

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 an 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.

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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

from the cryogenics and magnet people



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obituaries

theorists Sidney M. Dancoff and Robert H. Serber (later president of The American Physical Society), Donald W. Kerst, who invented the betatron while at Illinois, Lee J. Haworth, later director of the NSF, the noted experimenters Norman F. Ramsey and Maurice and Gertrude Goldhaber, and Richard H. Bolt, expert in acoustics.

In rebuilding the department after World War II, Loomis added the field of solid-state physics to the department in 1949, bringing the noted theorist Frederick Seitz, now president of Rockefeller University, to head the group that included Robert J. Maurer, David Lazarus, Dillon E. Mapother and John C. Wheatley. Later additions included John Bardeen, who in 1956, shared the Nobel Prize with William Shockley and Walter Brattain for the discovery of the transistor, and in 1972 again shared the Nobel



LOOMIS

Prize—this time with J. Robert Schrieffer and Leon Cooper for their joint work at Illinois that gave an explanation to superconductivity. Other scientists whom he brought to Illinois included the well-known particle theorists Geoffrey Chew, Francis Low and K. Nishijima.

As a reflection of Loomis's standing in the scientific community, he was asked by Lee DuBridge, the director of the MIT Radiation Laboratory, to assume the number-two position at the facility, a post that he held from 1941 to 1946. In 1952, Loomis founded and directed the Control Systems Laboratory at the University of Illinois to contribute to the further development of air defense. The name of the laboratory was later changed to the Coordinated Science Laboratory when its work became unclassified.

Loomis's abilities as a leader of scientists led to repeated invitations to head major government agencies or otherwise

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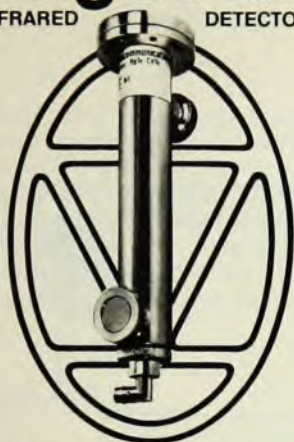
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take up new careers. Even though he took leaves to serve his country, he always returned to his position as head of the physics department he had built at the University of Illinois. He wished to be close to working physicists and to try to establish an active center of the best physics. He knew he could best achieve his goal as department head where he could judge what was happening first hand, take part as a colleague in research discussions and help to promote a spirit of excitement and importance of doing physics.

CHARLES P. SLICHTER

University of Illinois at Urbana-Champaign

Paul M. Higgs

Paul M. Higgs, Associate Professor Emeritus at the University of Washington, Seattle, died on 11 February at the age of 80. Upon graduation from the University in 1919, he was employed as a demonstrator; he then joined the teaching staff in 1926 and in 1959, was appointed associate professor.

Higgs's career was built on a love of physics. He was a master of experimental technique and had a remarkable intuitive grasp of the properties and uses of materials. One of the numerous examples of his ability was the time in 1946 when, relying for data mainly on some photographs of the ruins of Hiroshima and Nagasaki, he successfully designed gauges to measure the underwater pressure-time characteristic of the Bikini atomic-bomb test. All attempts by others, above or under water, failed. It was also characteristic of this talented, enthusiastic physicist that within six years of his retirement (1966), he took up a vigorous part in a low-temperature research effort by contributing techniques for measurement and sample preparation.

Higgs brought physics alive to his students through the design and construction of laboratory and demonstration equipment, establishing a tradition that still remains strong in the department. Sometimes within months of their discovery, such phenomena as electron diffraction, the deuterium spectrum, optical pumping and the Mössbauer effect were available to his classes. During his final year of teaching, he was busy devising an apparatus for measuring the properties of "second sound" in liquid helium.

Asking only to serve, Higgs was uncomfortable with recognition given by the endowment of a prize in tribute to his sustained devotion to teaching, and in 1967, a citation from the American Association of Physics Teachers for distinguished service. His students and colleagues will remember him as a dedicated and effective teacher, but above all, a man of good will and good humor.

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