

Ernest in Canada, 1905

“Quickly!” shouted Ernest down the corridor of the Physics building, “put all smokes out. Macdonald is about to visit.” The visitor was none other than Sir William Christopher Macdonald, the man responsible for attracting Ernest to Montreal in the first place.

Macdonald had made a fortune in the American Civil war. There was a great shortage of tobacco in the Northern States like New York as nearly all tobacco was produced in Southern States like Georgia. Macdonald got round the problem by importing tobacco from the Southern States into Canada and then sold it to the Northern States. He never married and lived on £250 a year. Macdonald began using his great wealth to fund charities and education in Canada. His generosity paid for the cost to construct buildings at McGill University to house new chemistry and physics departments. Macdonald even paid for the running costs of these departments for a time. Ernest was tempted and wrote to May that

I am expected to do a lot of original work and form a research school in order to knock the shine out of the Yankees! The laboratory is one of the best in the world and has a magnificent supply of gear.

There was an unexpected twist though; the man who made a fortune from tobacco disliked it personally.

When Ernest had arrived in 1898 the salary for this new professor was £500, twice that of Macdonald’s and enough for Ernest and May to be able to start married life. Ernest found a “state of the art” building. The cold, cramped days of Rutherford’s Den in Christchurch were now past, there were workshops, storage rooms for equipment as well as rooms set aside for research and nothing else! Not that Montreal wasn’t cold in winter, it was very cold. From December to March the average temperature was below freezing, even November at an average of 1.3 °C wasn’t tropical. It had been tempting to apply for the physics professor position at Wellington, back in New Zealand. It would have been good to be “home” and £700 was good money but there was a “but”. It was a teaching position and Ernest loved research. Indeed the English Physicist Sir Oliver Lodge wrote to Ernest

I trust you will not waste your time lecturing but will go on with your experiments and leave lecturing to others!

Also, New Zealand was so far away from the best minds on the subject.

Discussion questions

- 1) What was the American Civil war about and who were the Yankees?
- 2) What attracted Ernest to Canada?
- 3) What is Canadian weather like?
- 4) Why did Ernest not return home to New Zealand to work?

Later that day Ernest thought about where his research into radioactivity was going. “Into a mighty battle with those chemists” he thought. All this stuff about scientists being people who looked at all the facts before they made any conclusions sounded good. Scientists were meant to be willing to change their views if new research

showed something new to be true. Yeah, right. Scientists are people, and people have their own pet ideas and may not want to change those ideas.

The problem; Ernest's research was suggesting the chemist's idea of what an atom was like may be wrong. Chemists had a model for the atom, whole atoms that were stable and could not be divided into anything smaller. To suggest anything else could make one well, unpopular. One could even be called an alchemist!

Alchemy had been popular between the 14th and 17th Centuries with important people like Sir Isaac Newton spending a lot of time on different experiments. What alchemists are most famous for is attempting to turn common elements like lead into gold. They did not succeed and in the 18th Century alchemists started to fall out of favour. Modern chemists thought of atoms as stable and unchangeable. Anyone suggesting change was possible were like those uncool alchemists of the past.

Ernest had been fascinated by the discovery of radium by Marie and Pierre Curie and the fact it gave off two types of radioactivity. Ernest had thought up the names for this radioactivity, coming from the first two letters of the Greek alphabet, alpha (α) and beta (β). Alpha particles were positive and beta particles were negative (like the + and - signs on an AA battery). Today almost every house in New Zealand has a smoke detector that uses alpha particles to work. He started experimenting with another radioactive element thorium and discovered that it decayed into another smaller element called radon and gave off these alpha and beta particles. This meant that there were these smaller positive and negative bits in an atom which meant atoms weren't stable and unchanging. "What can we call this?" Ernest had asked his fellow scientists. They came up with this word, transmutation and it stuck.

Discussion questions

- 5) Are scientists always correct and how do some react to new ideas?
- 6) Who were alchemists and why did they want to make gold?
- 7) What use do we make from alpha particles?

Ernest missed May and his 4 year old daughter Eileen. They had gone on ahead to New Zealand to visit the family and he couldn't join them till the research was done and the summer holidays began. In the meantime he was boarding with Professor Morrin, Professor of French. Morrin noted that *Ernest did not eat a lot for breakfast, eggs, bacon and toast, washed down with strong French coffee followed by many cigarettes. He was nervous and very active, devoting all his time to working in the physics laboratory. Sometimes, I should say often, he got up during the night and went to his laboratory.*

All this hard work was starting to pay off. Last November he was awarded the Rumford medal by the Royal Society. These were the who's who of science and someone aged just thirty-three was not usually considered. It was a bit like being called player of the year by fellow All Blacks. The £70 that went with the gold medal was also welcome. Macdonald had insisted on throwing a dinner to celebrate, 120 invited guests turned up and it didn't finish till 2 a.m. Ernest at times felt embarrassed, listening to people saying how good he during three hours of speeches!

The small town kiwi kid was a modest one, and had not forgotten his roots. The research was much more important than becoming a celebrity.

The time in Canada was drawing to a close. Six month winters and tensions between English and French speaking Canadians did not help. The main reason to leave was that Canada was about 5,700 km from England. He was isolated from scientists like JJ and the Curies.

His friends at McGill thought the world of him. One of them, John Cox, would nominate Ernest for the Nobel Prize before he left. This was the highest award anyone could get. Alfred Nobel from Sweden, who made his fortune by inventing dynamite, left a gold medal and a cash award each year for chemistry, physics, medicine, literature and peace. When Ernest was awarded the Nobel Prize for Chemistry in 1908 he was the man, number one in his field.

Discussion questions

- 8) Why stopped Ernest from travelling with May and Eileen?
- 9) How do we know that others thought a lot of Ernest as a scientist?
- 10) Who was Alfred Nobel and what did he do?