# A Specific Period When Māori Arrived in Aotearoa-New Zealand

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**Abstract**

At the beginning of the 20th century Western historians determined that the 'main-fleet', carrying the Polynesian people from the Central Eastern Pacific to settle New Zealand, arrived in the year 1350 AD. These Polynesian people would become known as Māori. The arrival date was derived using whakapapa or traditional Māori genealogies which served as an elementary chronology to fix an arrival date, with no other supporting evidence. Over the past century the arrival date of 1350 AD has become entrenched in the nation's consciousness and has remained largely unchallenged.

This research proposes that the 'main-fleet' arrived in December 1408 AD, almost 60 years later than 1350 AD. This new arrival date is derived through a method aligning a different interpretation of the whakapapa/genealogy evidence of two of the ocean going vessels/waka, the Tainui and the Te Arawa, with lunar information, seasonal markers, traditional astronomical alignments and traditional oral evidence. Importantly, the new proposed time-period is reinforced by archaeo-astronomical evidence affirming that a full solar eclipse occurred on 9 October 1409. This event was witnessed by prominent members of the Te Arawa waka who had travelled inland to explore and claim the new landscape.

Furthermore, this archaeo-astronomical event suggests a departure date for Tainui and Te Arawa of mid-November 1408 from their traditional home in Hawaiki, in the Eastern Pacific, and an arrival date of mid-late December 1408 in New Zealand.

**Introduction**

The dating of historical events in cultures with no written record relies on oral narrative and traditions to estimate the time of occurrence. For the indigenous peoples of New Zealand known as Māori the reliance of dating historical events relied on oral tradition, in particular the tradition of whakapapa, or genealogical lineage. Whakapapa is the ability to recite genealogies in a proper order (Williams. 1975:259).

Whakapapa involves the *oral transmission and memorizing of genealogies*. It is a highly prized tradition of Māori, and was *a routine part of the Polynesian system of education* (Buck, 1938:21). The *genealogical recital could play several roles in Māori myth and tradition. In the case of the great cosmogonic genealogies it was a genuine, if cryptic, literary form. Within the body of prose stories interpolated genealogies served to relate the characters to each other and to the larger cast of tradition in general. Genealogy also served as a relative time scale for the whole of Māori legendary history, and experts in tradition used it as such. Finally, an accompanying genealogy, which brought down to the narrator himself, served to illustrate his right to tell his tale* (D.R. Simmons, 1976:12).

When whakapapa is used for dating a historical event a rough estimate of 25 years between generations is used. The twenty-five-years-to-a-generation standard was established in New Zealand in the early 20th Century (D.R. Simmons, 1976:37; Buck, 1938:23). This is often crude and unsatisfactory as a method of establishing a chronological time frame. Although genealogies can provide time-frame-period of an individual's probable birth, an alternate supporting dating-mechanism needs to be sought in order to more accurately define historical event and, or a historical event of significance.

The use of celestial events that coincide with historical events is a growing field (NAOJ Report, 2014)[1]. The descriptions of historical events can be imbedded in stories or legends that continue to be passed down through the generations (Buck, 1938:21). In particular the use of solar eclipses have been useful as a reoccurring phenomenon. In March 2014, Tanikawa san presented a paper, 'Delta T Variations from 1133 to 1267 AD', at the Eighth International Conference on Oriental Astronomy (ICOA-8) in China. The presentation concerned a traditional Japanese legend and that was dated by the correlation of the recorded event that was calculated as a full solar annular eclipse event in the 12th century to an accuracy of 17 November 1183 AD (Tanikawa, ICOA-8, 2014)[2].

The ancient Japanese legend described by Tanikawa san told the story of man apparently chasing a women into a cave that was interpreted as a solar eclipse event. Importantly, Tanikawa san and his colleagues of the National Astronomical Observatory of Japan could date the historical eclipse event.

Similarly this Japanese story draws striking resemblance to a well-known traditional Māori legend called Hatupatu. The similarity with the Japanese legend strongly suggests that the Hatupatu legend might also represent the description of a full solar eclipse that can be dated. The importance of this legend is that Hatupatu was a member aboard the Te Arawa waka, an ocean going vessel. The Te Arawa apparently arrived in New Zealand in 1350 AD as part of the "Great Fleet". The historical date of 1350 AD was determined using a 25 years-per generation model which has the potential to be grossly inaccurate. The correlation of an archaeo-astronomical event, such as a solar eclipse, has the potential to provide an extrapolated Gregorian date. This date may more accurately determine a specific period when Māori arrived in New Zealand.

The idea of comparing a particular legend such as Hatupatu that dates a well-known historical event has the potential to provide accuracy to the arrival time that is unprecedented in recent Māori history. In addition, during this particular period, two other prominent historical events may be recognition of the same event by other members of the Te Arawa ocean voyager. The two key events in question were the naming of Lake Taupō in the Central North Island and Rangipō, a barren plateau region south of Lake Taupō.

The narratives of the naming of these geographic locations describe events that could be interpreted as potentially this same solar eclipse event. Thus these narratives surrounding the naming of geographical locations can potentially lead to clues about important historical events and contribute to a more accurate arrival time of the Māori. This paper proposes that the effects of the solar eclipse on those original native explorers was culturally significant. It had major ramifications on traditional Māori life from the outset of their settlement in New Zealand. Legends were created and superstitions aroused and these consequences of the 1409 event are still known in New Zealand today.

This paper explores the idea that a solar eclipse event is thought to be represented in oral tradition. Furthermore, the solar eclipse event may help to calculate a new extrapolated Gregorian arrival date for the Tainui and Te Arawa waka to New Zealand.

# ARRIVAL OF THE MĀORI

The indigenous people of New Zealand originate from Western Polynesia (Buck, 1938:259; Evans, 1998:21)). Their original ancestors set off from the Asian mainland at least 5,000 years ago or more coming out of China via Taiwan and the Philippines (King, 2003:31; Evans, 1998:15). On their voyage via Micronesia their ancestral God, Maui-tikitiki, fished up the islands of Fai and Yap in the Caroline Island group in the Northern Pacific (Lewis, 1978:59). Sometime later Māori legends records their ancestral God Maui-tikitiki also fished up the North Island of New Zealand. The legends narrative records the name of the North Island as *Te Ika a Maui*, meaning the fish of Maui (Grey, 1988:26).

The Western Pacific of Samoa and Tonga was reached about 3,500 years ago (Evans, 1998:16). From here the early Māori again set off and reached the Marquesas-Society Islands and settled the Eastern Pacific about 2,000 years ago. From the Tahitian group, the first settlers reached New Zealand during the Archaic Phase of settlement in New Zealand. These initial tentative arrivals to New Zealand possibly occurred between eleventh and twelve centuries. Concentrated efforts of settlement from the Eastern Polynesian islands by early Māori commenced in earnest about the late thirteenth century right into the fifteenth century (King, 2003:51).

**The Arrival of the Māori**

The first traditionally recognised Polynesian and Māori ancestor to arrive in New Zealand New Zealand was Kupe. He came from the Central Eastern Pacific and tradition has it that he made landfall in about 1100 AD. Kupe returned to his home in Hawaiki (Tahiti) giving directions back to New Zealand as *a little to the left of the setting sun in the months of November and December* (Buck, 1938:269)[3]. In the 13th Century further Eastern Polynesian explorers followed Kupe's directions back to New Zealand. They brought with them their wives, children, grandchildren, extended families, animals and plants.

By the 14th Century, possibly because of conflicts, food shortages, apparent droughts, and wars, in their homelands, a great number of Eastern Polynesians were forced to leave. They set out in their sailing vessels to settle in New Zealand. Migration happened over several generations departing from a wider group of islands, from the Marquesas-Society Islands in the Eastern Polynesian region. This variation in island-origins is reflected in different traditions, social orders, different tribes, and different dialects in New Zealand (Condliffe, 1971:171, 290; Buck, 1938:273).

Most of the ocean going waka, commonly referred to as the 'great fleet,' made landfall in the Bay of Plenty, near Cape Runaway, on the East Coast of the North Island of New Zealand New Zealand. It is commonly known from traditional narrative that they arrived in December when the native pōhutukawa (New Zealand Christmas trees) were in full bloom (Buck, 1938:269 and Biggs, Jones 1995:36).

The popularised State school version tells us that the 'great fleet' contained seven waka named: Horoutā, Takitimu, Te Arawa, Aotea, Tainui, Mātātua and Mamari (King, 2003:43). There was, however, a lot more waka, possibly more than 200 ocean-voyagers (Reed, 1977:265), than those emphasised in the 'great fleet' story. They came out over several centuries, from about 1100 AD to 1450 AD. The great number of traditional waka have been largely ignored, or just forgotten, by the dominant Western society (Evans, 2009)[4].

