

The life and achievements of henri becquerel essay



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Antoine Henri Becquerel was born in Paris on December 15, 1852. He was a member of a family of scholars and scientists over four generations, including his grandfather, Antoine-Cesar Becquerel (1788-1878), his father, Alexandre-Edmond Becquerel (1820-91), and his own son Jean Becquerel (1878-1953). After his early schooling at the Lycee Louis-le-Grand, Henri studied engineering at the Ecole des Ponts et Chaussees (1874-77), history at the Ecole Polytechnique (1872-74) and his fields of science were physics and chemistry.

In 1876 he became assistant teacher at the Ecole Polytechnique, where in 1892 he succeeded to the chair of physics at the Museum National d'Histoire Naturelle, the third in his family to achieve this. In addition to his teaching and research posts, Becquerel was for many years an engineer in the Department of Bridges and Highways, being appointed chief engineer in 1894. By 1896 Henri was a talented and respected physicist but more important than his research were his skills with phosphorescent materials, his knowledge of uranium compounds and his general laboratory techniques which included photography.

Combining all these skills together would place the discovery of radioactivity within his hands. Becquerel started investigating the work of German physicist Wilhelm Conrad Rontgen on his discovery of x-rays. On 8 November 1895, Wilhelm Conrad Rontgen (1845 - 1923) who was a German physicist, discovered electromagnetic radiation in a wavelength range, which today is known as X-rays. He investigated whether there was a connection between this invisible radiation and visible light so that however stimulated the luminescent materials were, they would also produce X rays. Henri Becquerel

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discovered that uranium salts released rays that resembled X-rays in their penetrating power. Becquerel was studying phosphorescence in uranium salts which is what resulted in him accidentally discovering radioactivity. He wrapped the fluorescent substance potassium uranyl in photographic plates and black material to use in an experiment that would need bright sunlight.

However, before he could actually do the experiment, Becquerel saw that the photographic plates were already exposed and that the materials would glow in the dark after exposure to light. This discovery led Becquerel to investigate nuclear radiation and realised it did not need an external source of energy such as light, but seemed to rise spontaneously from uranium itself. He again wrapped the photographic plates in black paper but this time placed various phosphorescent salts on it. He found that all the salts were negative until he used uranium salts which left blackening of the plates.

Becquerel learned that his uranium salts continued to release radiation even when they were not subjected to the ultraviolet rays in sunlight and he soon realised that the blackening of the plate had nothing to do with phosphorescence, as the plate blackened even when the salts were in the dark. Originally it seemed that this new radiation was similar to the then recently-discovered X-rays. For months this research continued and was found that this form of radioactivity was significantly more complicated. Becquerel, Pierre Curie, Marie Curie, Ernest Rutherford, Paul Villard, and others discovered that different types of adiation can occur from different types of decay. Rutherford was the first to find that they all happen with the same mathematical formula and that many decay processes resulted in transmutation, which is the conversion of one chemical element or isotope

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into another. They also discovered that there were many other chemical elements other than uranium that have radioactive isotopes. From this he concluded that something very similar to X rays were released by this luminescent substance at the same time it threw off visible radiation.

Even though radiation was initially discovered by Becquerel, Marie Curie later named the discovery. During 1896 Becquerel published seven papers on radioactivity, in 1897, only two papers. X rays were far more popular to use as they could take sharper shadow photographs and were much faster. It required the discovery of another known element, thorium (by Gerhard Carl Schmidt) which was also radioactive and the discovery of new radioactive materials, polonium and radium by Pierre and Marie Curie and their colleague, Gustave Bemont, to show the world and Becquerel just how significance and important this discovery was.

Pierre Curie was sure that what Marie had discovered would not have much effect on her investigation but he was so intrigued that he decided to drop his work and join her. As they were unaware of the effects of radiation exposure on the body and all their work was unprotected whilst working with the radioactive substances, the Curies had no idea what would happen to their health all in the name of research. In July 1898, Curie and her husband published a paper announcing the existence of an element which they named " polonium", in honor of her home, Poland. On 26 December 1898, they then discovered and announced the existence of another element, which they named " radium" due to its intense radioactivity. Marie Curie was the first woman to be awarded a Nobel Prize in 1903 which she also shared with

Becquerel and Pierre. Sadly on 19 April 1906 Pierre was walking across the <https://assignbuster.com/the-life-and-achievements-of-henri-becquerel-essay/>

Rue Dauphine and was struck by a horse-drawn carriage. He fell under its wheels and killed as his skull had been fractured.

Eight years later, in 1911, Marie received the Nobel Prize in Chemistry “ in recognition of her services to the advancement of chemistry by the discovery of the elements radium and polonium, by the isolation of radium and the study of the nature and compounds of this remarkable element. ”

Due to her long-term exposure to radiation, on 4 July 1934, Marie died at the Sancellemoz Sanatorium in Haute-Savoie, eastern France, from aplastic anemia. The effects of ionizing radiation and the damage it causes on the body were not then known, and most of her work had been carried out in a shed without any protective clothing.

Becquerel was aware of how important it was to publish his discoveries quickly and if he had not presented his discovery to the Academie des Sciences the day after he made it, credit for the discovery of radioactivity and even his Nobel Prize, would have gone to Silvanus Thompson instead. After his phenomenal discovery, Becquerel made three more important contributions to science. In 1899 and 1900, he measured the deflection of beta particles and the radiation in both electric and magnetic fields. He then discovered that the active substance in uranium, uranium X, eventually stopped radiating after a period of time, while uranium, though inactive when freshly used, eventually regained the radioactivity it had lost. Becquerel's last major achievement was the physiological effect of the radiation. He reported in 1901 of the burn caused to his chest when he carried an active sample of the Curies' radium in his vest pocket which ultimately started an investigation by physicians on radiation and the body. For his discovery of <https://assignbuster.com/the-life-and-achievements-of-henri-becquerel-essay/>

radioactivity, Becquerel shared the 1903 Nobel Prize for Physics with Pierre and Marie Curie “ in recognition of the extraordinary services he has rendered by his discovery of spontaneous radioactivity”.

In 1908, the year of his death, his own Academy of Sciences elected him its president and one of its permanent secretaries of the Academie des Sciences. He sadly died at the age of 55 in Le Croisic. In his honour, there is a crater called Becquerel on the Moon and also a crater called Becquerel on Mars. As well as receiving the Nobel Prize for Physics in 1903, he also received many other awards for his hard work. The Rumford Medal (1900) The Helmholtz Medal (1901) and The Barnard Medal (1905).