



Charles Thomson Rees Wilson

1869 - 1959

Awarded the Nobel Prize for Physics in 1927

Have you ever had the chance to observe an aeroplane leaving a cloud track in a blue sunny sky? I should think so. Something similar happens in the Wilson cloud chamber, only in this case the role of the plane is played by the flying atomic particle (and the mechanism is different). It ionizes atoms of gas in the chamber, and drops of overcooled cloud condense on these ions. The volume of the chamber has to be expanded sharply to reduce the gas temperature. In this way with the help of the Wilson chamber it is possible to study tracks and thereby the properties of the smallest particles of matter.

Charles Thomson Rees Wilson was born on 14th February, 1869, in Glencorse, just outside Edinburgh. His father, a sheep farmer, died when Charles was four and his mother moved to Manchester with her children. There Charles attended first a private school then, at 15, Owens College. He started with zoology, but following the advice of his tutor, he passed exams for Cambridge in practical physics and chemistry and was awarded a scholarship to Sidney Sussex College in Cambridge.

After graduating from Cambridge in 1892, **Wilson taught for four years at Bradford Grammar School.** He returned to Cambridge in 1894 to continue his scientific work in the Cavendish laboratory. There he began constructing an expansion chamber.

Wilson's great discovery of the cloud chamber was brought about by a thorough study of atmospheric cloud formation, an interest that began with an observation of clouds on Ben Nevis (Britain's highest mountain) while climbing on holiday in 1894. The wonderful optical phenomena 'when the sun shone on the cloud' so fascinated Wilson and excited his interest, that on his return to Cambridge he tried to simulate them in his laboratory.



The 'Wilson Cloud Chamber' was used to study nuclear interactions



Cloud chamber tracks are like aircraft vapour trails

Allowing moist air to expand within a glass vessel he found out that the condensation occurred on ions, produced when X-rays irradiated the expansion chamber. Later he discovered that not only X-rays, but also other ionizing agents such as uranium and ultraviolet rays, produced condensation in gases.

Between 1888 and 1899, he was engaged full time in studying condensation on the positive and negative ions.

In 1899 Wilson joined the Meteorological Council as a researcher on atmospheric electricity. He found that even a well insulated electroscope showed a residual leakage, the same in daylight and darkness. He wrote that it might be due to radiation sources outside the atmosphere. **It was confirmed later in the discovery of the 'cosmic radiation' by Viktor Hess.**

Returning to the cloud chamber in 1910 Wilson continued to study the formation of tracks by charged particles moving through it. If the chamber is put in a magnetic field it causes the particle to move in an arc and therefore the track left by it is curved. This gives the chance to measure its charge and mass. The magnet-cloud chamber immediately became vital to the study of nuclear physics.

From 1925 and before his retirement in 1934 'CTR' was Jacksonian Professor of Natural Philosophy at Cambridge University. He remained highly active after his retirement and continued mountain climbing until he was well into his eighties. Even at the age of 86 he took weather flights over the Outer Scottish Isles as an honorary member of the University of Edinburgh Meteorology Department. He was the oldest member of The Royal Society. Colleagues remembered him as gentle, serene and mostly indifferent to prestige and honour.

S.E.