**The popularised view when Māori arrived - The European Background**

The idea of a 'great fleet', popularised during the 20th Century, that suggested that Māori all arrived in New Zealand in a single collective voyaging fleet has been largely dismissed (King, 2003:46; D.R Simmons,

1976). Eastern Polynesians initially commenced settlement in New Zealand possibly as early as the 11th Century, before the final thrust as historians have suggested in the mid-14th Century (King, 2003:18 and Turnbull, McLaren, 1964:8)[5].

Early Pakehā (European) historians and ethnologists recognised the recital of whakapapa (genealogy) as a unique Māori and Polynesian skill. Moreover, Pakehā acknowledged, with a degree of reverence, that the recitation of whakapapa was a prodigious feat of memory (Buck, 1938:21). The admiration of these feats of memory encouraged Pakehā historians to use this dating methodology to "formally" fix the chronological arrival date of the 'great fleet' to New Zealand to the year 1350 AD.

The date of 1350 AD was originally established by Stephenson Percy Smith, an early New Zealand historian, at the beginning of the 20th Century. Percy Smith came *up with his date by simply averaging out a great number of unrelated genealogical lines (*King, 2003:45; D.R. Simmons, 1976). Smith's arrival date was merely an exercise in basic arithmetic but it captured the nation's consciousness, both Pakehā and Māori alike (King, 2003:45; D.R. Simmons, 1976). This nationwide adoption of the iconic date of 1350 AD was further entrenched by the State's education system.

**Background to the Tainui and Te Arawa Whakapapa (Genealogy descent Lines)**

History records that two ocean going vessels the Tainui and the Te Arawa departed together from their island homeland in 'Hawaiki' (Tahiti, Society Islands) in the Eastern Pacific. After about 26 to 30 days at sea they arrived in New Zealand with the 'great fleet' in that celebrated year of 1350 AD. Tradition records that the Te Arawa and Tainui arrived at about the same time on the East Coast of the Bay of Plenty, at Whangaparaoa, near Cape Runaway.

The voyaging personnel aboard the Tainui and Te Arawa were closely related. The captains were both accompanied by their wives, children, grandchildren and great-grandchildren. Each waka had possibly as many as 100 passengers aboard. The names of the men and women on board both waka had been retained to memory by traditions, stories, and waiata (songs) and recorded with the arrival of Europeans in the 19th Century (Stafford, 1967:19:49, Gudgeon, 1894:47).

**The voyagers on Te Arawa and Tainui**

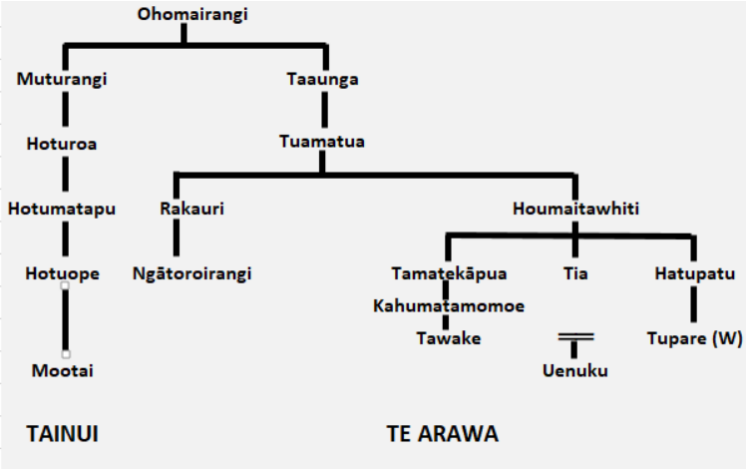
The captain of Te Arawa was Tamatekapua. Tamatekapua's brothers were Tia and Hatupatu among others. The tohungā, or priest, and principal navigator, Ngātoroirangi, was in Western terms an older first cousin.

The captain of Tainui was Hoturoa also had his family members on board with him included his son Hotuopē, grandson, Hotumatapū and great grandson, Mōtai-tangata-rau (Mōtai).

The following genealogy/whakapapa (see Whakapapa 1 chart) is chronologically set around 1350 AD. The genealogy outlines the relationships between key personnel who arrived on the Te Arawa and Tainui, namely:

- Te Arawa members: Ngātoroirangi, Tamatekapua, Kahumatamomoe, Tawakemoetāhanga (Tawake), Tia, Hatupatu, Tūparewhaitaita (Tūpare) and Uenuku-mai-Rarotonga (Uenuku).
- Tainui members: Hoturoa, Hotuopē, Hotumatapū, Mōtai-tangata-rau (Mōtai)
- The elders, parents did not sail to and remained in Hawaiki, Eastern Polynesia.

**Whakapapa 1 – Tainui and Te Arawa Genealogies**




The genealogies of the main fleet explorers of the Tainui waka and the Te Arawa waka provide a contextual and historical link between these individuals. Furthermore, the narrative and stories around key personnel of the Te Arawa, namely, Ngātoroirangi, Tia and Hatupatu within the context of this paper will feature in determining a specific arrival period.

**A specific timeframe defined by a six generation cohort**

The genealogies associated with the members of both Tainui and Te Arawa can be utilized as an important time-period parameter. Furthermore, the departure from the Eastern Pacific and arrival in New Zealand can be narrowed down to a very specific timeframe, of much less than a generation, possibly less than a decade. This is due to inter-generational cohort of related individuals spanning six generations.

The whakapapa charts identify four generations aboard both the Tainui and Te Arawa waka on arrival in New Zealand[6]. On the departure from Rangiātea (Ra'iātea) in the Society Islands, Tamatekapua's father, Houmaitāwhiti and his grandfather, Tuamatua, were still alive according to tradition (Reed, 1977:101). Houmaitāwhiti must have been at least 75 years of age. Moreover, the patriarch Tuamatua was in his late 90 years and may have been over a 100 years old[7].

This provides a cohort of five generations all living at the time of departure. That is, two older generations were left behind when Te Arawa left their homelands. Four generations were on-board when Te Arawa and Tainui arrived in New Zealand.

This six-generational cohort provides specific arrival period of less much than a generation. This narrow timeframe is due to the time constraints of the two eldest living generations and the sixth generation, born on the journey. This limits the arrival and departure period to a very narrow window of opportunity.

Percy Smith in developing his chronology timeframe using linear whakapapa ignored this important but subtle intergenerational detail. Therefore the traditional historic arrival date of 1350 AD cannot be supported for both the Tainui and Te Arawa ocean-going vessels.

**Genealogical connections to Tainui and Te Arawa**

The following will provide more detailed genealogical records in a similar method to that was used by Percy Smith over a Century ago. Although Smith's methodology has been largely discredited there is still merit in improving the methodology. This can be done by providing better information and a more analytical approach to the genealogical data. Therefore the following genealogy tables will track backwards from the 1900's as did Percy Smith's when he established the original date of 1350 AD.

**Understanding the Genealogical Tables**

Tables 1 gives an example of the linear genealogies of Tainui and Te Arawa crew members who arrived in New Zealand in around 1350 AD[8]. Here the charts link the descendants of Tiaki Kereti and Rangimahora Mete to members on the Tainui and Te Arawa. Tiaki Kereti is the paternal grandfather of the Simmonds (co-author) and Rangimahora Mete who is a traditional grandmother to Simmonds. Both Tiaki Kereti and Rangimahora Mete have the same grandfather, Te Taute (Hare Teimana).

