

ERUPTION CHRONICLES

Mount Tarawera in Rotorua, New Zealand, is a restlessly sleeping volcano that has erupted five times in the last 18,000 years. It is situated within the Okataina Volcanic Centre, which is part of the Taupo Volcanic Zone. This zone in turn is the New Zealand part of the "Pacific Ring of Fire" where the Pacific Tectonic Plate meets the India-Australia Tectonic Plate. A feature of the Taupo Volcanic Zone is the relatively shallow depth - only a few kilometres beneath the surface - at which large masses of molten rock are believed to reside.

The mountain one sees today was built during eruptions approximately 18,000, 15000, 11,000 and 800 years ago. The three domes of Tarawera were all seemingly named in antiquity - Ruawahia (split or cloven hole or cave), Tarawera (burnt cliff or peaks) and Wahanga (bursting open) - giving rise to speculation as to whether early Maori were witness to the 800 year old ("Kaharoa") eruption. The most recent eruption, on June 10 1886, was of a different character and instead produced only fragmentary material and fresh basalt lava that was ejected with explosive force and distributed over the surrounding country.

Between the Kaharoa and the 1886 eruptions, two small lakes existed in the area now occupied by Lake Rotomahana. Maori had given them the names *Rotomakariri* - Cold Lake and *Rotomahana* - Warm Lake. Old Rotomahana was adorned by the unique Pink and White Terraces which had grown on opposite shores there over a period of many centuries.

From 1870, growing numbers of tourists began to visit the New Zealand thermal region and local Maori were employed as guides and boatmen taking visitors across Lake Tarawera and Lake Rotomahana to view the Terraces.

During the early hours of 10 June 1886 persistent and increasingly-felt earthquakes culminated in a sudden eruption on Ruawahia, the central and highest dome of the volcano.

The black column of ash that arose, illuminated by flashes of lightning, quickly turned incandescent with the glow of red-hot lava. Over the next two hours the eruption extended

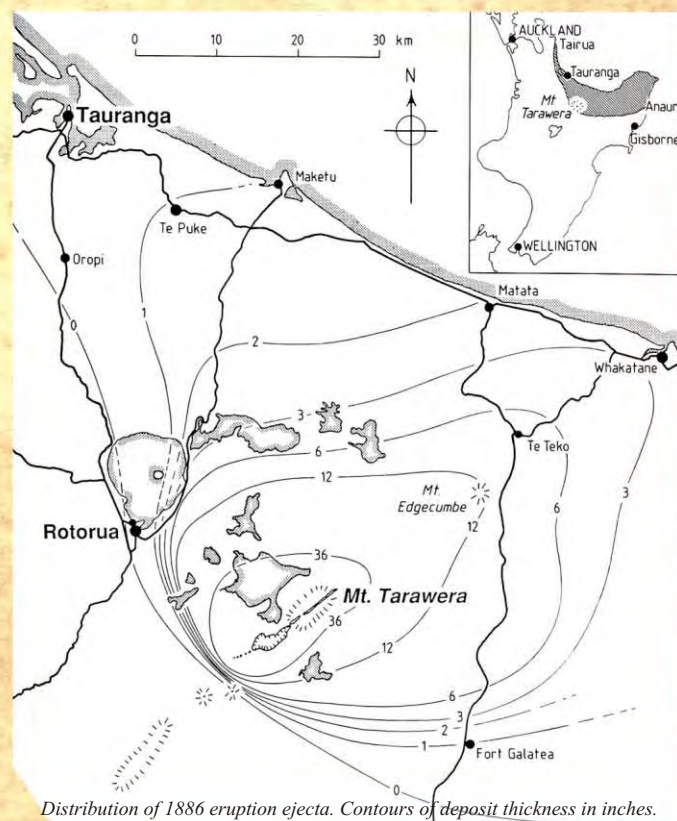


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until the whole length of the mountain top appeared to be erupting a gigantic broad sheet of fire. The glowing mass was seen from as far away as Gisborne, Napier, and the Wanganui river valley. The eruption then extended further to the southwest, blasting many new craters at the sites of Rotomakariri and Rotomahana. The explosion at Rotomahana was particularly energetic and ejecta consisting of dust, sand and rock mixed with fragments of new lava, and filled with steam and other gases is believed to have risen about 11 kilometres. On its collapse, this material, falling from the sky as a coherent mass, flowed horizontally across the surrounding area.

