (H. Shuman, New York, 1947). In the course of this mission he had the devastating experience of seeing the ruins of his childhood home in The Hague and of learning that his parents had been deported by the Germans to an extermination camp. These tragic events depressed Sam and his ebullience and enthusiasm for research suffered.

In 1946 he joined Northwestern University, Evanston, Illinois. In 1948 he came to Brookhaven National Laboratory, where he remained until his retirement in 1970. From 1952 to 1960 he was the Chairman of the Brookhaven Physics Department and in this capacity attracted many outstanding physicists who played a vital role in the development of the Laboratory. Here also he carried out his only experimental work, the building and use of a magnetic time-of-flight mass spectrometer of his design (with E. E. Hays and Paul I. Richards, Phys. Rev. **84**, 824, 1951).

Sam was Editor-in-Chief of the American Physical Society from 1951 to 1974. He founded *Physical Review Letters* in 1958, a much imitated letter journal and still the most widely known. His sense of humor helped him deal with the many idiosyncrasies of authors: without mentioning names he enjoyed telling some of his experiences such as the story of a manuscript which was followed by a telegram saying simply, "I am worried about equation two." He also liked to tell the joke, provoked by the explosion of physics articles, that simple extrapolation shows that by the year 2000 the speed of growth of the *Physical Review* on a shelf would exceed the velocity of light; but this would not contradict the special theory of relativity since the information transfer would by then go to zero!

While at Brookhaven he also found time to teach courses at Rockefeller University. He especially enjoyed teaching physics to "humanists" and continued to do this at the University of Nevada. His warm interest in young people, his enthusiasm, his scholarship and his wit made his lectures a great success.

Among his honors, many of which he shared with his friend George Uhlenbeck, are the Max Planck Medal of the German Physical Society (1965), the Karl T. Compton Award for Distinguished Statesmanship in Science, American Institute of Physics (1974), Commander of the Order of Orange-Nassau (1977) (one of the highest Dutch distinctions), and the

National Medal of Science (1977).

Sam had a passionate interest in Egyptology which began when he was a graduate student, and he did original research on papyri. On Sam's first visit to Copenhagen in 1926, Niels Bohr took him to the collection of Egyptian sculpture at the Glyptotek. As Bohr started to translate the Danish labels, Sam quietly told him that this was not necessary; he could read the inscribed hieroglyphs. He had a talent for solving puzzles, be they scientific, historical, artistic or crossword.

Sam will be remembered as a man who stood up for his convictions. In his will, in his usual self-effacing way, he asked that no memorial session be held for him, a request not easy for his friends to honor.

MAURICE GOLDHABER
Brookhaven National Laboratory

Warren Weaver

PHOTO BY H. H. COSTAIN

WEAVER

Warren Weaver died at his home in New Milford, Connecticut, on 24 November at the age of 84. He had a profound impact on sicence and the public understanding of science, as a teacher, as a researcher and as a foundation executive for 46 years. He played an important role in the late 1940's and 50's in the transition of science from war to peace.

His earned degrees were from the University of Wisconsin: a BS (civil engineering) and a PhD in mathematics. The first to appreciate his talents were physicists. Weaver joined the faculty of Throop College/California Institute of Technology, as an assistant professor of mathematics, at the request of Robert Millikan. A few years later Charles Mendenhall, then head of the Physics Department at the University of Wisconsin, persuaded Weaver to return to Madison (1922).

Max Mason, a theoretical physicist, persuaded Weaver to leave the University of Wisconsin, where he was now head of the mathematics department and join the Rockefeller Foundation as the director of the division of natural science. Weaver ended his career at Rockefeller in 1959 as vice-president for natural and medical science.

Following his retirement from Rockefeller, Weaver became a Trustee and vice president of the Alfred P. Sloan Jr Foundation.

As a Foundation executive he set a pattern for support of science that was followed by Federal agencies engaged in support of research after World War II. The emphasis was on people, the researcher. The institution received secondary consideration.

During the early 1930's he understood that the instruments, the tools of physics and chemistry, were bound to play a major role in biology and genetics. Some who received his attention and the Foundation's were scientists trained in physics who turned to biology.

During World War II he joined Vannevar Bush's Office of Scientific Research and Development, first as chairman of the fire and control section and then chief, applied mathematics panel.

During the postwar years Weaver was active in the biological areas, serving as Chairman of the National Academy of Sciences Committee on the Biological Effects of Radiation, Trustee of Memorial Hospital and Sloan Kettering Institute for Cancer Research, Chairman of the Science Policy Committee and participating in the founding of the Salk Institute.

Weaver was also a member of the Governing Board of the Courant Institute of Mathematical Science, helping to ensure financial stability for applied mathematics. The building that houses the Institute was named Warren Weaver Hall.

He never lost his interest in probability, which he taught in Madison, and wrote a popular book, *Lady Luck,* which was translated into nine languages.

Warren Weaver's great love was science and he wanted the public to share that love. He had another love: Lewis Carroll's (Rev. Charles Lutwidge Dodgson, an Oxford mathematician) *Alice in Wonderland.* He collected writings of Dodgson, first editions of *Alice in Wonderland* and more than two-score translations in various languages, and wrote *Alice in Many Tongues.*

His philosophy is best expressed in an autobiographical book, *Scene of Change.*

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