The march of the Maoris

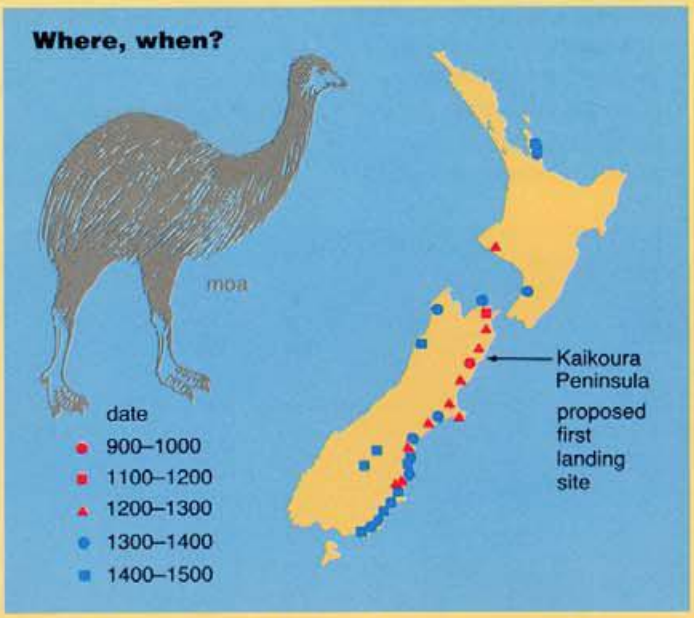
Maori legend tells the story of the arrival in Aotearoa — loosely translated as the Land of the Long White Cloud — of New Zealand's original inhabitants in ten large canoes. The seafarers, coming from a land they called Hawaiki, supposedly landed in the north of what is now the country's North Island, and this event marked the beginning of Maori civilisation in New Zealand. (We now believe that Hawaiki was somewhere in or near Tahiti or the Marquesas Islands.)

Story-telling over many generations records the names of the canoes and those who sailed in them, and, just like white Australians fascinated with the First Fleet, many Maoris trace their ancestry back to this landing.

Modern archaeological research has found evidence of Maori occupation dating back about a thousand years, as well as the remains of moas, the giant flightless birds that the first Maoris ate and ultimately made extinct. Most of the archaeologists have also believed that, true to the legend, the first landings occurred somewhere in North Island, and that the people slowly spread southwards.

But now Dr Graeme Caughley of the CSIRO Division of Wildlife and Ecology has re-examined much of the archaeological evidence and come up with some startling new conclusions. Dr Caughley — himself a New Zealander — has carefully examined the data derived from carbon-14 dating of remains from all the known sites of the moa-hunting settlers.

At first the figures showed little clear pattern to suggest where first landfall occurred and how the islands were colonised. But then Dr Caughley removed the dates coming from analyses of the charcoal found in the sites, and quite a different picture appeared.



Carbon-14 dating for 31 moa-hunter sites suggests the Maoris first came ashore on New Zealand's South Island.

The three most widely used materials for dating the Maori sites are collagen (the protein in bone), shells from sea creatures, and charcoal from fires. Although all three can have various associated problems that affect accuracy, Dr Caughley argues that charcoal fragments give the least accurate dates.

This is because we cannot know the age of the wood when it was burnt. The exchange of carbon-14 with the environment ceases when a living thing dies, and the isotope within it decays at a known rate from that time on. The heartwood within a tree can be dead for centuries before the tree falls. If it's then used in a fire, the date derived by carbon-14 analysis of its charcoal would be that of the death of the cells in the wood, rather than the time when those cells were burnt to cook up a moa dinner for hungry Maoris.

Such errors are negligible when dating very ancient archaeological sites and so are often ignored, but, with many Maori settlements only about 600–800 years old, charcoal from decades-old wood can seriously bias the results.

So, ignoring the charcoal figures, Dr Caughley concentrated on the reported dates of 55 bone and shell fragments from 31 different sites — only four of them on North Island. Matching the locations of the sites with their dates suggests that the Maoris made their landfall on the north-eastern coast of South Island at a site on Kaikoura Peninsula in about 1000 AD — give or take a century. They then moved south down the coast, and reached North Island later.

Furthermore, the data suggest that the colonisers moved only slowly at first, averaging about half a kilometre per year, Dr Caughley calculates. About 200 years after landing this had reached about 1 km per year, with an annual population growth of 3%. By 1400 AD the expansion had reached a peak of about 10 km annually, at which point the Maoris completely colonised the islands, reaching the end of the available land just as their process of colonisation was getting into its stride.

Like humans everywhere, the Maoris had a big impact on the environment. New Zealand had no native mammals, but the colonisers found giant flightless birds an easy source of meat. Consequently all 11 species of moa quickly became extinct.

Archaeological evidence suggests that the human population density increased when people and moas coexisted in an area. As the moas became locally extinct — a period estimated to be about 100 years — meat became less abundant and the human population decreased to a level that the agriculture of the time could support. However, the 'colonising front' would encounter new regions stocked with moas, giving rise to a 'rolling wave' pattern of colonisation.

Now Dr Caughley is not an archaeologist, and his work on this subject is purely theoretical. But — in his work as a mammal ecologist — he has taken the methods and mathematical models normally used in studying populations of large mammals and applied these to the Polynesians as they arrived in a group of islands uninhabited since the world began. He has found much the same pattern of spread and population fluctuation as occurs when, say, deer are introduced into a new area full of food and with little competition.

Dr Caughley admits that his ideas remain speculative. To know more, we need more dates. If archaeologists can find extra material in North Island the new data may disprove this theory, but until then Dr Caughley's view will continue to stir up some Kiwi controversy.

Roger Beckmann

The colonisation of New Zealand by the Polynesians. G. Caughley. *Journal of the Royal Society of New Zealand*, 1988, **18**, 245–70.