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28. Traditional Use of Geothermal Resources by New Zealand Maori

by
C. M. Severne

Abstract: Geothermal resources were revered in traditional times throughout Aotearoa ("New Zealand"). In the Taupo Volcanic Zone, the Maori people used geothermal resources for many traditional purposes, including cooking, heating, bathing, and agriculture. The Maori people regarded these resources as natural treasures that were preserved for future generations by guardians (*kaitiaki*) living in the area. The understanding between Maori and the *taha wairua* ("spiritual dimension") did not allow improper use of or disrespect for physical resources to go unpunished.

Development of geothermal resources by people other than Maori has raised a number of issues regarding *kaitiakitanga* ("guardianship") and *rangatiratanga* ("full authority") over the resources. The information in this chapter includes research conducted by the New Zealand Waitangi Tribunal and information from early explorers.

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INTRODUCTION

'Ko Tongariro te maunga

Ko Tongariro te awa

Ko Taupo te Moana

Ko Ngati Tuwharetoa te iwi

Ko Te Heuheu te Tangata

Tihei Mauriora'

Tongariro is the mountain

Tongariro is the river

Taupo is the sea

Tuwharetoa is the tribe

Te Heuheu is the man

ALL NATURAL RESOURCES IN THE MAORI TRADITION WERE *taonga*, valuable natural treasures derived from gods. In a very special way, Maori were aware that their possession of them was on behalf of someone else in the future. Myths and legends support a holistic view encompassing spiritual and physical dimensions.

In 1840, many of the Maori leaders and representatives of the Queen of England signed the Treaty of Waitangi. The treaty extinguished Maori sovereignty and established that of the Crown. Natural resources are covered in the treaty by the

term *taonga katoa*, which implies Maori treasures, namely knowledge, language, heritage resources, and more, all inherited from ancestors. This important term was translated in the English version of the treaty as “other properties.” The treaty was believed to signify a partnership, but this was never attained due to similar examples of misunderstandings and conditions not honored.

As the treaty was not honored by the government, Maori have watched the development of laws enacted by the government deprive them of privileges secured in the Treaty of Waitangi. In 1975, the Waitangi Tribunal was established to make recommendations to the Crown on claims relating to the treaty. To prepare claims for the hearings, *Whakapapa* are recited; this identifies the *iwi* or *hapu* who have *mana whenua* and so *kaitiakitanga* and *rangatiratanga* over the resources. The ownership of the geothermal resource is still not resolved, although claims for Ngawha and the Rotorua areas have been heard.

This traditional view of resources has always differed fundamentally from that of the European settlers (*Pakeha*) who came to Aotearoa (New Zealand) in the 19th century. Maori and *Pakeha* each had very different world views, for the Maori traditionally did not compartmentalize resources into separate components.

The preservation of physical resources for future generations is a part of the concept of *kaitiakitanga*. Exploitation of the geothermal resources cannot be confined to traditional uses, as Maori have a commitment to provide for their families in a changing economic environment. The development of geothermal resources by other parties has resulted in complex situations between the developer and *tangatawhenua*, due to the lack of understanding and recognition

MAORI GLOSSARY (additional Maori words are explained in the text.)