**Table 1: Whakapapa – Linear Genealogy to Tainui and Te Arawa members**

| Year | Tainui 1 | Tainui 2 | Tainui 3 | Te Arawa 1 | Te Arawa 2 | Te Arawa 3 | |
|---|---|---|---|---|---|---|---|
| **1300** | | | **Hoturoa** | | | | **25** |
| | | **Hoturoa** | Hotuope | | | | **24** |
| **1350** | **Hoturoa** | Hotuope | Hotumatapu | | | | **23** |
| | Hotuope | Hotumatapu | Motai | | | | **22** |
| **1400** | Hotumatapu | Motai | Uetapu | | | | **21** |
| | Motai | Uetapu | Rakamamao | | | | **20** |
| **1450** | Uetapu | Rakamamao | Kakati | **Tamatekapua** | **Tamatekapua** | **Tamatekapua** | **19** |
| | Rakamamao | Kakati | Tawhao | Kahumatamomoe | Kahumatamomoe | Kahumatamomoe | **18** |
| **1500** | Kakati | Tawhao | Whatihua | Tawake | Tawake | Tawake | **17** |
| | Tawhao | Turongo | Uenukuwhangai | Uenuku | Uenuku | Uenuku | **16** |
| **1550** | Turongo | Raukawa | Kotare | Rangitihi | Rangitihi | Rangitihi | **15** |
| | Raukawa | Takihiku | Kauwhata | Tuhourangi | Tuhourangi | Tuhourangi | **14** |
| **1600** | **Whakatere** | **Pipito** | **Wehiwehi** | **Uenukukopako** | **Uenukukopako** | **Uenukukopako** | **13** |
| | Poutu | Tamatewhana | Tutete | Whakaue | Kiritai (w) | Whakaue | **12** |
| **1650** | Huri | Maihi | Parekarewa (w) | Kaitapu | Hineau (w) | Tawakeheimoa | **11** |
| | Ahiroa | Pareunuora (w) | Ngatokowaru | Rangipunga | Pareunuora (w) | Rangiwewehe | **10** |
| **1700** | Te Awa | Matau | Matau | Tiori | Matau | Kereru | **9** |
| | Te Ngue | Puauea (w) | Puauea (w) | Te Ngakau | Puauea (w) | Wehiwehi | **8** |
| **1750** | Haehaekuku | Parehikanga (w) | Parehikanga(w) | Hoputu | Parehikanga (w) | Whatutapunui | **7** |
| | Hakunga | Kainganui (w) | Kainganui (w) | Paneturi (w) | Kainganui (w) | Ngarotu | **6** |
| **1800** | Kapu (w) | Pahau | Pahau | Kapu (w) | Pahau | Whekiki | **5** |
| | Rauti (w) | Rauti (w) | Rauti (w) | Rauti (w) | Rauti (w) | Hikairoa | **4** |
| **1850** | Hare Teimana | Hare Teimana | Hare Teimana | Hare Teimana | Hare Teimana | Atareta (w) | **3** |
| | Tawhai | Tawhai | Tawhai | Tawhai | Tawhai | Heketoro | **2** |
| **1900** | **Tiaki** | **Tiaki** | **Tiaki** | **Tiaki** | **Tiaki** | **Rangimahora (w)** | **1** |

- See Appendix A: Additional genealogy charts (2-4)

The tables' left-hand columns represent the chronological year from 1900 in generational steps of 25 years. The tables' right-hand columns represent the number of generations from 1900.

**The genealogical lines have all been given from reputable sources but still variations can be seen here.** There is however a significant difference in the number of generations descended from each waka. Tradition records that both the Tainui and Te Arawa left Rangiātea (Ra'iātea, Tahiti) in the Eastern Pacific

at the same time and arrived in together. A total of 24 genealogies of Tiaki Kereti and Rangimahora Mete are given in Tables 1 above and Tables 3-4 (Appendix A). The collection of these whakapapa show the limitations of using the 25 year-per-generation-step for estimating the arrival time these two waka.

The disparity in generations, between Tainui and Te Arawa whakapapa lines, show variations ranging from 16 to 26 generations, a span of 10 generations, or 250 years. This variation could be due to incorrect whakapapa handed down over approximately 600 years. In addition the estimation of 25 years- per-generation-step is compounded by the fact that consecutive generations may be born earlier or later than 25 years. For example, three and not four generations may be born in any one century, making the spread greater. And in extreme instances two-generations-per-century are born (Pers.com, Mete, 1986)[9].

Importantly, the disparity between generations, of both the Tainui and Te Arawa genealogies, can largely be ignored when defining a period. Both Tainui and Te Arawa left together and arrived together which fundamentally aligns the generations as contemporary. Furthermore, the father and grandfather of Tamatekapua were still alive on departure. Therefore, the six-generation-cohort implies the time period for the departure and arrival is a very narrow window of opportunity, which helps identify a specific timeframe period for these historical events.

**Whakapapa – Genealogy: Consistency and limitations**

The recital of genealogies was an established technique in the social order of Polynesian life that served as a chronology of historical events associated with key ancestors (King, 2003:67). New Zealand's most internationally recognised anthropologist, Te Rangi Hiroa , known also as Peter Buck, maintained that the Central Eastern Polynesians all had genealogies that were essentially consistent. Te Rangi Hiroa recognised that Māori genealogies went back about 500 years, from the 1900s, to the first ancestor who arrived in New Zealand (Buck, 1938:22).

Te Rangi Hiroa recognised that there were limitations to the fidelity of genealogies the further they reached back in time. It is just not possible for a human to retain to memory in great detail the events and whakapapa that stretch back over a half-millennium or more. Prior to this six-century phase, genealogies drift off into myths, the spiritual worlds and native gods. Furthermore, Pakehā historians, like S. Percy Smith, failed to understand the subtle cultural nuances of Māori and Polynesian inter-generational relationships. A direct linear association of genealogies when trying to establish a chronological date mechanism is fraught with difficulties that Pakehā failed to understand when deciding on 1350 AD as the arrival date.

**Estimating the arrival period of Māori to New Zealand**

The disparity of whakapapa versions shows the inadequacies of using this 25 years per-generation to estimate the date of arrival of Māori to New Zealand. Here we propose a new time-period estimate that is derived from archaeo-astronomical evidence of a full solar eclipse that is postulated to have occurred just after the arrival of the 'great fleet'.

According to traditional narrative a solar eclipse event was witnessed by prominent members of the Te Arawa who were exploring the central volcanic plateau following their arrival. The eclipse experience and impact on the explorers, their families and people, is still imbedded in legends and traditional stories. The event strengthened customary behaviour, inspired new geographical names and is celebrated by current public and Government sponsored events. The impact of the historic arrival and

the subsequent witnessing of solar eclipse event still resonates with Māori and New Zealand's society today. Surprisingly, the traditional evidence, and an associated archaeo-astronomical event, is not recognised by the current academic and scientific fraternity in New Zealand.

Traditionally Māori are deeply superstitious. Although the 21st Century is well into the second decade, many Māori still vehemently hold on to superstitions that emanate from classical traditions. Many of these superstitions can be directly linked back to the period of the original voyagers in the 'great fleet'.

The Hatupatu legend and iconic rock, is a government protected site, as a wāhi tapu (sacred place)[10]. This historic site is named after a legendary traveller and Māori explorer called Hatupatu who was being pursued by an evil witch called Kurungaituku. To escape from her clutches, Hatupatu hid inside the rock and although legend says she scratched and clawed at the rock to try and capture him she eventually gave up. Hatupatu got away unharmed to escape safety back to his people.

The Hatupatu legend and the rock itself are significant to the tribes of Tainui, Te Arawa and Tūwharetoa, the traditional people of the region[11]. The rock shelter is located in the central volcanic plateau beside State Highway One, at Atiamuri, about 230 km's south of Auckland city.

This paper argues that the well-known legend of Hatupatu ties in with the exploration of the central volcanic plateau, by members of the Te Arawa people, at the time of an historical solar eclipse.

**Hatupatu legend and other links to an astronomical event**

The legend of Hatupatu and other stories show possible links to the astronomical event. During the 1960s, personal communications with elders and Joe Stevens[12], a prominent teacher in the local community told of the famous legendary ancestors of the original Te Arawa people of the central volcanic lands[13]. Within these stories were narratives of many sacred and tapu sites around the wider Taupō central plateau volcanic region. This dictated the behaviour of some of the students, particularly Māori students, who listened to these stories. One being that Simmonds (co-author) states that tapu, or sacred sites and locations were imbedded in memory and respectfully avoided. These stories were also reinforced by tribal elders making children more fearful and frightened of tapu sites.

Three particular locations and associated place-names hold significant importance to the tribal authorities in the central volcanic plateau. The location are the naming of Lake Taupō, or more correctly, Taupō-nui-ā-Tia, Rangipō, a barren desert plateau South of Lake Taupō and Onetapu, now called the Desert road. The legendary naming of Lake Taupō is by an ancestor from the Te Arawa waka called Tia. The name Taupō-nui-ā-Tia, apparently translated as 'The Great Cloak of Tia.' Stories were also told about a legendary figure called Ngātoroirangi, a tohunga, a renowned priest, and an early explorer also from Te Arawa. Ngātoroirangi named Rangipō a barren desert plateau and Onetapu, now the Desert Road. Here we describe these locations and the associated legends that will be used to strongly infer the occurrence of the archaeo-astronomical event.

