



Albert Einstein

Albert Einstein was born in Germany in 1879. He enjoyed classical music and played the violin. One story Einstein liked to tell about his childhood was of a wonder he saw when he was four or five years old: a magnetic compass. The needle's invariable northward swing, guided by an invisible force, profoundly impressed the child. The compass convinced him that there had to be "something behind things, something deeply hidden."

Even as a small boy Albert Einstein was self-sufficient and thoughtful. According to family legend he was a slow talker, pausing to consider what he would say. His sister remembered the concentration and perseverance with which he would build houses of cards. Albert Einstein's first job was that of patent clerk.

In 1933, he joined the staff of the newly created Institute for Advanced Study in Princeton, New Jersey. He accepted this position for life, living there until his death. Einstein is probably familiar to most people for his mathematical equation about the nature of energy: **$E = MC^2$** .

Albert Einstein wrote a paper with a new understanding of the structure of light. He argued that light can act as though it consists of discrete, independent particles of energy, in some ways like the particles of a gas. A few years before, Max Planck's work had contained the first suggestion of a discreteness in energy, but Einstein went far beyond this. His revolutionary proposal seemed to contradict the universally accepted theory that light consists of smoothly oscillating electromagnetic waves. But Einstein showed that light quanta, as he called the particles of energy, could help to explain phenomena being studied by experimental physicists. For example, he made clear how light ejects electrons from metals.

There was a well-known kinetic energy theory that explained heat as an effect of the ceaseless motion of atoms; Einstein proposed a way to put the theory to a new and crucial experimental test. If tiny but visible particles were suspended in a liquid, he said, the irregular bombardment by the liquid's invisible atoms should cause the suspended particles to carry out a random jittering dance.

One should be able to observe this through a microscope, and if the predicted motion were not seen, the whole kinetic theory would be in grave danger. But just such a random dance of microscopic particles had long since been observed. Now the motion was explained in detail. Albert Einstein had reinforced the kinetic theory, and he had created a powerful new tool for studying the movement of atoms.

The Atomic Bomb

Please don't build one at home. On August 2nd 1939, just before the beginning of World War II, Einstein wrote to then President Franklin D. Roosevelt. Einstein and several other scientists told Roosevelt of efforts in Nazi Germany to purify U-235 with which might in turn be used to build an atomic bomb. It was shortly thereafter that the United States Government began the serious undertaking known only then as the Manhattan Project. Simply put, the Manhattan Project was committed to expedient research and production that would produce a viable atomic bomb.

Albert Einstein in Princeton

"Albert Einstein (1879 - 1955) first gained worldwide prominence in 1919, when British astronomers verified predictions of Einstein's general theory of relativity through measurements taken during a total eclipse. Einstein's theories expanded upon, and in some cases refuted, universal laws formulated by Newton in the late seventeenth century."

In 1940 Einstein became a citizen of the United States, but chose to retain his Swiss citizenship. He made many contributions to peace during his life. In 1944 he made a contribution to the war effort by hand writing his 1905 paper on special relativity and putting it up for auction. It raised six million dollars, the manuscript today being in the Library of Congress.

By 1949 Einstein was unwell. A spell in hospital helped him recover but he began to prepare for death by drawing up his will in 1950. He left his scientific papers to the Hebrew University in Jerusalem, a university which he had raised funds for on his first visit to the USA, served as a governor of the university from 1925 to 1928 but he had turned down the offer of a post in 1933 as he was very critical of its administration.

One more major event was to take place in his life. After the death of the first president of Israel in 1952, the Israeli government decided to offer the post of second president to Einstein. He refused but found the offer an embarrassment since it was hard for him to refuse without causing offence.

One week before his death Einstein signed his last letter. It was a letter to Bertrand Russell in which he agreed that his name should go on a manifesto urging all nations to give up nuclear weapons. It is fitting that one of his last acts was to argue, as he had done all his life, for international peace.

Einstein was cremated at Trenton, New Jersey at 4 pm on 18 April 1955 (the day of his death). His ashes were scattered at an undisclosed place.