has openly thanked the Laboratory:

"Looking back, we had much to be thankful for. We had indeed been in the right place at the right time. The unlikely trail from bombs to detection of the free neutrino could, in my view, only have happened at Los Alamos." (Reines 1982) ■

Further Reading

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Frederick Reines is best known for his discovery of the nearly massless elementary particle, the neutrino. For this work, he was awarded the Nobel Prize in physics in 1995. Collaborating with Clyde Cowan, Jr., Reines determined conclusively the existence of the neutrino during experiments conducted at the Savannah River Plant in 1956. Subsequently, Reines devoted his career to investigating the properties and interactions of the neutrino as it relates not only to elementary particle physics but also to astrophysics.

This lifelong research produced a number of fundamental "firsts" credited to Reines. One of the most recent achievements, the codiscovery of neutrinos emitted from supernova 1987A (SN1987A), demonstrated the theorized role of the neutrino in stellar collapse. Reines captured the difficulty of this work vividly: "It's like listening for a gnat's whisper in a hurricane."

Significant other firsts include detecting neutrinos produced in the atmosphere, studying muons induced by neutrino interactions underground, observing the scattering of electron antineutrinos with electrons, detecting weak neutral-current interactions of electron antineutrinos with deuterons, and searching for neutrino oscillations (the possibility of neutrino transformation from one type to another). In addition, Reines and his coworkers have pursued for nearly forty years a program of experiments to test some of the fundamental conservation laws of nature, including conservation of lepton number (which would be violated in the decay of an electron or neutrino or in the change of lepton type) and conservation of baryon number, which would be manifested in the decay of the proton, as predicted by the Grand Unified Theories of elementary particles.

Reines was born in Paterson, New Jersey, on March 16, 1918. He earned his M.E. in mechanical engineering in 1939 and his M.A. in science in 1941 from Stevens Institute

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Clyde L. Cowan, Jr., was born in Detroit, Michigan, on December 6, 1919. He earned his B.S. in chemical engineering at the Missouri School of Mines and Metallurgy (later to become part of the University of Missouri) in 1940 and his M.S. and Ph.D. in physics from Washington University in St. Louis, Missouri, in 1947 and 1949, respectively.

During the Second World War, Cowan joined the U.S. Army Chemical Warfare Service as a 2nd lieutenant and shortly thereafter left for England with the 51st Troop Carrier Wing. While he was stationed in England, Cowan was involved in making changes to the newly developed radar. For this significant work, he was later awarded the Bronze Star.

Soon after the war, Cowan returned to the United States where he was accepted as the first physics graduate student to Washington University. His thesis was an in-depth study of the absorption of gamma radiation. Soon after graduate school, Cowan realized that Los Alamos was the logical place for him to work, and in 1949 he joined the Laboratory as a staff member. Only two years later, Cowan became group leader of the Nuclear Weapons Test Division at Los Alamos.

In 1951, Cowan began a historic collaboration with Fred Reines. Its outcome was the successful detection of the neutrino during an experiment conducted at the Savannah River Plant in 1956. After this discovery, neutrino physics became seminal