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Ernest Lawrence

On August 8, 1901, in Canton, South Dakota, future Nobel laureate in Physics, Ernest Lawrence, entered this world. His parents, Carl Gustavus and Gunda Lawrence, were Norwegian immigrants. They met in Canton, where the both taught at the high school there. His father was the superintendent at the time. Ernest Lawrence had a younger brother, John H. Lawrence, who aided him in some of his research at the University of California at Berkeley. He attended Canton High School and then went off to St. Olaf College. He later received a B.A. in Chemistry at the University of South Dakota, an M.A. from the University of Minnesota, and a Ph.D. from Yale University. In 1928, he took on the position of Associate Professor of Physics at the University of California at Berkeley. Two years later, he became Professor. At the time, Lawrence was the youngest professor at the university. He married Mary Kimberly Blumer in May 1932 and they had six children together. The majority of Ernest Lawrence's career was centered on nuclear physics. His ascent to greatness did not stop there. He received the Nobel Prize in Physics in 1939, due to his invention of the cyclotron. He also played a major role in the development of the atomic bomb. Afterward, he spoke at the 1958 Geneva Peace Conference to gain support for the suspension of its testing. On August 27, 1958, Ernest Lawrence passed away due to chronic colitis. He played a major role in the development of the atomic bomb. Afterward, he spoke at the 1958 Geneva Peace

Conference to gain support for the suspension of its testing. The majority of Ernest Lawrence's career was centered on nuclear physics.

Ernest Lawrence was awarded the 1939 Nobel Prize in Physics "in recognition of his invention of the cyclotron, of its development, and of the results gained therefrom, especially with reference to the production of artificially radioactive elements." His Nobel Prize was the first won that was one through work done entirely on a University of California campus. In addition, Lawrence was the first South Dakota native and professor at a public university to win the prize. The cyclotron is a unique circular particle accelerator. Lawrence came up with the idea for its construction from a paper written by Norwegian engineer Rolf Wideroe, which would make sense considering the common heritage between that the two share. The first version of the cyclotron was made of not only glass, sealing wax, and bronze, but also a kitchen chair and a wire-coiled clothes tree. The total cost of these supplies would have only been about 25 dollars today! This seemingly simple contraption led to the development of particle physics and revealed much unknown information about the nature of the universe. When Lawrence applied 2,000 volts of electricity to the cyclotron, he ended up with 80,000-volt particles whirling around at terrific speeds. A method for smashing atoms had finally been discovered.

All of the work relating to the construction of the cyclotron was done at the University of California at Berkeley. More specifically, the building in which the cyclotron was developed had formerly been called the Civil Engineering Testing Laboratory. Lawrence acquired usage of the building in August 1921 and renamed it the "Radiation Laboratory." The paper written by Rolf Wideroe that served as the inspiration for the

cyclotron was located in the library at the university. Ernest Lawrence stumbled upon it while researching in his free time. The diagram present in the journal caught his eye. After much contemplating as to whether or not the idea discussed was feasible, Lawrence contacted his former physics professors at Yale University. They confirmed that this fantastic idea, may, in fact, be possible to prove. It is doubtful that Lawrence would have made this remarkable discovery if he had not been in such a favorable research environment at the time.

The so-called “Roaring Twenties” were a great time for scientific research. Science was promoted as innovations in technology were proving to be profitable. Since the welfare of American citizens was generally positive, more focus could be put on education and scientific development. After the Great Depression, scientific discovery took a turn for the worse. The well-being of the country was at an all-time low. Shortly after, however, the economy steadily recovered. President Franklin D. Roosevelt’s New Deal brought much of this funding to public education, from which Lawrence clearly profited. The severity of the Great Depression was wearing off, and the United States was ready for a new means to re-inventing itself. The University of California at Berkeley was well-known for its exceptional chemistry department at the time, and wanted to bring its physics department up to the same level. The university made the smart decision of hiring Ernest Lawrence, and Lawrence made the smart decision of accepting their offer. The University of California offered vast opportunities for research.

After Lawrence received his Nobel Prize in Physics in 1939, the Rockefeller Foundation created a difficult challenge for the newly-honored Nobel laureate. The Rockefeller Foundation provided 1.4 million dollars toward the creation of a “giant

cyclotron”. It would be the grand-daddy of all cyclotrons measuring 184 inches and housing a magnet that weighing over 4,000 tons. Construction of this massive piece of technology was completed in 1946. This was the last of many cyclotrons that Lawrence constructed. But there was a delay that lasted over a year right after the start of the project. Ernest Lawrence and his colleagues had been summoned to help develop the atomic bomb to be used in World War II. The team successfully achieved the electromagnetic separation of uranium-235. This discovery was essential in developing the atomic bomb used in Hiroshima several years later. Because of the important role that Ernest Lawrence had in the development of the highly-destructive atomic bomb, he was chosen to speak at the 1958 Geneva Peace Conference to gain support for the suspension of further testing. He continued to serve as a professor at the University of California at Berkeley up until his death at the age of 57.

Ernest Lawrence’s memory continues to survive today. He is remembered not only as a winner of the Nobel Prize in Physics, but also as a peace advocate for his talk at the 1958 Geneva Peace Conference. His contributions to physics led to the discovery of particle physics, a valuable branch of the science that is utilized plenty in modern society. Shortly after the death on August 27, 1958, in Palo Alto, California, of the esteemed Nobel laureate, the University of California at Berkeley changed the name of the Radiation Laboratory to the Lawrence Radiation Laboratory in his honor. The University of California at Berkeley’s physics department is still one of the best in the country, if not the best among all public universities, due to Lawrence’s creation of the cyclotron and the recognition he received along with his Nobel Prize win. In these ways,

Ernest Lawrence made clear contributions to the realm of physics, especially particle physics, and was well-deserving of the Nobel Prize.

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