hapu - aggregation of *whanau* (family), where

whanau is the association of close relatives

iwi - Maori tribe sum total of its *hapu*

kaitiaki - steward or caretaker

ngawha - geysering boiling pools

puia - boiling pools

rangatiratanga or *tino rangatiratanga* - full authority

tangatawhenua - people of the land

taniwha - supernatural being, can dwell above or underground, has many forms

taonga - treasure, prized thing of cultural and/or spiritual significance

tapu - sacred

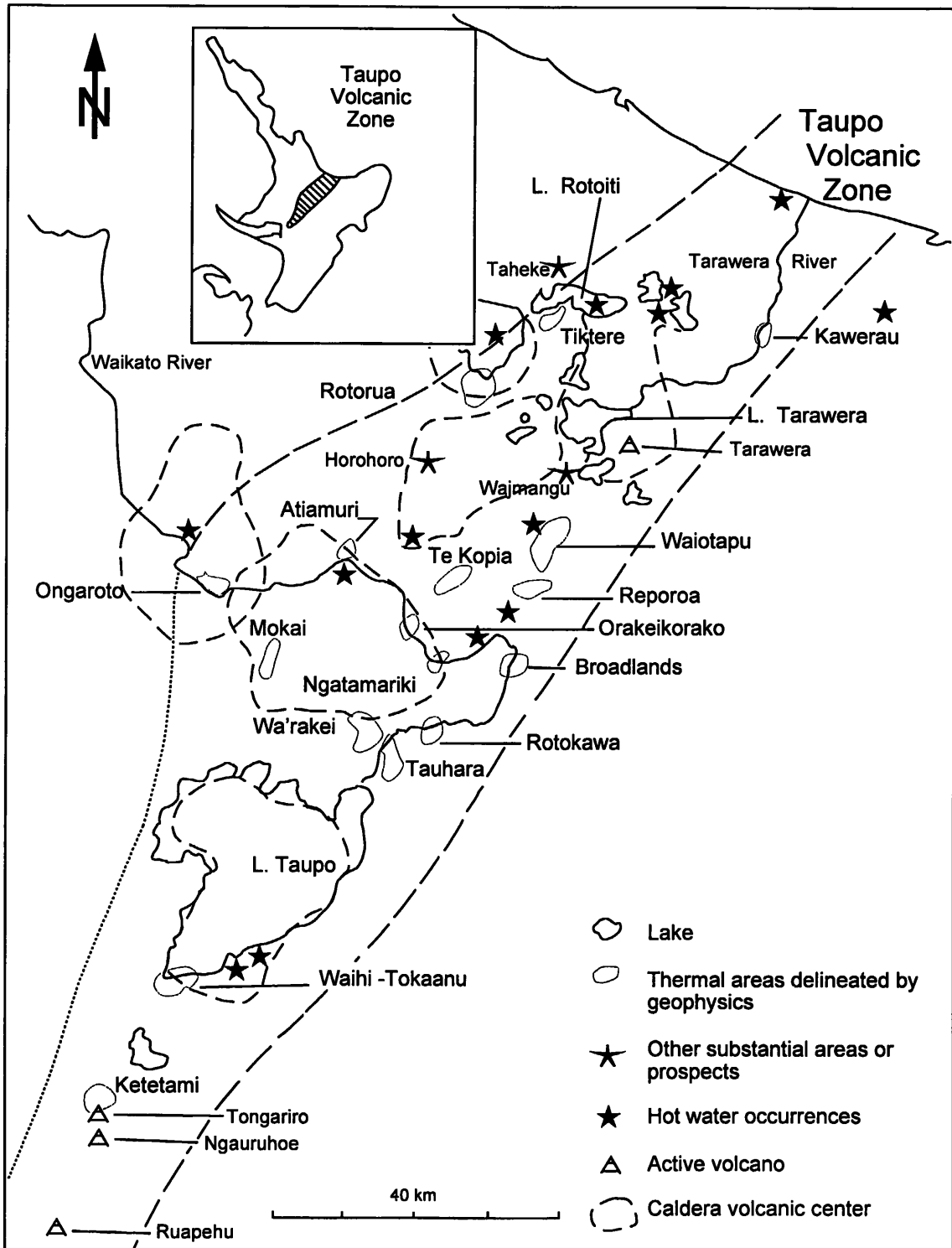
tohunga - high priest

waiariki - warm pools

whakapapa - genealogy

whanau - family

whaunaunga - extended family



Taupo Volcanic Zone, North Island, New Zealand.

of *rangatiratanga* and *kaitiakitanga* by the developers. Development requiring massive geothermal fluid withdrawal has destroyed many of the manifestations traditionally used by Maori. Some measures can be enforced to preserve thermal features. The deep geothermal resources themselves are not in danger of overexploitation; at present only the top 1-2 km of an enormous heat resource is mined (M. P. Hochstein, pers. comm.).

In Maoridom, it was believed that human existence was subordinate to the physical and spiritual components that combined to form the total environment. Geothermal resources are a case where resources were not isolated. Traditional evidence indicates that thermal springs were the face or eye of the geothermal *taonga*. Maori understood that thermal springs and the underlying geothermal activity were one and the same thing and that particular pools were connected to other surface manifestations. Maori people have long connected the *ngawha* and *puia* with the centers of volcanic activity that are still active.

The geothermal resource in the Taupo Volcanic Zone is a highly esteemed *taonga* of the Ngati Awa, Te Arawa, and Ngati Tuwharetoa tribes, who have centuries of association with the resource. The tradition attached to the tribal areas of *wahi tapu* ("sacredness") is explained later.

LEGENDS

THE GEOTHERMAL RESOURCES ENCOUNTERED IN THE TAUPO VOLCANIC ZONE ARE REFERRED TO as the legacy of Ngatoroirangi. This account is one that is associated with the descendants from the Te Arawa canoe, *Mai Maketu ki Tongariro*, "from the prow of the canoe at Maketu to the stern at Tongariro" (Stokes, 1991).

