

Ernest Rutherford: A New Zealand legend (2)

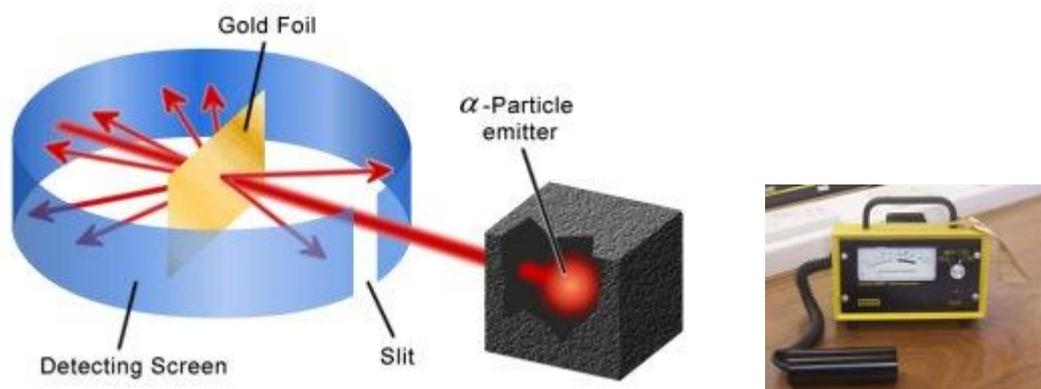
Ernest arrived at Manchester University in 1907 and within a year was awarded the 1908 Nobel Prize in Chemistry for "for his investigations into the disintegration of the elements, and the chemistry of radioactive substances". He had to go to Sweden to get the prize that today is worth over NZ\$2 million. The Nobel Prize gets its name from Alfred Nobel, who made his money from the invention of dynamite and in his will left money to be given each year to the person making the biggest contribution to Physics, Chemistry, Literature, Peace, and Medicine.



At Manchester Ernest worked with Hans Geiger to make a device that measures radioactivity, it is now called the Geiger counter. Homer Simpson, who is accident prone, would find one to be essential, working at the Springfield Nuclear Power plant. Ernest and a team of workers used radioactivity to probe what atoms were made of.

In 1911 he proposed his model of the atom. He stated that most of it was empty space and there was a small, dense nucleus in the middle made of positive charge. This was Rutherford's second great finding and a scientist (Neils Bohr) developed it further and was awarded the Nobel Prize in Physics in 1922.

By now Ernest was showing himself to be a leader of scientists. He would encourage them in their experiments and make suggestions to them. Ernest did not seek to be first in everything. Many of the discoveries others made were because of Ernest's help, but he did not bother to put his name down on their experiment paper.



When World War One started in 1914 Ernest had to spend a lot of time away from the laboratory. He did research on how to detect submarines. This was important as submarines were sinking a lot of ships causing much loss of life and supplies. He

developed a hydrophone and suggested a sonar type device that could detect reflected waves. Today sonar is used to detect where fish and underwater objects are.

Ernest's third great discovery took place in 1917 when he bombarded nitrogen with alpha particles produced hydrogen and oxygen. For centuries people had tried to change other types of atoms into gold, without success. These people were called alchemists. Ernest became the world's first alchemist, by splitting the atom and changing it into another type of atom!

In the 1919 Ernest returned to the Cavendish Laboratory at Cambridge University and was in charge till his death. The laboratory became a world leader in nuclear research and no less than six of his students were awarded Nobel Prizes. One of them, a Russian called (Peter) Kapitza made up the nick name "crocodile" for Ernest.



Ernest also spoke out about issues he was concerned about. On his last visit to New Zealand in 1925 he said it was important to keep our beautiful scenery preserved. He also said that New Zealand needed a science organisation to help farming and industry. From that the DSIR was founded.

In 1931 he was given the title Ernest Lord Rutherford of Nelson. He headed an organisation to help Jewish academics fleeing Germany when Hitler came to power. He promoted the good uses of science such as using radioactivity to treat cancer, doing research to beat tropical diseases and improving a country's living standards. He was against using planes to bomb cities and hoped a way of using nuclear energy would not found till people lived at peace.

