Glenn Seaborg, Leader of Team That Found Plutonium, Dies at 86

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Correction Appended

Dr. Glenn T. Seaborg, leader of the scientific team that created plutonium -- the fuel used in the atomic bomb that destroyed Nagasaki in 1945 -- died on Thursday night at his home in Lafayette, Calif.

Dr. Seaborg, who was 86, died of complications of a stroke he suffered last August while exercising on a flight of stairs at a scientific meeting in Boston. His longtime collaborator and friend at the Lawrence Berkeley National Laboratory in California, Albert Ghiorso, said that after Dr. Seaborg collapsed, he fell down the stairs and was seriously injured and lying helpless for several hours until he was discovered. He was mostly paralyzed thereafter.

Although he was a chemist by training and occupation, Dr. Seaborg became one of the world's best-known nuclear physicists. He led the research that created nine artificial elements, all heavier than uranium. They were plutonium, americium (used today in smoke detectors), curium (used in medicine), berkelium, californium, einsteinium, fermium, mendelevium and nobelium.

Besides these new elements, Dr. Seaborg and his team, which included Mr. Ghiorso as chief builder of the required apparatus, created many isotopes, or forms of elements, with differing numbers of neutrons in their nuclei.

Two years ago, Element 106, which Dr. Seaborg did not create or discover, was named seaborgium in his honor. Until then, no element had been named after a living person.

For his achievements in making artificial elements by bombarding natural elements with projectiles that included deuterons, the nuclei of a heavy isotope of hydrogen, he shared the 1951 Nobel Prize in Chemistry with Dr. Edwin M. McMillan.

During his long career Dr. Seaborg held many senior positions in government and scientific institutions. In 1958 he was appointed chancellor of the University of California and, at President John F. Kennedy's request in 1961, became chairman of the Atomic Energy Commission, a post he held for 10 years.

But although Dr. Seaborg devoted much of his career to advising Presidents and senior officials on science policy, his first love remained "nuclear alchemy," the transmutation of chemical elements into other elements. His laboratory even achieved the dream of medieval alchemists: transmuting lead into gold, although such a tiny amount that the

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method could never be used to create riches.

Dr. Seaborg was one of a handful of nuclear physicists who believed in the possibility of creating "superheavy" elements that would be fairly stable, unlike most synthetic elements that decay radioactively in fractions of a second. These elements, from about Element 114 up to 125 or higher, would form "the island of stability."

Mr. Ghiorso, who designed and built the cyclotron accelerator and equipment used in most of Dr. Seaborg's experiments, did not believe that the "island" would ever be reached, and the two scientists had a long-standing bet on their differing estimates.

But in October, an international team of physicists at the Joint Institute for Nuclear Research at Dubna, Russia, and the Lawrence Livermore Laboratory in California succeeded in creating one atom of Element 114. It survived for about 30 seconds -- an extraordinarily long time for a superheavy element. The shore of the island had been reached.

"I wanted Glenn to know," Mr. Ghiorso said in an interview yesterday, "so I went to his bedside and told him. I thought I saw a gleam in his eye, but the next day when I went to visit him he didn't remember seeing me. As a scientist, he had died when he had that stroke."

Years earlier, Dr. Seaborg led a major effort to create an isotope of plutonium with 244 protons in its nucleus, and he succeeded in making a small quantity of it. It was this same batch of Pu-244 that the Russians used in January to create Element 114.

Dr. Seaborg's tall, rangy figure was a familiar presence at the world's major scientific meetings. He was always ready to explain nuclear science for anyone interested, and his students at Lawrence Berkeley Laboratory and elsewhere held him in great affection.

A mural in his laboratory depicted the periodic table of elements, including all the known isotopes of each one. Whenever the Seaborg group created or discovered one, something that happened quite frequently, a small celebration always accompanied the marking-up of the new arrival on the periodic table.

Dr. Seaborg was often questioned about the atomic bombs dropped on Japan. He usually replied that although the huge loss of life in Hiroshima and Nagasaki saddened him, the bombings hastened the end of the war and was necessary. (Hiroshima was destroyed by a bomb containing uranium-235.)

When he reminisced about the creation and discovery of plutonium, his voice quickened with excitement as he recalled the night in 1941 when he, Dr. McMillan and the others in the Manhattan Project's metallurgy team, working at the University of Chicago, transmuted an isotope of uranium into a minute quantity of a new element, plutonium-239.

Glenn Theodore Seaborg was born on April 19, 1912, in Ishpeming, Mich., an iron mining town on the Upper Peninsula. His father was the son of Swedish immigrants and his mother was an immigrant herself, and he spoke Swedish before he learned English. When he was young, the family moved to Southern California.

He received his bachelor's degree from the University of California at Los Angeles in 1934 and his doctorate from the University of California at Berkeley in 1937.

An enormously popular teacher himself, he often acknowledged a debt to his own teachers. As a high school student in the Watts section of Los Angeles, he recalled in a 1982 autobiography, he nearly missed out on a science education.

"Because my high school was small," he wrote, chemistry and physics were offered in alternate years." His first science teacher, Dwight Logan Reid, "exerted a strong formative

influence on me.

A high point in his education, he wrote, was the Physics Journal Club at Berkeley, presided over by Dr. Ernest O. Lawrence, who invented the cyclotron, and included such nuclear luminaries as Dr. J. Robert Oppenheimer, director of Los Alamos National Laboratory; Dr. McMillan; Dr. Luis W. Alvarez; Dr. Philip H. Abelson; Dr. Martin D. Kamen, and Dr. John J. Livingood.

In 1937, Dr. Seaborg was appointed a research associate at Berkeley, and from then on his career flourished. With the outbreak of World War II, Dr. Seaborg moved to the University of Chicago, where he directed plutonium research.

After the war, he joined the Lawrence Berkeley Laboratory as head of the nuclear chemistry division. Later he became director of the laboratory, and died as its emeritus director.

He frequently served as the United States delegate to international meetings on atomic energy, and he was an honorary fellow of scores of scientific societies. Among his many awards was the $50,000 prize of the Enrico Fermi Award.

Dr. Seaborg was survived by his wife, Helen, and five of their six children, Lynne Annette Seaborg Cobb of Grand Junction Colo.; David Seaborg of Walnut Creek, Calif; Stephen Seaborg of La Mesa, Calif.; John Eric Seaborg of Free Union, Va., and Dianne Karole Seaborg of Lafayette. Their son Peter Glenn Seaborg died in 1997.

Photo: Among Glenn Seaborg's prizes: an elements table, sculpted by a fan. (Associated Press)(pg. A13)

Correction: *March 4, 1999, Thursday A front-page obituary headline on Saturday about Dr. Glenn T. Seaborg referred imprecisely to his achievement. Plutonium was created, not found, by his team. The obituary also referred incorrectly to Pu 244, a plutonium isotope he later created. The 244 refers to the total of protons and neutrons in the atom's nucleus, not the number of protons.*