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FRANCIS WHEELER LOOMIS

1889—1976

A Biographical Memoir by
FREDERICK SEITZ

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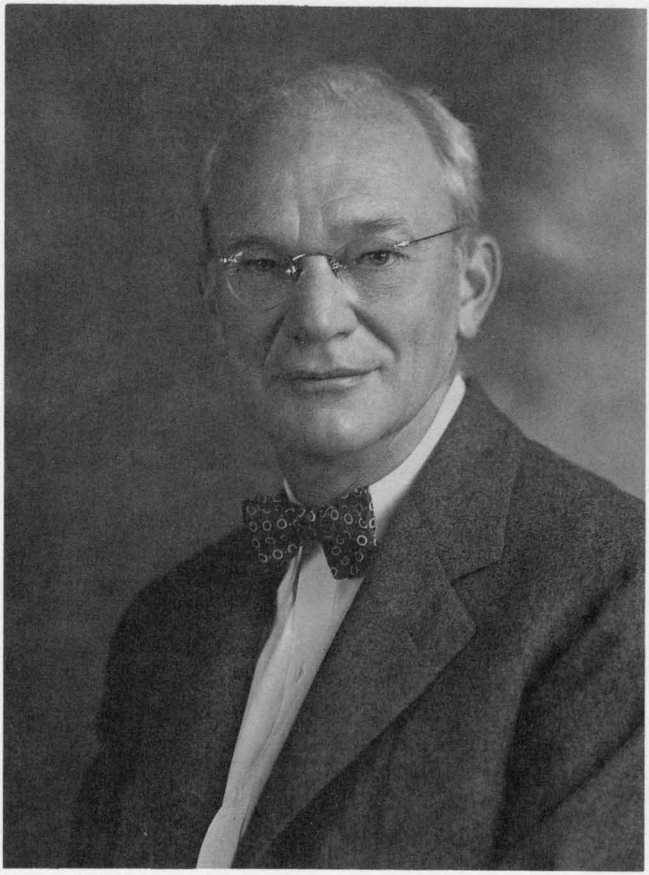
Biographical Memoir



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FRANCIS WHEELER LOOMIS

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BY FREDERICK SEITZ

FRANCIS WHEELER LOOMIS—or Wheeler Loomis as he preferred to be known—was a distinguished prototypical physicist of his generation who also possessed exceptional qualities of leadership.

He was born in Parkersburg, West Virginia, in 1889, just ten years before a small band of stalwarts created the American Physical Society in an attempt to foster physics on a national scale. For although physics in America had always been appreciated in a peripheral manner (one thinks of the remarkable work of Benjamin Franklin, Joseph Henry, Henry Rowland, Abraham Michelson and Willard Gibbs), it emerged relatively late here as a respected and respectable formal discipline. Striking exceptions to this rule were the Smithsonian Institution, the National Academy of Sciences, the Bureau of Standards, and a small number of universities (The Johns Hopkins University and, most notably, The University of Chicago, which established a research-oriented graduate Department of Physics in the last century). Nevertheless, the new Physical Society provided a forum throughout the country open to novice and skilled professional alike, and from its establishment onward, American physics was a cornerstone of science, a handmaiden to technology, and a key contributor to human enlightenment.

Loomis was destined not only to benefit from the new cohesive interest in physics in our country but also to be instrumental in raising the standards in his chosen profession to their present level of sophistication. Throughout his career he focused on two objectives: the pursuit of research of the highest quality and the building of research institutions upon a firm base. It was no accident that his student Polykarp Kusch won a Nobel Prize; it was no accident that the University of Illinois' Department of Physics that he headed for nearly thirty years was named after him and remains one of the most distinguished in the country.

EDUCATION AND EARLY YEARS

Loomis entered Harvard University as an undergraduate in 1906 and stayed on until he received his Ph.D. in 1917. He never spoke much about his Harvard years, though they were obviously highly formative ones. He was not much given to reminiscing, most of his conversation focusing rather on the present and future.

Loomis was presumably attracted to physics by a combination of his own natural talents and the stimulus provided by the revolutionary rise of quantum and relativity theories during his student days. He thoroughly enjoyed, moreover, the society of physicists, once commenting to the writer that he knew of no professional group with which he would rather be associated.

