Frederic Joliot

1900 - 1958

Awarded the Nobel Prize for Chemistry in 1935

Frederic Joliot, and his wife Irène Curie were awarded the Nobel Prize for Chemistry in1935 for the discovery of artificial radioactivity. In 1939-1940, Joliot was one of the leading physicists in the discovery of the conditions for a chain reaction in uranium. He was very much concerned by the social and political responsibilities of scientists.

Jean Frederic Joliot was born on March19th,1900, in Paris. His father, a businessman, born in Lorraine, had sympathised with the Commune of Paris in 1871; his mother had been born in Alsace. His older brother, Henri, was killed during the first weeks of World War One. Frederic became en engineer physicist from the Industrial physics and chemistry engineering school of the city of Paris, where Pierre Curie had been professor twenty years before.

In December 1924, he was recruited as 'preparateur' by Marie Curie for her laboratory of the Radium Institute in Paris. Her daughter Irène Curie who was already working there introduced him to the field of radioactivity. Frederic and Irène, who had complementary personalities, married in 1925. Frederic was enthusiastic, outspoken and engaging.

After his PhD in 1930, Frederic and Irène decided to work together. They prepared very intensive polonium sources which delivered strong alpha-ray beams. With these alpha-particles they studied the mysterious very penetrating rays seen by Bothe and Becker in Berlin, when bombarding beryllium or boron, and observed that these were able to project protons out of hydrogenous materials. This observation led Chadwick less than one month later to the discovery of the neutron.

In the continuation of these experiments, the two young physicists observed that when an aluminum foil is bombarded with a strong alpha-ray beam it emits neutrons and positive electrons. This led them, in January 1934, to the discovery of artificial radioactivity: the bombardment by alpha-particles creates in aluminum radioactive phosphorus, not known naturally on Earth, which decays with a half-life of about 3 minutes into the stable element silicon. They confirmed this result by chemical identification. The applications of artificial radioactivity are very important; already in 1935, Hevesy used radioactive phosphorus as a biological tracer.

During the Second World War he was a member of the French Resistance Movement

In 1937, Frederic Joliot became professor at the Collége de France in Paris. In January of 1939, learning about the discovery of nuclear fission by Hahn and Strassman in Berlin, he performed an experiment to obtain physical confirmation of the fission of uranium, and immediately realized that a chain reaction in uranium might be possible. In a series of experiments with his co-workers, Halban and Kowarski, he showed in 1939-1940 that a chain reaction was indeed possible and that a nuclear reactor would be feasible, using an assembly of uranium and heavy water to slow down the neutrons.

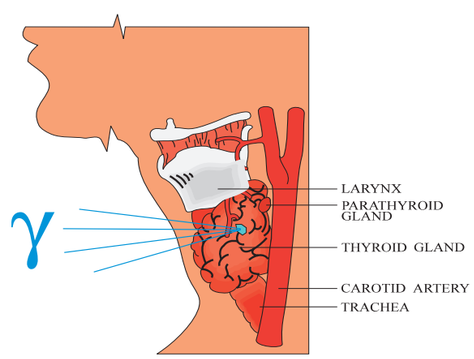
The defeat of France interrupted this endeavour. Joliot sent his co-workers to the UK and stayed himself in France. His laboratory was occupied by the Germans and he joined the French Resistance.

After the Liberation of Paris, in August 1944, Joliot became director of the CNRS, the French research organization, and, at its creation, "Hautcommissaire" (scientific director) of the French atomic energy authority.

Frederic Joliot was strongly concerned about the responsibility of scientists facing the social and political issues raised by their discoveries. In 1949 he became President of the International Peace movement and initiated the Stockholm manifesto against the use of atomic weapons. He died on August 14th, 1958 and received a State funeral.

P.R.

Artificial radioactivity can be used to study the human body



Irène and Frederic