**Lake Taupō and the Central Volcanic Plateau**

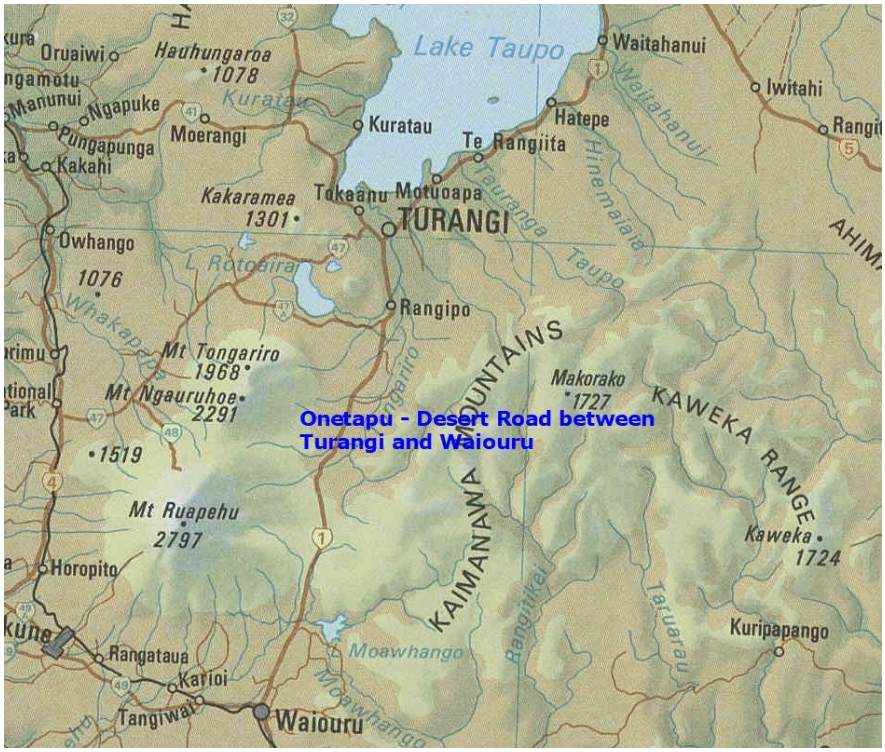
The mountains that dominate the central volcanic plateau are Ruapehū, Tongāriro and Ngāuruhoe[14]. These famous mountains, along with the Desert Road that runs across the plateau in front and east of them, were viewed by Māori with dread and ill intent. Stories abound of the evil and darkness that pervaded the wind swept tussocks of the central volcanic plateau. The roadway was considered tapu, or sacred. In former times travellers would stop at intervals during their journey across the Desert Road to recite karakia, prayers or incantations, to pacify the spirits that looked down from the

mountains (Grace, 1959:63). One particular region called Onetapu requires particular care.

The implications of travelling though these areas could manifest in sickness or worse (pers.comm: Hoani (John) Wereta, 1987). A karakia, or incantation by Wereta was witnessed by Simmonds (co-author). The incantations is a demand or request to the Māori gods, ancestors. Incantations are an order to protect travellers before traversing across the region called Onetapu, or sacred sands. To most New Zealander it is known as the Desert Road. The karakia given by Wereta lasted around 10 minutes, possibly longer, before the journey to continue safely across 'Onetapu', the Desert Road. The Desert Road, part of the nation's State Highway 1, runs south from Turangi to Waiouru, a distance of about 50 Km's. It passes between the Kaimanawa Ranges to the east and the mountains of Ruapehū, Tongāriro and Ngāuruhoe to the west.

The archaeo-astronomical event in question is also related to the naming of 'Onetapu' is a direct result of those who witnessed the solar eclipse event. The event also resulted in the naming of Lake Taupō and Rangipō. The historical solar eclipse event still has an enduring effects on Māori well over 600 years later.

**Map 1: Rangipō and Onetapu locations**




## Traditional interpretations of a solar eclipse

### Inland exploration of the central volcanic plateau

The Te Arawa and Tainui arrived in New Zealand at Whangaparaoa, on the East Coast. The Te Arawa people explored the East Coast and finally settled at Maketū in the Bay of Plenty. The Tainui people eventually sailed on and settled at Kawhia on the West Coast of the North Island of New Zealand[15].

After a brief period of settlement at Maketū disputes within the Te Arawa party resulted in groups

splitting away and their leaders moving off to lay claim to undiscovered lands for their people. The captain of the Te Arawa, Tamatekapua, was now an elderly man. His son Tuhoro took Tamatekapua to Moehau at the top of the Coromandel Peninsula, about 200 km's north of Maketū, to die (Stafford, 1967:25).

**Inland exploration by Tia**

A group under the leadership of Tia, the elder brother of Tamatekapua, and a younger brother, Hatupatu, moved Westward inland to explore the central volcanic plateau (Grace, 1959:59). The Taupō volcanic plateau at that time of their exploration in the 14th Century was a bleak, barren and economically unproductive landscape. A vast area of desolate volcanic waste lands. The volcanic plateau had still not recovered from last major Taupō volcanic eruption in 180 AD[16].

> *Remnants of the plateau formed by the [180 AD] eruption can be found on the Rangipō Desert – where volcanic flows of pumice smashed into, burned, and buried forests. Both of these volcanic events would have contributed to what is now called the Taupō volcanic plateau. The eruptions with most influence on the plateau formation are much older - Super-eruptions 340,000-320,000 years ago* (Pers.com: Hikuroa, 21/02/2018).

Tia and Hatupatu travelled via Rotorua and Horohoro and eventually arrived at a place Tia named Atiamuri about 120 km's from Maketū. Tia and his group then travelled up the Waikato River to seek the source of the river and arrived at Lake Taupō, a distance of about 50 km's from Atiamuri. On their arrival, Tia and his people set off to explore the shores of Lake Taupō.

**Inland exploration by Ngātoroirangi**

The tohungā, and spiritual leader of Te Arawa, Ngātoroirangi and his followers, on arrival on the east Coast at Whangaparaoa, did not travel and settle at Maketū. They stayed in the area near Whakatane (Pers.com: Katene, 31/03/2018)[17]. Ngātoroirangi and his group travelled West to Taupō and moved inland to cross the Tarawera volcanic plateau and then across the Kaingāroa plains to Lake Taupō, a distance of about 120km from the East Coast. Ngātoroirangi climbed Mount Tauhara which stands to the East of the current town of Taupō. Taupō town is the location of lake's only outlet to the sea by the Waikato River (Grace, 1959:61). From the top of Mount Tauhara, Ngātoroirangi could see the vast mountains of Tongāriro standing in the West across Lake Taupō, about 80 km's away. His goal was to climb and claim the mountains for his people[18].

During their travels Tia and Ngātoroirangi met lakeside, possibly on the south end of Lake Taupō, as they explored the Eastern shores. Ngātoroirangi warned Tia and his people that he must not be followed (Grace, 1959:62; Stafford, 1967:21). Tia's people were aware of the great mana, or authority and sacredness of Ngātoroirangi and they would certainly not disobey his wishes. Tia and his group left Ngātoroirangi and travelled North-West towards the Karangāhape cliffs on their way to the mountain of Titiraupengā on the far West side of Lake Taupō.

At some point Hatupatu left Tia's group to return to Maketū in the Bay of Plenty on the East Coast. Tradition suggests that he followed the same route back to Maketū via Atiamuri beside the Waikato River[19].

**Meaning of Lake Taupō**

The full name of Lake Taupō is Taupō-nui-ā-Tia. There are numerous references to meanings of the full

name of this iconic lake in the middle of the North Island. The most well-known translation is "the great cloak of Tia." The translation is apparently in reference to some cliffs that visually represented the cloak that Tia was wearing during his travels across the central volcanic plateau.

Traditional Te Arawa history describes the name of Taupō-nui-ā-Tia as 'the great enveloping of Tia by night, or darkness, affecting his eyesight'. This effect is in reference to the karakia, or spell invoked by Ngātoroirangi to stop any person from following (Reed, 1977:118). In the history of Ngāti Tūwharetoa people, whose tribal region covers this area, the name of Taupō-nui-ā-Tia originated as the result of the blotting out of Tia's view of the surrounding country (the great envelopment of Tia by darkness) (Grace, 1956:67).

In the Māori language 'Taupō' can refer to a rough black and yellow cloak. However in this instance 'tau' may mean "strange". Also the statement, *ko te **pō,** ā **tau** ana ki runga i ia,* meaning the darkness settling on him, that is Tia (Paipera Tapu, 1968)[20]. This is not specifically as tradition determines "the cloak" of Tia. The Māori word 'pō' means night and combined with 'tau' and 'nui' meaning "great or intense" conjures up images of a solar eclipse or an intensely, strange night or darkness settling over Tia and his party, Taupō-nui-a-Tia (Williams, 1971:224, 285,397,401).

**Meanings of Rangipō and Onetapu**

The meaning of 'Rangipō' in the Māori language is clear. 'Rangi' means 'sky' and 'pō', means 'night, or darkness'. Therefore, 'Rangipō' translates as dark sky. The published meaning of Rangipō, by various Western authors and historians, is mixed, from windy sky, to bleak weather (Stafford, 1967:22). The Rangipō plateau is an area that straddles Onetapu, the Desert Road, or the national road, State Highway One.

