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Charles Guillaume

The Nobel Prize in Physics was awarded to Charles Edouard Guillaume in 1920 "in recognition of the service he has rendered to precision measurements in Physics by his discovery of anomalies in nickel steel alloys". (Nobelprize.org) The Nobel Prizes include the subjects: Physics, Chemistry, Physiology or Medicine, Literature, and Peace. Guillaume was awarded the Nobel Prize in Physics, showing the significance of his scientific achievements in this field. The Nobel Prize is a prestigious honor and the committee awards winners for a major contribution to the specified subject.

It is common practice for the Nobel Prize Committee to split an award to more than one person. Impressively, Charles Edouard Guillaume won the full Nobel Prize in Physics in 1920. Guillaume was born in Fleurier, Switzerland on February 15, 1861. He lived until May 13th, 1938. Guillaume lived his early life in Switzerland. His parents moved to Switzerland from France (phew!) for business and political reasons (and probably because it's France). Guillaume attended school in Switzerland. As a young boy, Guillaume started out in elementary school with the Swiss kids and eventually enrolled in college when he was only seventeen years old. He was known as a gifted and intellectual boy. He excelled in his academics from the beginning. The college that he attended was Zurich Polytechnic, which is a college that specializes in engineering, science, technology, mathematics and management. This college is found in the city

of Zürich, Switzerland. In college, Guillaume began to pursue an interest in physics, and eventually earned his doctorates degree in physics.

Interestingly, Guillaume served a year in the military as an officer after he graduated college. The reason for this was that it was mandatory for him. At this time, World War I was going on and Switzerland had a draft. Guillaume was one of the many that were chosen to serve for the Swiss army. During this time, Guillaume studied mechanics and ballistics. After the military, In 1883 Guillaume became an assistant at the International Bureau of Weights and Measures at Sèvres. He was appointed director in 1915 and held this post until his retirement in 1936.

Importantly, Guillaume investigated the science of thermometry. He performed investigations on corrections to mercury thermometers and he created detailed calibration of thermometers. This research led Guillaume to study other precision instruments in his field. He was involved in developing the international standards for the meter, kilogram, and liter. Later on, he began to investigate various alloys and thermal expansion. After studying various alloys, he discovered an alloy that did not expand much with a rise in temperature. This material he created was called invar. This alloy showed to be useful in many ways. Many manufacturers began to use his creation in clocks, watches, and other instruments. He developed this nickel-steel alloy in 1896. The reason he named the alloy invar was because of its "invariability" when subject to different temperatures. It's coefficient of expansion is 15 times lower than steel's coefficient of expansion.

Also, he discovered a second alloy that's called elinvar. This alloy is a nickel-chromium steel alloy. The significance of this alloy is that it has an elasticity that does not change with an

increase or decrease in temperature. Guillaume combined elinvar with invar to create instruments that are much more accurate than instruments without these alloys.

Because of his discovery of nickel-steel alloys, Guillaume received the Nobel Prize in Physics. The alloys he created were found to be extremely useful. These alloys are used in precise measuring instruments such as watches and clocks. They increase the precision and eliminate error that the previous instruments had. This new invention of his drastically improved the world. Nations across Europe began to instantly use his inventions to improve their lives. Clearly, Guillaume deserved to win the 1920 Nobel Prize in Physics. Before this, the expansion and contractions of metals in the heat and cold was a major problem Many instruments were inaccurate just because the climate had the ability to change the shape of instruments and render them useless. The metals would be of different lengths in warmers places and cooler places. This created a huge problem across Europe for scientists. Certainly, scientists wished to get the most precise and accurate measurements possible, and at the time, the major limitation was the instruments that they had to use. Guillaume fixed this major problem. This shows that his research was hugely beneficial for the world.

The funny thing is, Guillaume happened to discover these alloys by accident. In studying the way numerous metals expand and contract, Guillaume undertook a chance observation that allowed him to get his results. Part of the reason he found the alloy was by luck. He happened to see the right observation which set his path toward greatness. Guillaume discovered these alloys and then tested them. Guillaume tested the elasticity of the alloys and found that elinvar had high elasticity. Guillaume tested the expansion of the alloys under certain temperatures. Guillaume found that invar would not contract or compress under extreme cold and hot temperatures.

Guillaume was just studying the way that metals contract and compress and by chance, found the alloys that could resist contraction and compression.

Guillaume's discovery of these new alloys improved devices that were subject to change shape in the extreme heat or cold. Some examples include toasters and freezers. Before Guillaume, toasters and freezers were easily shaped and destroyed by the climate. Luckily, Guillaume fixed this issue by discovering these alloys. These alloys are still used today in the design of these devices. This shows that Guillaume was simply ahead of his time, creating something for even the modern world. The reason that Guillaume went into this field of study was because of his innate interest and passion. Guillaume wanted to investigate scientific

Because of his research, he was positioned as Grand Officer of the Legion of Honour and was given honorary Doctor of Science degrees from the University of Geneva and Paris. He was a President of the Société Française de Physique, showing his scientific achievements in physics. Clearly, Guillaume was a well-respected scientist during his time. He was undoubtedly respected by his peers and country. Meanwhile, Guillaume married Mlle. A.M. Taufflieb in 1888. The Guillaume family consisted of three children. His children lived an affluent and happy life since Guillaume's discovery and contribution to science allowed him to live a prosperous life. Guillaume died on May 13, 1938.

From 1918 to 1933, Switzerland experienced an economic crisis. The war tax was introduced as World War I started. This however, did not affect Guillaume to a great extent. He was one of the most well-respected scientists at this time, and was able to live a comfortable and affluent lifestyle. In fact, during this economic crisis, Guillaume was helping the world by sharing his discovery of his alloys. This no doubt, had an economic benefit by creating jobs to manufacture this alloy. Guillaume clearly contributed a great amount to the world, and was

deserving of a full Nobel Prize in Physics. And certainly, Guillaume would not have won the Nobel Prize in Physics if his family had not moved out of France.

"The Nobel Prize in Physics 1920". Nobelprize.org. Nobel Media AB 2013. Web. 29 Apr 2014. http://www.nobelprize.org/nobel_prizes/physics/laureates/1920/

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