Ernest Rutherford died on October the 19th 1937, aged 66 years. His fellow scientists saw him as a great scientist, in the tradition of Newton and Faraday. Ernest is remembered in New Zealand on our \$100 note, in building names at Canterbury University, Rutherford's Den in Christchurch and a memorial at his birth place.



Ernest Rutherford: A New Zealand legend (2) Questions

Question 1	What award did Ernest receive in 1908?
Question 2	Where did the Nobel Prize money come from?
Question 3	Which two fields could he have been awarded a Nobel Prize?
Question 4	What use would a Geiger counter be for Homer Simpson?
Question 5	What was the first big discovery of Ernest's?
Question 6	What was the second big discovery of Ernest's?
Question 7	What does the fact that most of α (alpha) particles went straight through the gold foil tell us.
Question 8	Give an example of Ernest being a leader.
Question 9	Give an example that shows that Ernest was not just interested in being first all the time.
Question 10	What was a war use made of Ernest's work?
Question 11	What use does his World War 1 work have today?

Question 12	What was the third big discovery of Ernest's?
Question 13	What does an alchemist try to do and why?
Question 14	How do we know the Cavendish Laboratory was so successful?
Question 15	What animal is known for a stiff neck and going straight for its target?
Question 16	Give the short form of Department of Scientific and Industrial Research.
Question 17	Give an example of Ernest helping people in trouble.
Question 18	List 2 examples of how Ernest thought science could help people.
Question 19	Show working and calculate the year Ernest was born.
Question 20	Where would you expect to find Ernest's memorial to be sited?

Ernest Rutherford: A New Zealand legend (2) Questions

Question 1	What award did Ernest receive in 1908? Nobel Prize in Chemistry
Question 2	Where did the Nobel Prize money come from? Alfred Nobel's money from inventing dynamite
Question 3	Which two fields could he have been awarded a Nobel Prize? Chemistry or Physics
Question 4	What use would a Geiger counter be for Homer Simpson? Measure radioactivity at the Springfield nuclear plant
Question 5	What was the first big discovery of Ernest's? Elements can disintegrate
Question 6	What was the second big discovery of Ernest's? His model of the atom (it was mostly empty space, with a positive nucleus in centre)
Question 7	What does the fact that most of α (alpha) particles went straight through the gold foil tell us. Most of an atom is empty space
Question 8	Give an example of Ernest being a leader. Encouraging other scientists / making suggestions to them
Question 9	Give an example that shows that Ernest was not just interested in being first all the time. He did not put his name down on other's experiments, even though he had helped
Question 10	What was a war use made of Ernest's work? Detecting submarines
Question 11	What use does his World War 1 work have today? Finding fish / detecting underwater objects

Question 12	<p>What was the third big discovery of Ernest's?</p> <p>Atoms could be split and changed into other types of atoms</p>
Question 13	<p>What does an alchemist try to do and why?</p> <p>Make gold from other types of atoms, to get rich</p>
Question 14	<p>How do we know the Cavendish Laboratory was so successful?</p> <p>Produced 6 Nobel Prizes</p>
Question 15	<p>What animal is known for a stiff neck and going straight for its target?</p> <p>Crocodile</p>
Question 16	<p>Give the short form of Department of Scientific and Industrial Research.</p> <p>DSIR</p>
Question 17	<p>Give an example of Ernest helping people in trouble.</p> <p>Helped academic refugees fleeing from Hitler</p>
Question 18	<p>List 2 examples of how Ernest thought science could help people.</p> <p>Treating cancer / fight disease / improve living standards</p>
Question 19	<p>Show working and calculate the year Ernest was born.</p> <p>1937 – 66 = 1871</p>
Question 20	<p>Where would you expect to find Ernest's memorial to be sited?</p> <p>At Brightwater / Near Nelson</p>