Ngātoroirangi and his party set off towards the central mountain peaks and they met a traveller on the Rangipō plateau who was also exploring the region. The traveller was Hapetuārangi. He was warned by Ngātoroirangi not to follow him as the land was tapu, or sacred. Hapetuārangi ignored the plea and carried on exploring the area.

> *"The traditions of the tribes of Taupō say that the gods responded to the appeal, and in the skies great banks of dense, black clouds rolled by and all became dark as night. Snow fell and sleet swept the desert, and in the intense cold Hapekituārangi and his company perished"*( Grace, 1970:63).

Hapetuārangi perished in the cold and was covered in the desert sands, or onetapu, sacred sands. Onetapu is the traditional Māori name of their original track. Onetapu is now called the Desert Road, or State Highway One between Rangipō and Waiouru.

**The naming of geographical locations that recognises the solar eclipse event**

There is archaeo-astronomical evidence that suggests the explorers of the central volcanic plateau were overtaken by a full solar eclipse. The impact of the solar eclipse resulted in the explorers naming key geographical areas in the central volcanic plateau that are still recognised today.

The solar eclipse event appeared to have coincided with a storm. This also suggests the explorers did not see the sun move into darkness and disappear. Therefore they only became aware of the event, unknowingly, by the Taupō or the rangipō, the darkening sky.

Ngātoroirangi was at the beginning of his ascent of Mount Tongāriro when he first encountered the

winds and the sudden darkness and he named the area 'Rangipō', the dark sky Grace, 1970:63.

Oral tradition says Hapetuārangi froze to death in the storm and was covered in sand, hence the name 'Onetapu', or sacred sands, which adds to the mystique of the karakia, or spell, invoked by Ngātoroirangi. Ngātoroirangi reached the summit of Tongāriro and also nearly froze to death. One of his companions died in the cold and the iconic coned shaped volcanic mountain of Ngāuruhoe is named after that party member.

Further westwards the solar eclipse had passed over Tia and his party on the Western shores of the lake, enveloping Tia and his people in sudden darkness. Hence the name of the lake known today as Taupō-nui-a-Tia, the settling of a strange darkness over Tia.

Tia's brother, Hatupatu, had left Tia's group earlier and headed back to Maketū. Tradition suggests that he returned down the Waikato River via the location of Atiamuri. At this point, Hatupatu was overtaken by the solar eclipse and apparently took shelter in the rock now known and still revered as Te Kōwhatu ō Hatupatu, the Rock of Hatupatu. Oral tradition also conveys the fearful influence of the occasion via the famous Māori legend in which Hatupatu clashes with a 'patuapaiārehe' (a mystical fairy), called Kurangaituku[21].

**Ngātoroirangi – Tohungā, Spiritual Leader, Navigator**

The impact of this singular solar eclipse event on tribal traditions was due to the influence and powers of Ngātoroirangi, the renowned tohungā, priest, and navigator of the Te Arawa voyaging vessel. According to tribal tradition his prowess as a priest was of the highest order, enough for the captain of the Te Arawa, Tamatekapua, for all intents, to overtly kidnap both him and his wife from Tainui. He was to guide Te Arawa waka as head priest and navigator to New Zealand (Stafford, 1967:14). It was his mana or authority that set in motion the enduring tapu and sacredness of the region. This was due in part to the extraordinary timing of Ngātoroirangi's explorations, and those of Tia and Hatupatu and their followers, through the central volcanic plateau.

They all apparently witnessed an archaeo-astronomical event, a full solar eclipse. This event has been etched indelibly into their minds and embedded into their culture. Subsequently the retelling of their extraordinary experiences has influenced their cultural expectations of the time, ensured their preservation in an oral society. Even to this day, 600 years later, New Zealanders, both Māori and Pakehā, are mindful of what was seen and set in motion, in particular, by that most feared of all tohungā called, Ngātoroirangi.

**The convergence of the natural and a supernatural phenomena**

The power of Ngātoroirangi and the solar eclipse event, by themselves, was not the only factors that promoted the impact of the occasion on the newly arrived Polynesian visitors. There are several key factors that converged on that eventful day. The events were amplified by a mix of natural astronomical events combined with the supernatural.

The perceived supernatural was helped by a large measure of traditional tapu, or sacredness, which was entrenched within the culture of the intrepid explorers. Tapu literally means, prohibition by the laws of the native gods (Mead, 1984:91).

The natural archaeo-astronomical events were the combined effect of the solar eclipse in conjunction with a key lunar phase, a new-moon phase. The new moon phase is called Mutuwhenua. Mutuwhenua means that the *'whole world is in darkness according to Māori belief' (Pers.com: W.*

*Simmonds-Teimana, 1978)*. The new moon phase, the end of a lunar month, was a spiritual day of reflection and contemplation and tapu, sacred, to the native mind.

Importantly, to the explorers, a full solar eclipse was an unexpected and an unnatural event. This unexpected occurrence reinforced the underlying ethos and sacredness of fear embodied in the day. Adding to this ominous day already, in the native mind, was the weather. Tradition says it was cold, bleak and miserable. Psychologically the culture and new moon phase had pre-conditioned the emotions of the early explorers into a state of fear and fright. The unexpected solar eclipse exacerbated the utter fear of the native explorers which helped to entrench the occasion into native legends and stories that still exists today, including the fear and superstition.

**Location of the travellers at the time of the eclipse**

All three intrepid explorers from the Te Arawa waka and their respective parties were within the scope of the full solar eclipse on that eventful afternoon in October 1409 (See Map 2). Their specific locations at the time of the event can be placed possibly with a few kilometres.

The rock of Hatupatu is a well-known with the tribal communities, and the local Government bodies. It can be assumed that at the time of the solar eclipse Hatupatu was at the iconic rock when darkness of the partial-umbrella overcame his group.

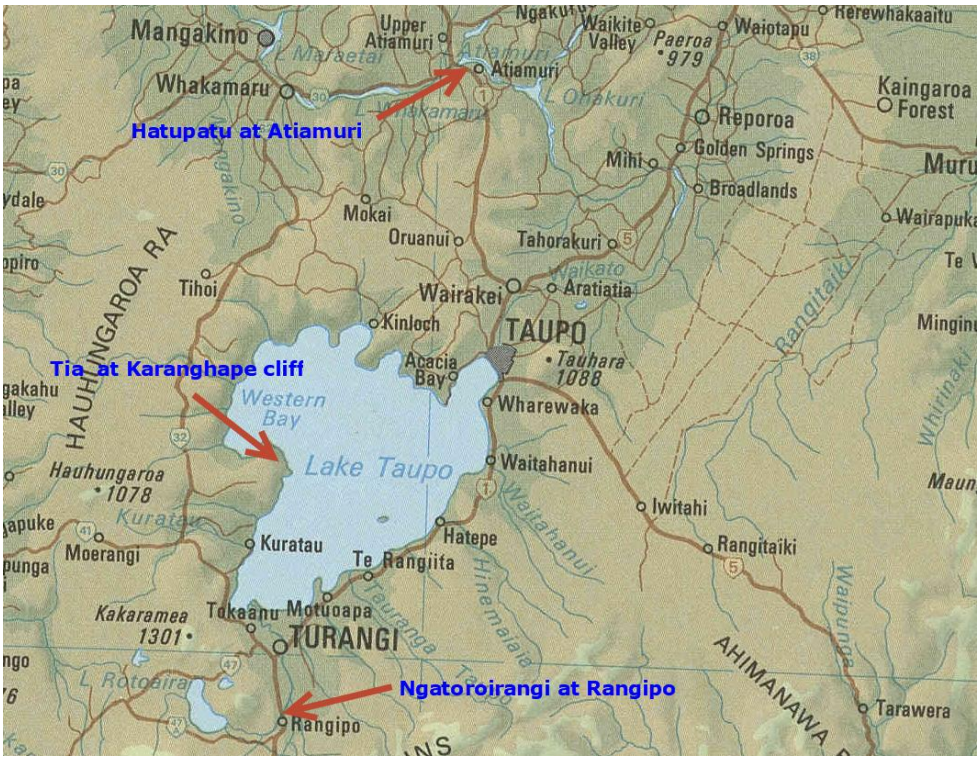
Ngātoroirangi was travelling within the Rangipō plateau during the event. Given we cannot know exactly where he might have been we can estimate within a few kilometres. However his party was within the wider area known as Rangipō.

The estimated location of Tia and his party is more difficult to determine. The interpretation of Taupō-nui-a-Tia, is the 'great cloak of Tia', is an apparent reference to a large cliff face. This may be in reference to the cliff-face of Karangāhape, an iconic landscape and tribal feature[22]. Therefore, Tia's party may have been in this region during the eclipse event.