Mountains, rivers, and lakes are physical features recorded in myths and legends since time immemorial. Each feature of the landscape had special meaning and significance. Maori legends and songs speak of the spiritual connection of the Maori with this resource. Maori extended their deep sense of spirituality to the whole of creation. In their myths and legends, they acknowledged gods and other beings who bequeath all of nature's resources to them (Wai. 22, 1988).

Ngatoroirangi, *Tohunga* ("high priest") of Te Arawa canoe, journeyed inland from Maketu in the Bay of Plenty to Tongariro. On the slopes of Tongariro, nearly freezing to death, he called to

his sister for help. The following account of the legacy of Ngatoroirangi was recorded by Dr. Ferdinand von Hochstetter in 1959:

“I reproduce the peculiar legend as I heard it from the mouth of the Chieftain Te Heuheu at Lake Taupo. Among the first voyagers who came from Hawaiiiki to New Zealand, was the chief Ngatoroirangi (‘heaven runner,’ ‘the traveler in the heavens’). He landed at Maketu on the east coast of the North Island. Thence, he made his way with the slave Ngauruhoe to explore the new country. He travels through the district, stamps springs of water from the ground to succor the mountains and glimpses to the south a great mountain, Tongariro (literally, ‘towards the south’). This mountain he determines to climb in order to survey the whole country from its summit. He comes to Lake Taupo in the inland plains. Here the bushes tear up his great cloth of kiekie leaves. The shreds strike root and become Kowhai trees. Then he climbs the snow clad Tongariro; higher up, however, it is so cold that chieftain and slave are in danger of freezing. Ngatoroirangi, therefore, calls his sisters who remain at Wakari [Whakaari] to dispatch him fire. The sisters hear the call and send sacred unquenchable fire that they brought with them from Hawaiiiki. They send it by means of two *taniwha* (spirits of the mountain and water, living underground), Pupu and Te Haeata [Te Pupu and Te Hoata], by a subterranean passage to the peak of Tongariro. The fire comes just in time to save the chieftain. When, however, the latter wishes to offer it to his slave, so that he can warm himself, Ngauruhoe was dead.”

“To this present day, the hole through which the fire rises in the mountain (the active crater of Tongariro) is known by the name of the slave, Ngauruhoe. Since, however, the fire was the sacred fire from Hawaiiiki, it still burns strongly today, and burns along the whole stretch between Wakari [Whakaari] and Tongariro at Motou-Hora, Okakaru, Roto-ehu, Rotoiti, Rotorua, Rotomahana, Paeroa, Orakeikorako, and Taupo, at every point where it shot up when the two *taniwha* brought it underground. Hence the innumerable hot springs” (Hochstetter, 1959). [Corrected spelling in brackets.]

This account is one of many that exist. Similar versions and variations involve the sisters traveling with the heat, sending gods or demons, or the sisters being called to in Hawaiiiki, not Whakaari. Always, the route the two *taniwha* took is consistent with the account of the Chieftain Te Heuheu.

The following version also is often heard:

“The sisters, who were back in Hawaiiiki, heard his call and set out at once. They rested and lit a fire at Whakaari (White Island, which is an active volcano in the Bay of Plenty), and then they made their way underground to Tongariro. Sparks fell from their fire at Waiotapu, Ohaaki, Rotokawa, Tapuae-haruru, and Tokaanu, creating hot springs, geysers, and boiling mud pools in these places. At Tongariro, the sister’s fire warmed Ngatoroirangi, but it came too late for Ngauruhoe; the crater of the mountain became his tomb, and its peak is known by his name. Then Ngatoroirangi took the fire and hurled it into the crater, where it still burns. His sisters returned to the Bay of Plenty, initiating, as they went, thermal activity at Waimahana, Whakarewarewa, Ohinemutu, and Tikitere” (Orbell, 1985).

Physical features were named to commemorate myths that surround them. For example, when Ngatoroirangi thought he was dying of cold, his words were “*Ka Riro Au Te Taonga.*”

Ngatoroirangi was chanting these words on the summit of the mountain we call Tongariro (Maxwell, 1991).

Myths also associate the mountains with movement. One of the best known myths is the tale of the four warrior mountains' love for Pihanga. In the days when the world was young, the great mountains stood on the heart of Ika a Maui (North Island, New Zealand). They were gods and warriors. Taranaki stood southwest of Ngauruhoe, Tauhara, and Edgecumbe, which was to the northeast.

