we hear that

Peter W. Likins, associate dean and professor at the University of California, Los Angeles' School of Engineering and Applied Science, has been named dean of Columbia University's School of Engineering and Applied Science. He will assume the new post on 1 July.

Frederick G. Fernald, a member of the Upper Atmospheric Project at the National Center for Atmospheric Research in Boulder, Colorado, has been appointed a research physicist at the University of Denver Research Institute.

Robert Bradshaw has been named head of Los Alamos Scientific Laboratory's engineering department.

obituaries

Alfred Landé

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LANDE

Alfred Landé was an inconspicuous and modest man, never ostentatious; he possessed a fine ironic humor, and a warm and kind personality. Landé, who died in November 1975 at the age of 86, was a brilliant lecturer and a giant in contemporary physics and the philosophy of science.

Landé was born in Elberfeld, Germany on 13 December 1888. He studied at the Universities of Munich and Göttingen, and moved to Göttingen after he decided to become a theoretical, rather than experimental, physicist. The greatest mathematician of his time, David Hilbert, asked Landé to keep him informed about the latest developments in physics, and thus the young student from Munich became acquainted with mathematicians such as Felix Klein and Edmund Landau. He also met Max Born, Theodore von Kármán, E. Madelung, Paul Hertz and Vladimir A. Fock. It was here that Landé intensified his studies of relativity, quantum theory, aerodynamics, thermodynamics and partial differential equations. At the same time, he attended lectures and seminars by visiting physicists such as Niels Bohr and Hendrik Lorentz.

However, it was in Munich that Landé received his doctorate under Arnold Sommerfeld in 1914. Two weeks later the war broke out and the young Landé served with the Red Cross until his former lecturer, Born from Göttingen, was able to place him at the Artillerie-Prüfungs-Kommission in Berlin, where both men worked on sound-detection techniques. This collaboration with Born led to a revolutionary paper in 1918 that refuted the plausibility of Bohr's model of coplanar electronic orbits.

Most of Landé's research at the time was devoted to various issues in quantum theory, and though always original, they did not represent a series of unmitigated triumphs. Wolfgang Pauli, then a 20-year old student of Sommerfeld, was able to show that some of Landé's calculations concerning the spectrum of helium and the stationary states of an excited helium atom were erroneous. Nevertheless, this work convinced Born to make Landé *Privatdozent* at the University of Frankfurt in 1920.

The same year at the Bohr Institute in Copenhagen, Landé reported on his symmetric model of the carbon atom—a lecture that was strongly criticized by Bohr. It was here that Landé became encouraged and stimulated by Bohr's ideas about the anomalous Zeeman Effect. Bohr, as well as Sommerfeld, had realized that this "unorthodox" magnetic-splitting effect concealed perhaps some of the deepest secrets of atomic structure. Consequently, Landé concentrated his work on every aspect of the anomalous Zeeman Effect at the Physical Institute of the University of Frankfurt, which after the war, had become a center for the study of magnetic-splitting of spectral lines and of molecular beams. Landé recognized that he was dealing with a dual problem: the vectorial presentation of angular momenta and the magnetic-core hypothesis. His work on this led him to the insight that the anomalous Zeeman Effect was inseparable from the multiplet line structure.

The result of these efforts culminated in the celebrated g or (the inverse of the) *gyromagnetic factor* that determines not only the fine, but also the hyperfine structures of optical and x-ray spectra. It is apposite to point out that Landé did not invoke quantum mechanics in order to arrive at his g-factor. This breakthrough was achieved in 1922, when Landé had accepted a associate professorship at the University of Tübingen. In the same year he found the interval rule for the separation of multiplet sublevels. The Landé g-factor, or *splitting factor*, and the Landé *interval rule* established his lasting fame.