All three explorers were within close proximity of the great lake during the solar eclipse event[23].

The map below identifies the location of the three explorers, Hatupatu at Atiamuri, Ngātoroirangi at Rangipō, and Tia at Lake Taupō on Karangāhapē. This is their suggested locations when they we overtaken by the shadow of the solar eclipse.

**Map 2: Suggested locations of explorers during the eclipse**




## GREGORIAN DATES

**Identifying Gregorian dates for departure and arrival**

Identifying a specific solar eclipse event associated with traditional stories, involves a process of eliminating other possible eclipse events. This requires searching through a cohort of solar eclipse events, spread over a 100-year timeframe. The period coincides with relevant whakapapa, or genealogical evidence that strengthens the period in question. The key solar eclipse event passed over the Taupō central volcanic region just after the arrival of both the Tainui and Te Arawa. This historic event was witnessed by leading members of the Te Arawa expedition.

The Gregorian date of this archaeo-astronomical event can be identified with certainty. Furthermore, this extrapolated Gregorian date can derive a traditional Māori luni-solar date for the same event, which we already as Mutuwhenua, a new moon. From the Gregorian date of the solar eclipse the arrival and departure of both Tainui and Te Arawa can be determined with a high degree of fidelity.

**Identifying a solar eclipse event**

Archaeo-astronomical research indicates that there are four possible candidate solar eclipse events between 1350 AD and 1450 AD. The eclipse events passed over the central Taupō volcanic region within the timeframe associated with the arrival of the 'great fleet'.

Therefore, orally evidence strongly suggests the intrepid explorers from the Te Arawa witnessed a solar eclipse on one of the following dates (Pers com: Tanikawa san, 23/04/2015)[24]:

- **15 June 1368: Early morning, North Island**

- **9 October 1409: Afternoon, North Island**
- **2 January 1424: Afternoon, North Island**
- **25 March 1438: Early morning, North Island**

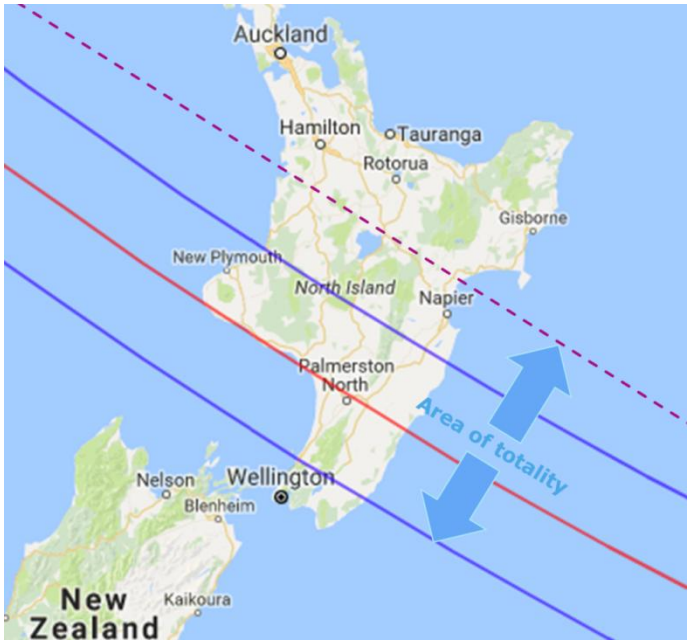
The traditional arrival period of 1350 AD suggests that the solar eclipse of 1368 AD is a possible observational archaeo-astronomical candidate. However, this event is not supported by a key factor. The year of 1368 AD is too early for a six-generation cohort whereby, the fourth generation, possibly the third generation would have not been born. Likewise, March 1438 AD is too late but may suit the youngest cohort but will not suit the older generational cohort. On this basis both 1368 AD and 1438 AD needs to be discounted as a possible eclipse event viewed by the Te Arawa explorers.

The January 1424 AD eclipse timeframe is likewise seasonally problematic. This is the middle of summer, the hottest season, in New Zealand. Snow in January is uncommon. Furthermore, the generational chronological window for a 1424 AD event is unlikely. Both captains and older crew members of the Tainui and Te Arawa are at the extreme end of their predicted life spans. Therefore, a departure and arrival in 1424 AD period must also be dismissed.

**Full Solar Eclipse – 9 October 1409**

The total eclipse of 9 October 1409 has a number of key feature that identifies it as the preferred candidate. It should be noted that the path of totality travelled over the central volcanic plateau on that fateful day. Importantly, the six-generation cohort aligns with the October 1409 event much better when considering both genealogies of Tainui and Te Arawa. On this basis this key archaeo-astronomic event is suggested to be the historic solar eclipse witnessed by the travellers from Te Arawa.

**Diagram 1: Full solar eclipse - 9 October 1409: Approximate area of totality**[25]



- Note: Arrows refer to area of totality are indicative only.

The intrepid explorers of Ngātoroirangi and Tia were within the area of totality. Hatupatu was in the penumbral shadow on the boundary limits of totality. Given that traditions tells us the day was already dark and bleak, heavily overcast, cold with snow and sleet. This overcast gloom and darkness would have been intensified by the effects of the eclipse's shadow of totality.

Consequently, the extrapolated Gregorian calendar favours the afternoon of 9 October 1409 AD, as the most likely date of dual archaeo-astronomical events: a full solar eclipse and a new moon phase. This choice takes into account a number of related factors experienced by the gallant explorers. October is occasionally more likely to be subjected to seasonal cold spells, including snow and sleet. Moreover, October 1409 provides sufficient time for the Te Arawa people, having possibly arrived the previous summer, to become adequately acclimatised through the winter months of 1409, before venturing into the interior.

The October 1409 eclipse event correlates with the seasonal conditions, the inter-generational and genealogy chronological factors, the exploration timing, departure and arrival dynamics. In other words, the archaeo-astronomical evidence strongly favours the solar eclipse in the afternoon of 9 October 1409 as the period when the intrepid explorer ventured inland.

**Factors that determine a possible arrival and departure period**

The premise of this research is that the October 1409 full solar eclipse was witnessed by members of the Te Arawa waka. This being the case, the ocean-going vessels, Te Arawa and Tainui, possibly arrived in New Zealand eleven months earlier, in mid-December 1408 AD. This arrival period is supported by tradition, whereby the voyagers made landfall near Cape Runaway, on the East Coast. At this time the Christmas trees, that is the native pōhutukawa, were in full bloom signalling summer (Stafford, 1967:428). The time-period is strongly supported by the narrow window opportunity identified with the six-generation-cohort discussed elsewhere in this paper.

This arrival period supports a departure period from Hawaiki, their traditional homelands in Central Eastern Polynesian. The journey is estimated to have taken approximately 30-26 days according to Tainui tradition (Biggs, Jones, 1995:52). With a December arrival in New Zealand, and a sailing period of 30 days, places the actual departure in November 1408.

**Identifying a specific Gregorian date of departure for the Tainui and Te Arawa Waka**

Tradition tells us that Tainui and Te Arawa departed from Hawaiki or Rangiātea (Ra'iātea) in French Polynesia (Buck, 1938:271; Reed, 1977:99). The vessels then sailed to Rarotonga (in the Cook Islands) before finally setting off for New Zealand New Zealand (Biggs, Jones, 1995:32)[26]. However, the task at hand is to determine an extrapolated Gregorian departure date.

The fixed Gregorian date of the solar eclipse, 9 October 1409 AD was also a new moon, or Mutuwhenua, lunar day 30 in the traditional Māori luni-solar calendar system. Tradition also records that both Tainui and Te Arawa waka arrived in December, mid-summer 1408 AD. This places their departure in November 1408 AD. The time it took to sail from their Eastern Polynesian home was approximately 26 to 30 days.

The traditional lunar day of departure was *Orongonui o te tau ururoa,* that is the 27$^{th}$ lunar day ((Buck, 1938:271; Winiata, 1950:5)[27]. This 27$^{th}$ lunar day corresponds with the 15$^{th}$ November, 1408 AD [28].

That is, the extrapolated Gregorian departure date from their traditional home in the Eastern Pacific of both Tainui and Te Arawa, was the 15th November, 1408 AD.

**Arrival date at Rarotonga and a departure date**

Rangiātea (Ra'iātea) in French Polynesia is approximately 1,000 km or 540 nm from Rarotonga. This is a modest distance and could be sailed easily by these ocean voyagers within a few days. Therefore, Tainui and Te Arawa departed Rangiātea (Ra'iātea) on 15th of November 1408 AD. After about three days at sea they arrived in Rarotonga. Tainui and Te Arawa stay several days in Rarotonga before setting off again for their final destination, New Zealand.