Pihanga was the sought after mountain; her fame and beauty had spread to the far corners of the land. Each of the four mountains wooed her and wished her to be his wife. The mountains battled for her hand and Tongariro emerged victorious. The defeated departed. Taranaki traveled toward the setting sun, carving out the mighty Whanganui River. Mount Edgecumbe journeyed northwards, and Tauhara, heavy in heart and lingering to gaze back at Pihanga, today stands on the northern shore of Lake Taupo (Potton, 1987).

The sighting of a phantom canoe on Lake Tarawera is deeply embedded in the mythology surrounding the 1886 eruption of Mt. Tarawera. Sophia, a well-respected guide at the Terraces, returned from guiding visitors one day and saw a war canoe full of warriors. The canoe was moving swiftly, as if pursued by the enemy. It was an omen and Sophia met with the landlord of the Hotel at Wairoa, saying, "I shall never go back to the Terraces; something is going to happen." A few days later, the forces of nature broke out and Tarawera erupted, along with Lake Rotomahana, destroying the Terraces and surrounding villages; 150 people were killed. Sophia reportedly believed the eruption was punishment from a demon called Tama-o-hoi, who long before had been imprisoned in the mountain by Ngatoroirangi.

KAITIAKI (CARETAKERS OF THE RESOURCE)

IN MANY CASES, PARTICULAR RESOURCES FORMED A CENTRAL CULTURAL COMPONENT BETWEEN *hapu* or *iwi* and their traditional territory. Particular springs in a region may have been used by all *hapu* from the time of the ancestors, who used the springs in early times for ceremonies. Events occurring through time accumulated into a history, enhancing the magical qualities of a pool.



Swimmers in a warm spring at Orakei Korako, with a geyser in the background, from *Te Ika A Maui: or, New Zealand and Its Inhabitants*, by the Rev. Richard Taylor. Maori villages were often built in thermal areas. The warm pools were popular bathing places and food was easily cooked in baskets lowered into hot pools. *Auckland Institute and Museum*

The *hapu* living in the immediate vicinity of the pools or springs acted as the *kaitiaki* (“steward or guardian”) on behalf of all the *hapu*. One of their major functions was to nurture and preserve the resource for future generations. Use by other *hapu* may have been due to the geographic position of the springs, traditionally a crossroads for Maori traveling in the region. The seasonal uses by the larger *iwi* will be discussed further.

There was a system of *tapu* (“sacred rules”) that, combined with the Maori belief in gods having overall responsibility for nature’s resources, served effectively to protect these resources from improper exploitation. To disregard or disobey any of the rules of *tapu* was to court calamity and disaster (Wai. 304, 1993).

The spiritual properties of an area are important and are *wahi tapu* (“sacred”) due to incidents involving ancestors. The *wairua* (“spirit”) of a feature or area has qualities to be respected and feared, because if not properly acknowledged it can cause ill to those who defile it.