His thesis was carried out under the direction of Professor H. N. Davis and involved thermodynamic measurements on the element mercury—a field quite different from that in which he ultimately distinguished himself. In the early part of this century, Harvard doctoral candidates in physics were expected to do experimental theses and Loomis enjoyed experimental work. This fact did not, therefore, much affect his career, though it did reshape the careers of students like

David Locke Webster, who was of a more purely theoretical bent.

On completing graduate work Loomis accepted a position as a research physicist at the Westinghouse Lamp Company in Pittsburgh. When World War I intervened, he became a research investigator in the Army Ordnance Department with the rank of captain. He was put in charge of antiaircraft range-firing and the preparation of associated ballistic tables. Loomis served out the war at Aberdeen Proving Ground, which later became a major research center under the directorship of a former Harvard classmate, R. H. Kent.

NEW YORK UNIVERSITY: BAND SPECTRA OF DIATOMIC MOLECULES

Since he did not particularly enjoy the special challenges and pressures of industrial research, Loomis accepted, in 1920, a position in New York University's physics department. When Loomis joined the department, physics at New York University was as highly regarded as at Columbia University, and it appeared to some that NYU might become the leading department in the New York area.

Once there, Loomis decided to work on the analysis of band spectra of diatomic molecules. He rapidly gained a worldwide reputation as the discoverer of the influence of the isotopic composition of the constituent atoms upon the bands, the initial work being carried out with hydrogen chloride.

The 1920s proved to be very productive years for him, involving, among other things, close cooperation with Robert W. Wood in the analysis of a number of spectra. Loomis discovered new isotopes of carbon and oxygen and determined, with Wood, the nuclear spin of potassium. Work with band spectra remained his principal research interest, yet Loomis—ingenious and with wide-ranging interests—also

experimented with the oil-drop technique for determining electric charge, using it to carry out (what for the times were) precision measurements of the ratio of the charge on the electron to that on the proton.

This was an enormously exciting period in the evolution of quantum theory. Quantum statistics and wave mechanics were finally achieving permanent form, at least in so far as they apply to atomic and molecular systems, and Loomis's research was central to the emerging structure.

UNIVERSITY OF ILLINOIS AT URBANA

In 1928 Loomis was awarded a Guggenheim Memorial Foundation Fellowship to study at Göttingen and Zürich. The association with European notables intrigued him, but his reflections on that period generally dealt with the European scientific environment of the day.

It was during that year, moreover, that he was invited to become head of the Department of Physics at the University of Illinois in Urbana, and he spent a significant fraction of his time dwelling on the offer. This involved a special trip back to the United States to look over the situation firsthand. By 1928 Loomis felt that the future of physics at NYU might prove to be limited, while Illinois, with a large and reasonably well-funded department, seemed very promising. Physics at Illinois had an interesting history, going back all the way to 1870, although a formal department was not established until 1889. The department's first head, Samuel W. Stratton, went on to become head of the Bureau of Standards and president of the Massachusetts Institute of Technology.

Loomis decided to accept the position at Illinois, and—aside from a four-year period as associate director of the Radiation Laboratory at MIT during World War II, and a two-year period as the organizer of the MIT Lincoln Laboratory—he remained in Urbana for the rest of the life. His

wife, Edith, a native New Englander, learned to enjoy life as a faculty wife in a large midwestern university while still remaining true to her heritage. Throughout their long happy marriage, the Loomises spent long periods during the summer with her family on Martha's Vineyard.

During the next decade Loomis's outstanding qualities as an institution-builder came to the fore. Despite the rigors imposed by the Great Depression, and in part because of them, he had succeeded in gathering a distinguished faculty of young physicists at Urbana by 1939. These scientists contributed enormously—both at Illinois and in subsequent posts elsewhere—to the profession's evolution and standing in our country. Building an outstanding research institution, Loomis at the same time made certain teaching at all levels conformed to the highest standards.

In spite of the heavy administrative obligations associated with heading a large department that serves a number of university interests, Loomis continued doing excellent research. During this time, moreover, a number of outstanding graduate students carried out their Ph.D. research under his tutelage.

