BURIED BLECHNUMS

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Elizabeth and I live on the Te Akau Peninsula, situated at the western end of Lake Rotoiti between the Okere Arm and Te Weta Bay. This peninsula supports some reasonably undisturbed native forest, plus a good number of residential properties, many of which are partly or largely covered with a mixture of native and exotic trees and shrubs. Our property is fairly steep, with the house located some 60 metres above the lake, and a track winding down to the lake through 'bush' dominated by some very tall mamaku (*Cyathea medullaris*).

A number of years ago we decided to replace a very decrepit pump shed down near the lake with a 'dry' boat shed. Having eventually obtained the necessary permits we proceeded to demolish the old pump shed – a simple exercise since it promptly collapsed into a pile of borer-riddled timber as soon as I climbed onto the roof. The next stage was excavation back into the toe of the hillside to clear out a flat platform on which to pour a concrete slab. After removing sundry vegetation we started to dig. We eventually dug to the back end of the necessary platform, where up to two metres depth of dark red-brown volcanic ash, with occasional small stones embedded in it, needed removing. We had almost reached the required depth, when we came across some ferns, buried deep (1.9 m) in the ground.

These ferns were immediately recognisable as *Blechum novae-zelandiae* (kiokio), and appeared to be fresh and bright green. We laid them out on the ground and examined them with interest. After just a few minutes they started to wither and blacken before our eyes. So how did these ferns come to be buried, and when? There was no evidence on the site of any soil disturbance such as would be caused by a landslide or by human interference. In the Rotorua region, an obvious candidate would be air-fall from a volcanic eruption.

Major Gilbert Mair witnessed the eruption of Mount Tarawera on the night of 10 June 1886 from Taheke, approximately 1 kilometre from our property, and wrote of his experiences in *The Transactions of the New Zealand Institute* (Mair, 1886). In his extremely well written and vivid account he comments of the morning following the eruption: "All round Rotoiti everything was covered with the grey volcanic deposit. In some places it was in drifts of 18 inches deep, and nowhere was it less than 3 inches."

This suggests that the ash layer that we dug through was not primarily derived from the Tarawera eruption, being much too deep, not grey, and the deposits that we encountered do not resemble the Tarawera ash that we are familiar with. We therefore assume that this layer derives from some previous eruption, of which the nearest in time and space is the Kaharoa eruption of approximately 700 years ago (Nairn 2002). This eruption, centred on the area between Lake Rotoiti and the Tarawera Volcanic Complex, was powerful and gave rise to large plinian eruption columns (as in the historic eruption of Mt Vesuvius that buried Pompeii and Herculaneum) followed by pyroclastic flows that covered large areas of the northern North Island with Kaharoa Tephra deposits. So it seems quite possible that the ferns which we unearthed were rapidly buried and heat-sterilised about 700 years ago, and lay undisturbed, in a remarkable state of preservation, until finally exposed to light, air and oxygen, which presumably caused rapid oxidation of long-preserved phenolic or other organic compounds, leading to a speedy collapse. We need to seek a geological opinion on the probable age of the deposit, sometime!

References

Mair, Major W.G. 1886. Notes on the Eruption of Tarawera Mountain and Rotomahana, 10th June, 1886, as seen from Taheke, Lake Rotoiti. [*Read before the Auckland Institute, 26th July*, 1886.] *The Transactions of the New Zealand Institute*,*Volume 19*, 372-374.

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