DIRECT USE

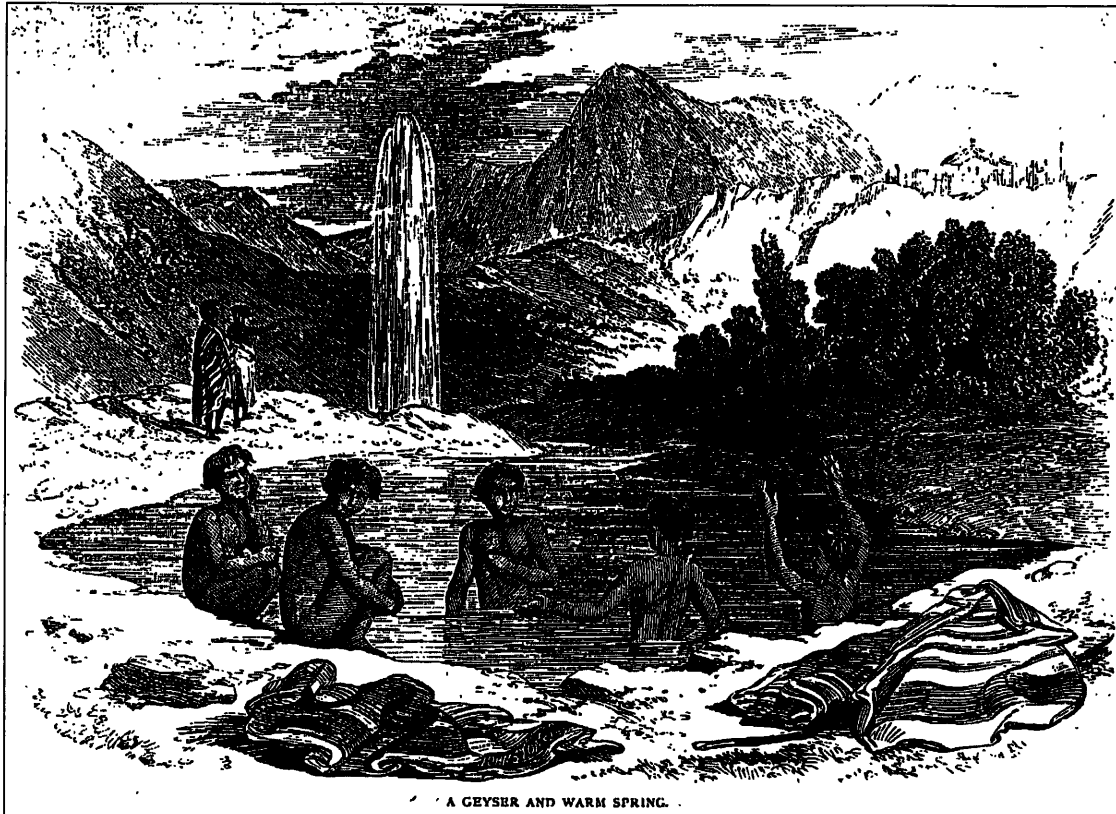
IN TRADITIONAL MAORI TERMS, HOT SPRINGS WERE NOT A SINGLE ISOLATED PHENOMENON; HOT springs were seen as the face or eye of the resource. The surface components of the resource have been given specific names, ranging from boiling mud pools (*ngawha paruparu*) to sulfur deposits (*kupapa*) (Maxwell, 1991). *Puia*, *ngawha*, and *waiariki* are Maori terms used to distinguish among geysering pools, boiling pools, and warm pools.

Icelanders distinguish among *hverjar*, *namur*, and *laugar* as Maori distinguish among *puia*, *ngawha*, and *waiariki*. The *puias* of New Zealand correspond to springs called *hverjar* in Iceland. *Hverjars* can be either permanently flowing boiling springs or intermittent hot-water discharges. Surface manifestations at Tokaanu, Orakeikorako, and Rotorua include many intermittent geyser-like springs, which Maori referred to as *puia*. *Puia* is also used to describe a crater or volcano, for example the crater lake at Ruapehu, an andesitic volcano on the southern end of the Taupo Volcanic Zone (Hochstetter, 1959).

The areas with geothermal activity provided warmth, heat for cooking, therapeutic healing qualities from mud and hot pools, *kokowai* (“red ochre”), and sites for *paruparu* (“black dye”) preparation. In general, the favored sites for permanent settlement were within easy reach of forest, river or lake water, arable land, and geothermal areas (Stokes, 1991).

Medicinal benefits from geothermal areas have been known for centuries, and I outline a few. As these medicines are *taonga* to the various *hapu*, and should remain so, my discussion is brief. Bathing in pools was believed therapeutic for various skin diseases, such as eczema and rashes. Various pools were used to treat different ailments, and leprosy, arthritic, and rheumatic diseases could be treated in different pools from the same area.

Sulfur was mixed with pork fat and applied directly to any skin disease, *hakihaki*. It was also ingested whole to combat internal diseases. Maori had special medicines for people burnt by hot water or steam. At Rotorua, “shells from fresh-water shellfish (*kakahi*) were ground to the consistency of talcum powder, *rekereke* was applied next, then rendered fat was added to seal the burn” (Maxwell, 1991). The ingestion of some thermal waters (*e.g.*, Waitangi at Rotorua)



The Cold Basins, White Terraces, Rotomahana, from *Illustrated London News*, 1880. Pools like these were used for healing, relaxation, and a chance to *korero* (“talk”). *Auckland Institute and Museum*

was said to help cure stomach complaints. Often the ingested waters have been predominantly bicarbonate-chloride waters.

As mentioned before, some of the pools and springs are *tapu*. The *wairua* (“spirit”) of the manifestation can be due to past events or to current activities. Examples of *tapu* manifestations are pools used for burial or bathing the dead, areas used for childbirth, and pools used by menstruating women.