Between 1923 and 1931, he presented some novel concepts of axiomatic thermodynamics and also published several papers on the new quantum mechanics. In 1931, he became a professor at the Ohio State University in Columbus (a position he held until his retirement in 1960), and continued to investigate the quantum-mechanical or wave-mechanical principles advanced by Born, Louis de Broglie, Paul Dirac, Werner Heisenberg and Erwin Schrödinger, which culminated in the monographs entitled *Principles of Quantum Mechanics* (1937) and *Quantum Mechanics* (1950).

Landé followed for many years the *Copenhagen interpretation*, which was originally conceived by Bohr and Heisenberg during 1926–27. His later disenchantment with it resulted in the polemic *Foundations of Quantum Theory, a Study in Continuity and Symmetry* (1955), and the later writings, *From Dualism to Unity in Quantum Mechanics* (1960) and *New Foundations of Quantum Mechanics* (1965). Landé's position on the unitary conception represented a formidable challenge to quantum theorists, but in particular, to Bohr and his principle of complementarity.

Born had originally, long before Landé, propounded a unitary particle theory by his probabilistic interpretation of the Schrödinger wave function (1927). In the early 1950's, Landé appealed to Born for support of his ideas, yet his previous mentor remained on the side of the Copenhagen ideology. Landé had only stressed that there do not exist alternative corpuscular and wavelike manifestations of either matter or radiation; the "either-or" unitary view simply means that matter consists of corpuscles and radiation of waves. He demonstrated that a close examination of the Stern-Gerlach experiment, the work of William Duane (1923), and Paul Ehrenfest and Paul S. Epstein (1924) led automatically to a unitary interpretation. In 1966, Landé was able to develop a scheme for the construction of quantum mechanics by resorting solely to three nonquantal postulates and maintaining the statistical structure of microevents.

All his life, Landé had been preoccupied with the so-called "quantum riddle." It had always been his dream to erect the whole mathematical edifice of quantum theory without the use of quantal concepts. Only the future will show whether or not Landé succeeded in his task, although he was privileged to experience extensive argumentation, and often appreciation, of his bold ideas in his own lifetime.

WOLFGANG YOURGRAU
University of Denver
Denver, Colorado

F. Wheeler Loomis

F. Wheeler Loomis, professor emeritus of physics at the University of Illinois at Urbana-Champaign, died 9 February at the age of 86. A noted scientist and administrator of science, he headed the department of physics from 1929 until 1957, building it into one of the leading physics departments in the world. He also made important contributions to national defense as associate head of the MIT Radiation Laboratory during World War II, as head of Project Charles (1951–52), which led to the formation of the MIT Lincoln Laboratories, and as director of the Control Systems Laboratory at the University of Illinois (1952–59). He was honored by election to the presidency of The American Physical Society and membership in the National Academy of Sciences, both in 1949; the University of Illinois awarded him the honorary doctorate of science in 1969.

Loomis was born 4 August 1889 in Parkersburg, West Virginia. He did his undergraduate and graduate work at Harvard University, receiving his PhD in 1917. For two years he worked as a research physicist at Westinghouse Lamp Company, then joined the physics department at New York University. While abroad in 1928–29 as a Guggenheim Fellow studying at Zürich and Göttingen, he was invited to become head of the physics department at the University of Illinois, a job he retained until just before his retirement in 1959.

Thermodynamics was Loomis's PhD-thesis topic, but following World War I, he changed to the new field of molecular spectroscopy. In 1920, he explained the isotope effect in molecular spectra, thereby opening the way to the identification of several molecular species and to the discovery of important new isotopes, including several of carbon and oxygen. In the realm of teaching, Loomis exemplified his own ideal of a faculty totally involved in physics, active in research and instructing at both the elementary and advanced levels. Among his graduate students was Polykarp Kusch, who as professor of physics at Columbia University in 1955, won the Nobel Prize.

He demonstrated keen judgment of prospective young faculty, in creating a climate for their work and in identifying many who later became famous. In his early years at the University of Illinois, he attracted a group of young scientists, then relatively unknown, including the noted