This phenomenon, now called 'base surge', completely inundated the country to a radius of 6 kilometres from the focus in a boiling flood and had a devastating effect on the landscape and settlements. It left deposits up to 40 metres deep at the edge of the crater, thinning gradually to their outer limit. Altogether about 15,000 square kilometres received an appreciable deposit by the end of the 6 hour upheaval. The seven craters now visible in the Waimangu area were formed during the later stages of the eruption.



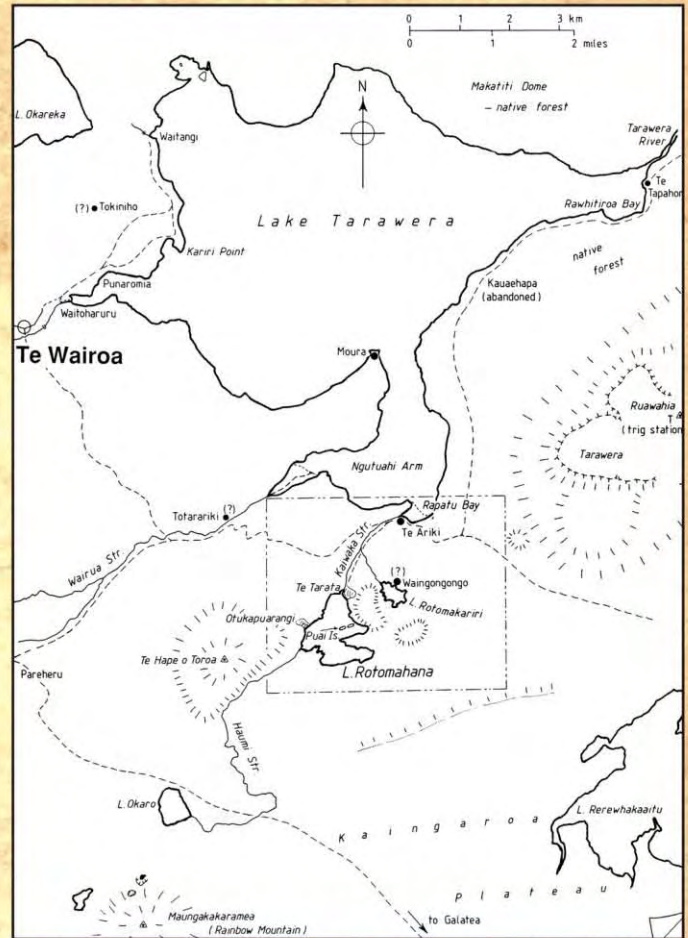
Distribution of 1886 eruption ejecta. Contours of deposit thickness in inches.

As well as significantly changing the landscape, the 1886 eruption was responsible for destroying several small villages, seven of which were inhabited at the time. About 120 people were killed. Of the villages (Moura, Waitangi, Waingongongo, Te Ariki, Te Wairoa, Tokiniho and Tototariki), only Te Wairoa (The Buried Village) can be visited to view excavations. This was the main kainga of the Tuhourangi tribe and was the staging post for visitors to commence their excursions to the Terraces pre-eruption.

The Tarawera eruption of 1886 caused many changes that induced longer term effects. Not the least was the destruction of the world-famous Pink and White Terraces with the effect their loss had on the tourist trade. Another was the complete re-shaping and enlarging of Lake Rotomahana - today this has a surface area twenty times

larger than pre-eruption and it includes the sites of both of the earlier lakes Rotomahana and Rotomakariri. Its water level stands 40 metres higher than it did before the upheaval due to the blockage of the former outflow valley. Filling freshly excavated craters, it is also one of the deepest lakes (125 metres) in the Rotorua region and is the youngest naturally formed lake in the North Island.

For visitors to Waimangu one of the more interesting consequences of the 1886 outbreak is that it initiated a new region of surface hydrothermal activity. Indeed Waimangu hydrothermal system is renowned for the fact that it is the only major system in the world whose surface activity commenced within historic times, at a time that can be pinned down to the actual day. The craters made on 10 June 1886 allowed geothermal fluids, already present underground, direct passage to the surface of the Earth. Since that date surface geothermal activity has developed in and around



KEY • Villages existing pre-1886 in which people were living at the time of the Tarawera eruption.

those craters and undergone a remarkable evolution. At Waimangu and elsewhere in the devastated region native forest has regrown naturally and has provided the only historical example in New Zealand of a bio-system re-establishing in an area following its complete destruction by a volcanic eruption.

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