Areas were often used seasonally by the whole *iwi* for digging the raw material needed to make *kokowai*, a red dye made from thermally altered clay, prepared by heating the clay and mixing it with oil and/or water, depending on use. The periodic use of thermal areas for digging roots and collecting clay for *kokowai* did not necessarily indicate continuous occupation. The treasures the Maori held dear (*taonga*) were not often mentioned to travelers for fear of exploitation.

CASE STUDIES: WELL-KNOWN AREAS TRADITIONALLY OCCUPIED BY MAORI

TE TARATA AND OTUKAPUARANGI (PINK AND WHITE TERRACES)

TE TARATA AND OTUKAPUARANGI WERE ALREADY THE FOCUS OF AN INTERNATIONAL TOURIST industry by the 1850s. The Ngati Tuhourangi people became an affluent tribe as the tourist industry in New Zealand developed when the world became aware of the unsurpassed geothermal spectacles, of which Hochstetter said, "They baffled description."

The following observations were made by Dieffenbach on his travels: "When we arrived on the crest of these hills, the view which opened was one of the grandest I had ever beheld. Let the reader imagine a deep lake of a blue color surrounded by verdant hills, in several islets, some showing the bare rocks others covered with shrubs, while on all of them steam issued from a hundred openings between the green foliage without impairing its freshness; on the opposite side a flight of broad steps of the color of white marble with a rosy tint, and a cascade of boiling water falling over them into the lake" (Dieffenbach, 1843).

At Rotomahana in 1882-83 prior to the eruption, it was observed that the local Maori had taken full advantage of the resource. On the edge of the lake, square shallow baths had been constructed, the sides formed of large stone slabs set upright, edge to edge, and the water led into them by ducts from various springs that bubbled up everywhere from the ground. A platform in this area was constructed by laying broad stone slabs over a spring for drying karaka and tawa berries. The stones were heated to a temperature necessary for drying (Wilson, 1884).

Rotomahana was a Ngati Tuhourangi stronghold right up to the Tarawera eruption in 1886. This meant that this tribe had a monopoly over the booming tourist industry before the Terraces were destroyed in the eruption. Ngati Rangitihi, another local tribe, and Tuhourangi disputed over lands at Rotomahana for many years, but reached a peace in 1855. The lives of Tuhourangi and Ngati Rangitihi were changed drastically after the eruption. When the surrounding arable land and the Terraces they so relied on for income were destroyed, the tribes relocated around Rotorua and in the Coromandal.

WAIHI

ON THE SOUTHERN END OF LAKE TAUPO, HOCHSTETTER VISITED WAIHI WHERE HOT SPRINGS discharge on the shore of the lake. The local inhabitants, Ngati Turumakina, had fitted up for themselves several bathing places where they filled basins with water at temperatures of 34° C. The foreshore near the village was changed forever in 1846 and 1910 by large landslides, and the 1846 event destroyed the ancient village of Te Rapa.

The following account of Te Rapa was recorded by Dieffenbach (1839-1841):

“Where the shore joins the delta of the Waikato [Dieffenbach refers to the Tongariro River as Waikato in his records], there is a narrow belt of flat land on which stands the village of Te Rapa. Behind it, the hills rise to about 100 feet above the lake. In ascending, the ground is found to be of high temperature; the surface is often bare, or scantily covered with mosses or lichens. It is formed of red and white clay of soft and alkaline nature, which natives use instead of soap, and sometimes eat. Gaseous effluvia seem to have converted the rock of the hill, which is basalt and sometimes amygdaloid, into this clay. When we approach the top of this amphitheater of hills, the scene which presents itself is very striking. Vapors issue from hundreds of crevices, and in most of these places, there are shallow springs, the bottom of which is a soft mud into which a stick can easily be driven ten feet. The temperature of the water is 200°-212° F. In some springs, it has an argillaceous and others a sulphurous taste. A subterranean noise is continually heard, resembling the working of a steam engine or the blast of an iron foundry. By placing some ferns over a crevice, and their food (potatoes, kumara, or pork) upon it, natives have a ready and convenient oven” (Dieffenbach, 1843).

Above the shores at Waihi is the thermal area Hipaua, named after the largest thermal feature, the Hipaua fumarole. The area is characterized by bare steaming ground, fumarolic activity, and occasional pools. Here at the foot of steaming hills, the ancient village of Te Rapa was overwhelmed by a landslide and the great Maori Chief Te Heuheu Tukino II (*Mananui*) was killed, along with 60 of his *whanau*.