The departure date of both Tainui and Te Arawa from Rarotonga, was on the traditional lunar day of Oo-Uenuku, day four of the luni-solar calendar. The departure was on the extrapolated Gregorian date of 22nd of November 1408 AD.

**Eastern-Pacific seasonal markers to support departure period in November**

In Eastern Polynesia a major celebration coincides with the evening rising of Matali'i (Pleiades) in November. In Tahiti the evening rising of Matali'i coincides with the seasonal return of abundant fish. This seasonal abundance begins with the '*einaa'*, or *inangā*, the whitebait fish, quickly followed by the auhopu, or au, or Pacific bonito fish (Pers com: Hinano Drollet, email 18/11/2016).

Clearly, the departure from Hawaiki, in November of 1408, coincided with an abundance of fresh food to stock their voyage supplies before departing, then possibly to restock again in Rarotonga. These key astronomical and seasonal markers strongly supports a departure in mid-November 1408 AD as these research findings assert.

**Gregorian arrival date in New Zealand**

The arrival in New Zealand by both the Tainui and Te Arawa has been debated for the past 600 years. Both ocean going vessels arrived near Cape Runaway, on the East Coast. Tainui traditions state that the journey took 26 days (Biggs, Jones, 1995:52). Traditionally, sailing vessels sailed via Rangitahua, Raoul Island in the Kermadec Island group (Rangi Hiroa (Buck), 1977:46). The Kermadec group lies 1,000 Km north-east of New Zealand and a short final journey[29]. Hoturoa Kerr, a current sailing traditional sailing expert, has taken 12 days to sail directly from Rarotonga to New Zealand (Pers.com. Kerr, 11/09/2017). Therefore the traditional recorded time of 26 days strongly supports a detour for Tainui and Te Arawa via Rangitahua, Raoul Island in the Kermadec group before their arrival on the East Cape in New Zealand.

The Tainui arrived in New Zealand during the *dark of the moon, the food was planted, which amounts to 26 days*. The pōhutukawa was in full bloom and therefore, indicates a mid-summer arrival time. Tainui left Rarotonga on 22 November 1408. It took taking 26 days to travel puts the traditional arrival date at Mutuwhenua, a new moon phase, in the month of December *(Biggs, Jones, 1995:52)*[30]. The extrapolated Gregorian arrival date for Tainui, a new moon phase, is the 18th of December 1408 AD. That is, Tainui arrived on the 18th of December 1408 AD.

When the Te Arawa arrived at Whangaparāoa, the crew realised, Tainui had arrived before them. The captain of Te Arawa, Tamatekapua, disputed being beaten by Tainui and this is still benig debated today. However, the Te Arawa arrived on the seventh lunar moon, in the Tamatea lunar phase, a first quarter

phase (Stafford, 1967:17). The extrapolated Gregorian date for the arrival of Te Arawa is the 26th of December 1408.

Both Tainui and Te Arawa arrived at Whangāparāoa, having journeyed using a host of traditional technologies, unknown and ignored by Western science, then and possibly now. However, the intrigue behind the historical journey, the navigational skills using stars, sun, moon, meteorological conditions and spirituality, is unique. Furthermore, the journey was much more fascinating than this research can ever cover with justice, respect and dignity.

**SUMMING UP**

Based on the stories handed down by word of mouth from one generation to the next there is a very strong argument to suggest that Māori arrived in New Zealand in the summer months of 1408 AD. They set out from their island homes just after the celebrated evening rising of Matali'i (Pleiades) a time of the year for bountiful fish in Hawaiki (Tahiti). They took so many days to sail here, via Rarotonga, and they landed when the pōhutukawa trees, the New Zealand Christmas tree, were in full bloom. They took time to adapt to their new environment in the Bay of Plenty. After acclimatizing and improvising warmer clothing, in their first in New Zealand winter, some of the chief men decided to explore the central volcanic plateau.

During this exploration Hatupatu separated from his companions and was chased by an evil witch. He hid in a rock near Atiamuri which still bears his name until he was safe to escape back to his people. Meanwhile, Ngātoroirangi and Tia and their companions ventured further into the Central Volcanic Plateau. During this time they were overtaken by a solar eclipse event, from which the Hatupatu legend and phenomenon of Taupō, Rangipō and Onetapu received their names.

This archaeo-astronomical event which occurred on the 9th October 1409 warrants a rethink about the arrival time of the Tainui and Te Arawa waka to New Zealand. This new arrival period in the first decade of the 1400s is supported by not only by genealogical evidence but is strongly embraced in Māori and Eastern Pacific customs and traditions that have survived for centuries. The earlier arrival date of 1350 AD, based on mathematical manipulation of whakapapa or genealogical lines, seems haphazard and fanciful in comparison.

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## APPENDIX A

### Table 2: Whakapapa – Linear Genealogy to Tainui and Te Arawa members

| | Tainui 4 | Tainui 5 | Tainui 6 | Tainui 7 | Te Arawa 4 | Te Arawa 5 | 28 |
|---|---|---|---|---|---|---|---|
| 1250 | | | | **Hoturoa** | | | 27 |
| | | | | Hotumatapu | **Tia** | | 26 |
| 1300 | | | | Hotuope | Tapuika | | 25 |
| | | **Hoturoa** | **Hoturoa** | Motai | Heiariki | | 24 |
| 1350 | **Hoturoa** | Hotuope | Hotuope | Uetapu | Ruahei | | 23 |
| | Hotuope | Hotumatapu | Hotumatapu | Rakamamao | Tangaia | | 22 |
| 1400 | Hotumatapu | Motai | Motai | Kakati | Piringa | | 21 |
| | Motai | Uetapu | Uetapu | Tawhao | Ruahei | | 20 |
| 1450 | Uetapu | Rakamamao | Rakamamao | Turongo | Raumotu | **Tamatekapua** | 19 |
| | Rakamamao | Kakati | Kakati | Raukawa | Turongoihi | Kahumatamomoe | 18 |
| 1500 | Kakati | Tawhao | Tawhao | Kurawai (w) | Kurawai (w) | Tawake | 17 |
| | Tawhao | Turongo | Turongo | Whaita | Whaita | Uenuku | 16 |
| 1550 | Turongo | Raukawa | Raukawa | Huiao | Huiao | Rangitihi | 15 |
| | Raukawa | Takihiku | Takihiku | Tuirirangi | Tuirirangi | Tuhourangi | 14 |
| 1600 | Whakatere | Pipito | Pipito | Uruopewa (w) | Uruopewa (w) | Uenukukopako | 13 |
| | Poutu | Tamatewhana | Tamatewhana | Maihi | Maihi | Whakaue | 12 |
| 1650 | Huri | Maihi | Maihi | Pareunuora (w) | Pareunuora (w) | Tawakeheimoa | 11 |
| | Ahiroa | Pareunuora (w) | Pareunuora | Huia | Huia | Rangiwewehe | 10 |
| 1700 | Te Awa | Matau | Matau | Korouaputa | Korouaputa | Kereru | 9 |
| | Te Ngue | Puauea (w) | Puauea (w) | Parewahawaha (w) | Parewahawaha (w) | Wehiwehi | 8 |
| 1750 | Haehaekuku | Parehikanga (w) | Parehikanga (w) | Tihao | Tihao | Whatutapunui | 7 |
| | Hakunga | Kainganui (w) | Kainganui (w) | Whatapaporoa | Whatapaporoa | Ngarotu | 6 |
| 1800 | Kapu (w) | Pahau | Pahau | Kaikaiwi | Kaikaiwi | Whekiki | 5 |
| | Rauti (w) | Rauti (w) | Rauti (w) | Ranginui (w) | Ranginui (w) | Hikairoa | 4 |
| 1850 | Hare Teimana | Hare Teimana | Hare Teimana | Parewahawaha (w) | Parewahawaha (w) | Atareta (w) | 3 |
| | Tawhai | Tawhai | Ranginui (w) | Ranginui (w) | Ranginui (w) | Heketoro | 2 |
| 1900 | **Tiaki** | **Tiaki** | **Rangimahora (w)** | **Rangimahora (w)** | **Rangimahora (w)** | **Rangimahora (w)** | 1 |