Since Urbana is what is sometimes called a centrally isolated community, Edith and Wheeler Loomis made certain that their home was a warm and happy mecca for a substantial fraction of the academic community, not least those in the physics department. They enjoyed, and indeed cultivated, people of all generations, a spirit that spilled over to the entire department. Many individuals who once spent time in the department later commented wistfully on the special atmosphere they had found there.

WORLD WAR II: THE RADIATION LABORATORY AT MIT

World War II intervened just at the time Loomis felt he had achieved his goal in developing a large, productive, mod-

ern Department of Physics. Inevitably, members of the staff were called away for various important aspects of military research. Early in 1941, Loomis received a plea from Dr. Lee A. DuBridge, director of the Radiation Laboratory at MIT, to join his administrative staff as associate director. One of their principal tasks was that of preserving the Laboratory's freedom of action in the face of meddling from Washington. They managed to do so with perfect tact. Both men earned the respect of the Laboratory staff for their dedication to all aspects of its functioning—not least for the attention given to both personal and professional needs of individuals in every rank.

Loomis's deep involvement with the Radiation Laboratory occupied his mind and physical energies completely and made a lasting imprint on him. The close personal associations he experienced there remained strong for the remainder of his life. Though not a man given to reminiscence, one of his fondest possessions was a framed panel of photographs of the twenty or so individuals who had led the Laboratory in its very successful wartime work.

RETURN TO ILLINOIS

In 1946 when Loomis and his family returned to Illinois they encountered a new world. Not only was the national physics community the object of considerable adulation, but an enormous flood of students, including returning veterans, decided to include physics in their curriculum. This required a rapid expansion of facilities and staff, and the opportunities for the employment of well-seasoned physicists was good everywhere. Some of the individuals who had been on the staff prior to the war, moreover, had left for special assignments elsewhere and decided for one reason or another not to return.

Many others in Loomis's position decided to fill their po-

sitions rapidly, but he wisely decided not to compromise on quality. He built Illinois' new, larger physics department gradually, as individuals who conformed to his standards became available.

In keeping with the interests of the time, he decided to focus first on developing a faculty of researchers in atomic, nuclear, and high energy particle physics. He noted, however, that solid state physics was beginning to emerge as a respectable field for study and in 1948 decided that some of the positions in his department should be devoted to it. One result of that decision was that he invited the author of this memoir to join the department and to help him expand that area of research. So began a long, close association and friendship that represents one of the most memorable facets of my own life.

Loomis was elected president of the American Physical Society in 1949. Addressing the Society on his retirement he spoke on the theme "Can Physics Serve Two Masters?" In this speech he expressed his deep conviction that, whatever else individual physicists became involved in, their principal obligation lay in the disclosure of the underlying properties of nature. This homely but profound advice was given at a time when it was easy for physicists to be diverted into applied work. Although he had great respect for applied research, Loomis made it clear that it was the profession's duty to give precedence to basic work.

During the Korean War in 1951, Loomis was asked to organize a new laboratory that would be attached to MIT. He spent the next two years at that task. Today the Lincoln Laboratory, one of the many products of his splendid organizational ability, occupies a leading position among defense laboratories everywhere.

Upon returning to Illinois after this second, relatively brief, sojourn in the Boston area, he took up campus life

again and remained active as department head until his retirement in 1957. By this time he was much revered on campus. His advice was sought and respected, but—unlike many other campus leaders—he was not one to dominate discussions at the University Senate meetings. When he did offer advice, his recommendations were generally taken.

Of everything that occurred at Illinois during the years following World War II, that of which he was perhaps most proud was the evolution within the department of the term "Loomis tenure." This expression was applied to the ironclad promise Loomis occasionally made to nontenured staff who had been offered attractive positions elsewhere. Once he had promised to give individuals tenure at a certain rank as the positions became available, it was done. (This would, of course, be somewhat more difficult today given the dubiously useful proliferation of committees in the decision-making chain.)

As was the practice in the University Senate at that time, Loomis sometimes delivered an obituary statement for a deceased member of the faculty, many of whom were old friends. He once confided to me that he labored hard in the preparation of such obituaries because he hated to think that, in paying the last tribute to an old associate, he would bore his colleagues to death. I trust that I have not done so in this account of his own richly productive life.

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