During the month of May 1846, Taupo experienced an unusually heavy rainfall that flooded rivers throughout the district. The heavy rain caused small slips to occur, with the result that in the course of three days the little valley (Waimatai) formed a lake. As the lake rose, there were further slips. Finally the barrier burst and the water, red clay, mud, and rocks went thundering down the hill toward the lake and Te Rapa. The avalanche swept everything before it and overwhelmed Te Rapa. It happened during the early morning hours when people were asleep and all were buried under the muddy thermal clay except for a few who fled to the nearby hills. It is said that during the night before the landslide, there was a thunderstorm. Chief Te Heuheu

rose at midnight, went outside, and recited incantations to his gods to pacify the elements. His ancestral spirits did not heed him and instead invoked Ruaimoko, the subterranean god, to destroy him.

The remains of the chief and his wife were taken to Pukawa, north of Waihi, until their final resting place at the top of Tongariro was prepared. The choice of a resting place on Tongariro was opposed by a neighboring chief, who considered that such a burial would give force to a claim by the descendants of Te Heuheu to a mountain to which the Te Heuheu line did not the have sole right. However, the bodies were secretly deposited on the mountain.

A resolution of the tension created within Tuwharetoa by the mountain burial was to come 60 years later. In 1910, in order to fulfill the terms to create the Tongariro National Park, the remains were brought down from the mountain to be buried in a vault provided by the government. When the bones were moved to Waihi, one of the carriers broke the law of *tapu* by jumping over a cooking fire. When he was returning with a party the following day, a landslide again came down from the thermal area, Hipaua, and he was killed.

WAIRAKEI

THE GEOTHERMAL RESOURCES AT WAIRAKEI WERE USED BY SEVERAL TRIBES IN TUWHARETOA, and Ngati Rauhoto maintain rights of *kaitiakitanga* and *rangatiratanga* over the Wairakei area. It has been reported that the encampments of temporary dwellers processed *kokowai* and fished for trout, among other activities (Stokes, 1991).

Kokowai was a valuable commodity used in ceremonial exchanges of goods that cemented tribal relations. However, the use of *kokowai* declined when European dyes were introduced. The resources of Wairakei that were highly valued included *kokowai* and the healing powers of the hot pools, *Matarakutia*. Ferns were also collected at different times of the year. Areas of *wahi tapu* exist all around the Wairakei thermal area, with the exact location known only to the members of the *hapu*. Karapiti (“Craters of the Moon”) is an area of special concern to the *hapu*. There are legends surrounding the large fumarole, destroyed under roof collapse in 1981, for which the area was named. The story involves a maiden with her child, jumping into the fumarole.

Kiriohinekai steam was so named by local people for its smoothing effect on skin after bathing, and Tuwharetoa used *Matarakutia* to care for leprosy or *ngerengere*. *Piroriro*, “new skin,” was the source spring that had curative properties for cleansing and invigorating (Stokes, 1991). The tragedy of development in the Wairakei field has been the loss of 22 geysers. By May 1964, six years after commissioning the geothermal plant in 1958, only one geyser was still playing. With continued extraction of steam and ground subsidence in the area, the geysers, hot springs, and mud pools have been replaced by steaming ground and a few fumaroles. The *taonga*, or treasures, in this area were numerous.

DISCUSSION AND CONCLUSION

WE HAVE DISCUSSED HOW MAORI COMMUNITIES USED GEOTHERMAL RESOURCES AS AN INTEGRAL part of their lives, for bathing, cooking, cleaning, healing, mediating, burial preparation, and sometimes for burial itself.

Maori have watched the implementation of the laws enacted by the government from 1840 to the present; all have tended to deprive them of privileges secured in the Treaty of Waitangi. In 1975, the Waitangi Tribunal Act was passed, and this has enabled the Maori to prepare claims to the government for the land and resources lost to them. The ownership of the geothermal resource is still not qualified, although claims for Ngawha and the Rotorua area have been heard and recommendations made.

The detail of Maori description and understanding of the geothermal resources is hardly surprising; their lives and customs were integrated with their physical environment. Knowing that the resource extended below the surface, Maori took a characteristically holistic approach to the *taonga*.

In many cases, the geothermal *taonga* formed a central component of the cultural relationship between *hapu* and *iwi* and their traditional territory. Springs may have been used by all *hapu* of a region from the time of the ancestors. Such history of tribal usage would reflect the magical qualities of the waters of the springs. It might also reflect the fact that the springs were traditionally a crossroads for Maori traveling. The *hapu* who traditionally lived in the immediate vicinity of particular springs may have tended the springs on behalf of the whole *iwi*.

