

Sarah Anderson

Period 7

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Mr. Smith

Ernest O. Lawrence

1939 Nobel Prize in Physics

On August 8th 1901 Ernest O. Lawrence, son of first generation Americans Carl and Gunda Lawrence, was born in Canton, South Dakota. Lawrence's parents would have described Ernest, their eldest son, as "born grown up". He was also very curious and almost killed himself at age two playing with matches. Ernest's mother Gunda got typhoid the week of Earnest was born and was concerned about Ernest's health but he proved to be perfectly fine. He was a little skinny, though.

Lawrence first went to St. Olaf College but in 1919 attended the University of South Dakota where he received his Bachelors (B.A.) degree in chemistry in 1922. Next in 1923, Lawrence received his M.A. from the university of Minnesota and topped it off in 1925 with a PhD in Physics from Yale University. In order too afford all these degrees Ernest sold kitchenware and farmed households. He served as an assistant professor at Yale in 1927 but transferred to The University of California, Berkley in 1928 to be an assistant professor for physics. Two years later he was given his own position as Professor of physics and became Berkley's youngest professor. Lawrence also became the Director of Berkley's radiation laboratory. It is here where Lawrence would do all his future research.

Legend goes that Lawrence came up with the idea of the Cyclotron eating dinner one night and consequently the first layout of the Cyclotron was scratched into a napkin. Originally the cyclotron was not a circle it was a long rectangle but to conserve space Lawrence decided to coil it onto itself into a circle. The concept was pretty basic: Spin particles around in a circle so that they get moving super fast and then sling shot them at atoms to break the atoms.

In 1929, at age 28, Ernest Lawrence invented the Cyclotron. The Cyclotron is a tool for accelerating nuclear particles to very high velocities without the use of high voltages. The fast particles are used to bombard particles of new elements to disintegrate the elements. In some cases completely new elements were discovered! Many radioactive isotopes of the already known elements were also discovered using the Cyclotron. In 1939 Lawrence won the Nobel Prize in Physics for his creation of the Cyclotron.

Lawrence was a humble man and enjoyed science for the fun not the profit. Unlike many greedy scientists Lawrence shared the blueprints of his Cyclotron with many other laboratories and encouraged others to make Cyclotrons. He also is the legal inventor of the Calutron isotope separator but he sold the patent rights to the U.S. Government for just one dollar.

Lawrence lived during the time period of World War Two (WWII). WWII was a war between the Axis Powers; Germany, Italy, and Japan and the Allies; America, Great Britain, the Soviet Union, France and China. There were many causes to the war but one major one in the eyes of America was to stop the fascist governments rising in Europe, to spread democracy. In December 7th 1941 the Japanese bombed Pearl Harbor, a military base in Hawaii. After this America was directly involved in the war. At the same time as the war Roosevelt had a secret underground project called the Manhattan project. The goal of this project was to develop an

atomic bomb, that if necessary could be used in the war. Ernest Lawrence did a lot of work for the Manhattan project and even held official appointments in the project. Lawrence was actually the man who introduced J. Robert Oppenheimer, the lead scientist for the Manhattan project, into the project. The atomic bombs Little Boy and Big Man were dropped on Hiroshima and Nagasaki, Japan by the US. They did devastating damage and killed over 200,000 Japanese.

Despite serious flare-ups of his chronic colitis Lawrence not only attended the Geneva Conference but was part of the U.S. Delegation at the Geneva conference in 1958 and spoke to promote the suspension of atomic bomb testing. Unfortunately Lawrence had to return home to California early where he would soon die.

Lawrence was not satisfied with his contributions to science thus far though. He had a passion for it and wrote or co-wrote 56 scientific papers between 1924-1940. Lawrence also created larger versions of his own Cyclotron. These bigger versions actually generate mesons, cosmic particles, and could be used to study antiparticles! Lawrence also discovered a way to measure time intervals that were as small as three-billionths of a second. This could be used to study the electric spark and discharge caused by it.

Due to his hard work Lawrence earned endless awards. Some worth mentioning include the Elliott Cresson Medal of the Franklin Institute, the Comstock Prize of the National Academy of Sciences, the Hughes Medal of the Royal Society and the Duddell Medal of the Royal Physical Society. He was decorated with the Medal for Merit and was an Officer of the Legion of Honor. Element 103, Lawrencium (Lr), is named after Lawrence. The Lawrence Berkeley Laboratory and the Lawrence Livermore National Laboratory are named in honor of Lawrence.

In May of 1932, Lawrence married Mary Blumer and they had six children. On August 27th, 1928 Ernest Lawrence died an accomplished man in Alto, California.

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