

Ta'Nia M.
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Sir James Chadwick

Noble prize winner James Chadwick was born in Cheshire, England on October 20th 1891 and died 82 years of age on July 24th 1974. James was born in a middle class family and a very country family at that. Chadwick lived with his grandmother and entered the local school when his dad moved to Manchester to start his laundry business because he didn't have much money, His parents are John Joseph Chadwick and Anne Mary Knowles. James Chadwick wasn't the only child though, he had 2 brothers and 1 younger sister that later passed away very young.

He discovered the neutron the third elementary particle of the atom; located in the nucleus. Walther Bothe and Herbert Becker inspired him and gave him clues to prove the existence of the particle but couldn't have done it without Rutherford. Discovering the neutron opened up a new era in nuclear physics research. He was military and civilian of that discovery. A neutron is a subatomic particle of about the same mass as a proton but without anelectric charge. James is the reason technology and medicine is what it is today. He graduated from Manchester High School followed by Manchester University. He graduated from honours school in physics in 1911. He originally wanted to be a mathematician but ended up in the wrong major line which was physics but was too shy to step out of line, so he stayed in line. James spent the next 2 years in the physical laboratory in Manchester, where he worked on many projects earning his M.Sc. degree in 1913. Professor Rutherford helped him also on radioactivity problems. But how all this came about is because Rutherford wanted to know

what happens if the nucleus of an atom of an element is bombarded with high energy alpha particles what would happen and he also wanted to know the size and structure of a nucleus. But in 1922 Chadwick and Rutherford discovered the Neutron with the bombarded alpha particles on nitrogen nucleus. Chadwick was the first person to show that beta particles have a range of energies. In 1851 he was awarded the Exhibition Scholarship and moved on to Berlin to work in the Physikalisch Technische Reichsanstalt at Charlottenburg under Professor H. Geiger. James was a hard dedicated worker who strived for what he wanted.

During the war, they locked James in a racetrack horse stall, back then the world were going through many changes. When World War I was happening, James was interned in the Zivilgefangenenlager, Ruhleben. In 1919 James Chadwick returned to England to accept the Wollaston Studentship and to resume his work with Rutherford. Rutherford was successful that year in disintegrating atoms by bombarding nitrogen with alpha particles, with the emission of a proton. This was the first artificial nuclear transformation, Chadwick worked with him on this project. Chadwick helped him discover more elements with bombardment with alpha particles and making more study work with atomic nuclei. Through 1921-1935 James was elected the fellow of Gonville and Caius College. He later became an assistant director of research in the Cavendish Laboratory in 1923. He was also elected fellow of the Royal Society in 1927.

In 1932 Chadwick proved something that we won't forget until this day. I will elaborate a little bit more on Chadwick's discovery. Chadwick had made a fundamental discovery in nuclear science, he proved the existence of the neutron, elementary with an electrical charge in similar with alpha rays. Neutrons are which present in nuclei of heavy atoms. Even capable of splitting

nuclei of the most heaviest elements. Chadwick prepared the way towards the fission of uranium 235 and towards the creation of the atomic bomb. Chadwick was the leader of the British technical team that helped the United States develop the atomic bomb for World War 2. On August 6, 1945, the first atom bomb was dropped on the Japanese city of Hiroshima. The second atom bomb was dropped on Nagasaki on August 9, 1945. Japan immediately surrendered and World War 2 came to an end. As you can see his help of the atomic bomb really changed things for us in the world, the atomic bomb was a great help to end the war. This man has a good head on his shoulders and is very smart. For this huge discovery of the neutron, James Chadwick was awarded the Hughes Medal of The Royal Society in 1932 and got the Noble Prize In Physics in 1935.

James was rewarded for proving the neutron to many people. In that same year, he was elected to the Lyon Jones Chair of Physics at the University of Liverpool. With the discovery of the neutron by James Chadwick, in February 1932 a scientific gold rush ensued to discover what effects would be produced by bombarding different materials with this new particle. Chadwick had found a new elementary particle, the third basic component of the nucleus. This not only changed our view of the nucleus, but also provided a new relatively inexpensive means of probing the nucleus. Several years later researchers all over the world bombard every known element with neutrons and recorded scores, lots of them, and radioactive isotopes. Fermi discovered the important principle of neutron behavior called "moderation" on October 22, 1934. Moderation is the phenomenon of enhanced capture of low energy neutrons, as when they are slowed down by repeated collisions with light atoms. The Chadwick Atomic Model is similar to the same model as Bohr, with the nucleus containing the protons, neutrons

and orbited by the negatively charged . In 1943-1946 James moved to the United States to become a part of the Manhattan Project to develop the Atomic Bomb. James retired most of his jobs and became a part time member of the United Kingdom Atomic Energy Authority from 1957-1962. Chadwick had many papers on the topic of radioactivity with Lord Rutherford and C.D. Ellis. He is co-author of *Radiations from Radioactive substances* published in 1930. Sir James Chadwick was knighted in 1945. Sir James Chadwick also received the Franklin Medal in 1951. He is an Honorary Fellow of the Institute of Physics and, in addition to receiving honorary doctorate degrees from the Universities of Reading, Dublin, Leeds, Oxford, Birmingham, Montreal...and many more. Sir James Chadwick worked very hard on a lot of projects to earn all these awards and I feel he truly deserves every single last one of them for his accomplishments in this lifetime that made us understand physics and particles much better than we did before.

In 1925, he married Aileen Stewart-Brown of Liverpool. They have twin daughters, and they live at Denbigh, North Wales. His hobbies include gardening and fishing. He spent most of his time away traveling doing work with his projects and helping people create more projects that he barely spent anytime with his family in town half the time. Although he loved his wife and children so much.

James never intended to become this successful in physics, he always wanted to be a mathematician but I bet he is glad that he made the decision he made to stay in that physics line that day. Who would think a mistake of getting in the wrong major line would make you so successful in that field of education that you never intended on being in the first place. His

decision to study physics has helped the world so much in many ways as possible. Sir James Chadwick will always be remembered and so will the neutron.