Maori believed there to be an interconnection between the springs and other surface manifestations. The geothermal resource is seen by them as one entity, with the surface and subsurface components inextricably linked. The legacy of Ngatoroirangi has been carried down through the centuries orally and more recently as written transcript. Whaakari (White Island) was the first place that the resource appeared, the beginning of the trail of heat through the Taupo Volcanic Zone.

ACKNOWLEDGMENTS

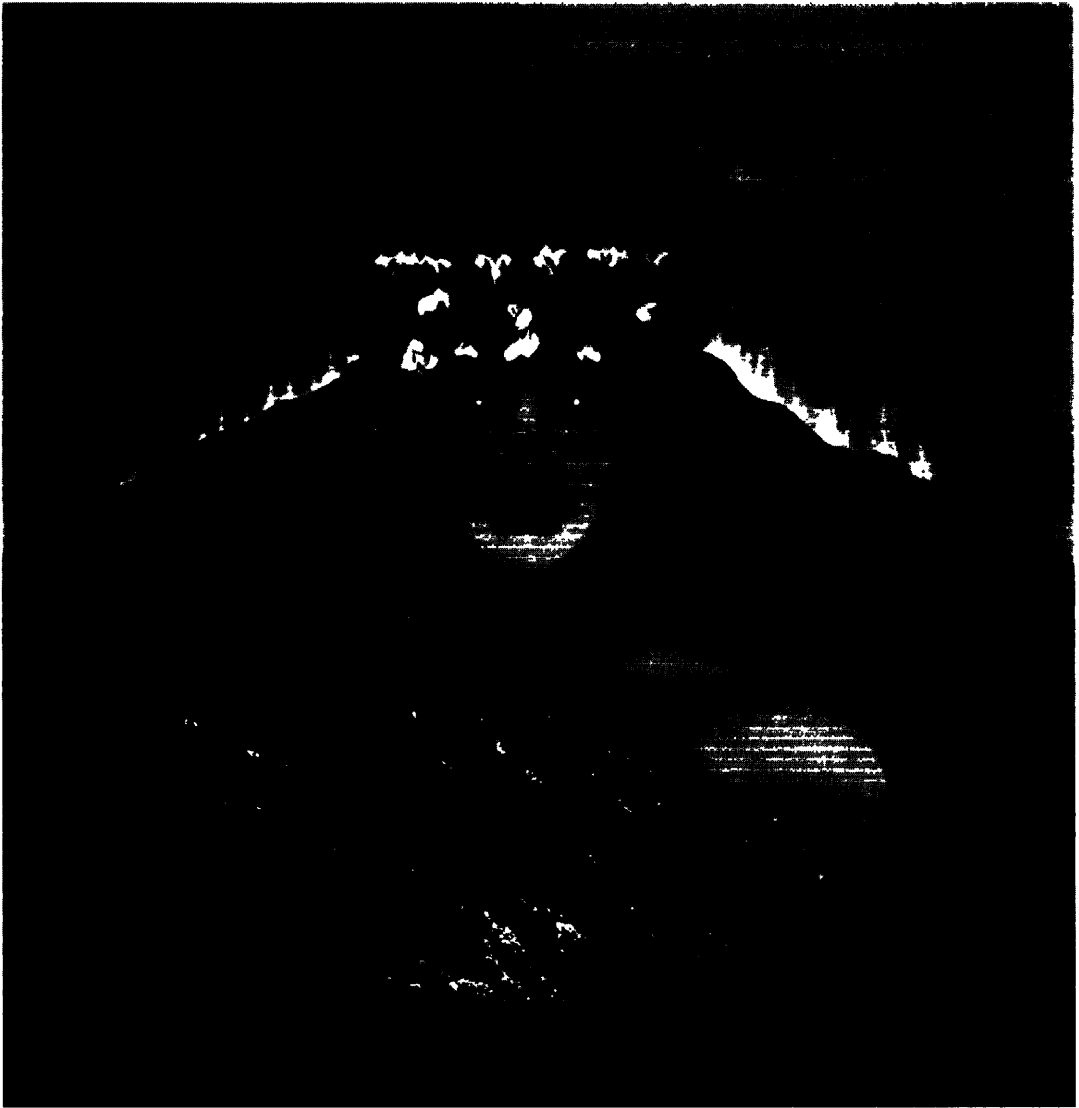
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The Author:

C. M. Severne
Geothermal Institute
The University of Auckland
Private Bag 92019
Auckland, New Zealand



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