### Table 3: Whakapapa – Linear Genealogy to Tainui and Te Arawa members

| | Tainui 8 | Tainui 9 | Tainui 10 | Tainui 11 | Te Arawa 6 | Te Arawa 7 | 28 |
|---|---|---|---|---|---|---|---|
| 1250 | | | | **Hoturoa** | | | 27 |
| | | | | Hotumatapu | **Tia** | | 26 |
| 1300 | | | | Hotuope | Tapuika | | 25 |
| | | **Hoturoa** | **Hoturoa** | Motai | Heiariki | | 24 |
| 1350 | **Hoturoa** | Hotuope | Hotuope | Uetapu | Ruahei | | 23 |
| | Hotuope | Hotumatapu | Hotumatapu | Rakamamao | Tangaia | | 22 |
| 1400 | Hotumatapu | Motai | Motai | Kakati | Piringa | | 21 |
| | Motai | Uetapu | Uetapu | Tawhao | Ruahei | | 20 |
| 1450 | Uetapu | Rakamamao | Rakamamao | Turongo | Raumotu | **Tamatekapua** | 19 |
| | Rakamamao | Kakati | Kakati | Raukawa | Turongoihi | Kahumatamomoe | 18 |
| 1500 | Kakati | Tawhao | Tawhao | Kurawai (w) | Kurawai (w) | Tawake | 17 |
| | Tawhao | Turongo | Turongo | Whaita | Whaita | Uenuku | 16 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **1550** | Turongo<br>Raukawa | Raukawa<br>Takihiku | Raukawa<br>Takihiku | Huiao<br>Tuirirangi | Huiao<br>Tuirirangi | Rangitihi<br>Tuhourangi | **15**<br>**14** |
| **1600** | Whakatere | Pipito | Pipito | Uruopewa (w) | Uruopewa (w) | Uenukukopako | **13** |
| | Poutu | Tamatewhana | Tamatewhana | Maihi | Maihi | Whakaue | **12** |
| **1650** | Huri<br>Ahiroa | Maihi<br>Pareunuora (w) | Maihi<br>Pareunuora (w) | Pareunuora (w)<br>Huia | Pareunuora (w)<br>Huia | Tawakeheimoa<br>Rangiwewehe | **11**<br>**10** |
| **1700** | Te Awa | Matau | Matau | Korouaputa | Korouaputa | Kereru | **9** |
| | Te Ngue | Puauea (w) | Puauea (w) | Parewahawaha (w) | Parewahawaha (w) | Wehiwehi | **8** |
| **1750** | Haehaekuku<br>Hakunga | Parehikanga (w)<br>Kainganui (w) | Parehikanga (w)<br>Kainganui (w) | Tihao<br>Whatapaporoa | Tihao<br>Whatapaporoa | Whatutapunui<br>Ngarotu | **7**<br>**6** |
| **1800** | Kapu (w) | Pahau | Pahau | Kaikaiwi | Kaikaiwi | Whekiki | **5** |
| | Rauti (w) | Rauti (w) | Rauti (w) | Ranginui (w) | Ranginui (w) | Hikairoa | **4** |
| **1850** | Hare Teimana | Hare Teimana | Hare Teimana | Parewahawaha (w) | Parewahawaha (w) | Atareta (w) | **3** |
| | Tawhai | Tawhai | Ranginui (w) | Ranginui (w) | Ranginui (w) | Heketoro | **2** |
| **1900** | **Tiaki** | **Tiaki** | **Rangimahora (w)** | **Rangimahora (w)** | **Rangimahora (w)** | **Rangimahora (w)** | **1** |

## Table 4: Whakapapa – Linear Genealogy to Tainui and Te Arawa members

| | **Tainui 12** | **Tainui 13** | **Te Arawa 8** | **Te Arawa 9** | **Te Arawa 10** | **Te Arawa 11** | |
|---|---|---|---|---|---|---|---|
| **1300** | | **Hoturoa** | | | | | **25** |
| | | Hotuope | **Ngatororoirangi** | | | | **24** |
| **1350** | **Hoturoa** | Hotumatapu | Tangihia | | | | **23** |
| | Hotuope | Motai | Tangiharuru | | | | **22** |
| **1400** | Hotumatapu | Uetapu | Tuhoroariki | | | | **21** |
| | Motai | Rakamamao | Te Ao | | | | **20** |
| **1450** | Uetapu | Kakati | Te Parepare | | **Tamatekapua** | | **19** |
| | Rakamamao | Tawhao | Te Tiwa | | Kahumatamomoe | **Hatupatu** | **18** |
| **1500** | Kakati | Whatihua | Pare | | Tawake | Tuparewhaitaita (w) | **17** |
| | Tawhao | Uenukuwhangai | Te Ataorongo | **Ika** | Uenuku | Uenuku | **16** |
| **1550** | Turongo<br>Raukawa | Kotare<br>Kauwhata | Kotare<br>Kauwhata | Taiaratitirangi<br>Kuaiongaio | Rangitihi<br>Tuhourangi | Rangitihi<br>Tuhourangi | **15**<br>**14** |
| **1600** | Whakatere | Wehiwehi | Wehiwehi | Tuwhakairiroa | Uenukukopako | Uenukukopako | **13** |
| | Poutu | Tutete | Tutete | Hingaora | Whakaue | Kiritai (w) | **12** |
| **1650** | Huri<br>Ahiroa | Parekarewa (w)<br>Ngatokowaru | Parekarewa (w)<br>Ngatokowaru | Hineihi (w)<br>Rangipunga | Kaitapu<br>Rangipunga | Hineau (w)<br>Pareunuora (w) | **11**<br>**10** |
| **1700** | Te Awa | Matau | Matau | Tiori | Tiori | Matau | **9** |
| | Te Ngue | Puauea (w) | Puauea (w) | Te Ngakau | Te Ngakau | Puauea (w) | **8** |
| **1750** | Haehaekuku<br>Hakunga | Parehikanga (w)<br>Kainganui (w) | Parehikanga (w)<br>Kainganui (w) | Hoputu<br>Paneturi (w) | Hoputu<br>Paneturi (w) | Parehikanga (w)<br>Kainganui (w) | **7**<br>**6** |
| **1800** | Kapu | Pahau | Pahau | Kapu (w) | Kapu (w) | Pahau | **5** |
| | Rauti (w) | Rauti (w) | Rauti (w) | Rauti (w) | Rauti (w) | Rauti (w) | **4** |
| **1850** | Hare Teimana<br>Tawhai | Hare Teimana<br>Tawhai | Hare Teimana<br>Tawhai | Hare Teimana<br>Tawhai | Hare Teimana<br>Tawhai | Hare Teimana<br>Tawhai | **3**<br>**2** |
| **1900** | **Tiaki** | **Tiaki** | **Tiaki** | **Tiaki** | **Tiaki** | **Tiaki** | **1** |

**APPENDIX B: Terms in te reo Māori, the Māori language**

| | |
|---|---|
| New Zealand | New Zealand |
| inangā | whitebait (einaa: Tahitian dialectal form) |
| karakia | prayer, chant |
| kaumātua | elder (kaumātua literally means without parents) |
| Māori | indigenous New Zealand native |
| maramataka | Luni-solar calendar |
| Matariki/Matali'i | Pleiades (Matali'i: Tahitian dialectal form) |
| nui | large; many |
| one | beach; sand, mud; soil |
| Pakehā | person of European descent |
| patupaiārehe | a fairy, an imaginary human being |
| pō | night, darkness |
| pōhutukawa | Scientific name: Metrosideros excelsa (NZ Christmas tree) |
| rangi | sky; day; heaven |
| taiaha | long wooden club |
| tapu | prohibition, restriction, sacred |
| tau | strange, used only in a few compound words, as tautangata, tauiwi, tauwhenua and (Taupō - a strange night), or to settle on, lay down, alight |
| taupō | a rough black and yellow cloak |
| te tau uru roa | The long breadfruit season (*uru* means breadfruit, *tau means season)* |
| tohungā | expert, priest |
| waka | canoe |
| waiata | song, chant |
| whakapapa | genealogy |

**Primary Sources: Unpublished**

The genealogy tables were developed from a number of comprehensive sources. The whakapapa, or genealogies were provided to Simmonds (co-author) by elders over the past 40 years. The manuscripts are authoritative traditional tribal whakapapa from the following individuals as primary sources:

i. Piripi Simmonds-Teimana from Ngāti Huri, Raukawa, Tainui and Te Arawa.
   - Personal manuscripts of genealogy links to the following voyagers, Tainui, Te Arawa, Kurahaupō, Aotea, Takitimu, Mātātua and Tokamaru – c1974

ii. Nigel Te Hiko from Raukawa and Tainui
   - Native land court minute records of Tainui and Te Arawa genealogies, 1860 to 1920

iii. Rangimahora Mete from Raukawa, Rangiwewehi and Te Arawa.
   - Personal manscripts, oral information on Tainui, Raukawa and Te Arawa whakapapa, c1986

iv. Te Ururoa Flavell from Raukawa, Rangiwewehi and Te Arawa.
   - Personal manuscripts of Te Arawa whakapapa, c1980

v. Rangipapanui Te Kaponga, from Tainui and Raukawa
   - Personal Manuscript: Comprehensive tables of genealogies of Tainui, Maniapoto, Raukawa, Te Arawa whakapapa, c1912

**Secondary sources: Tribal knowledge holders, oral sources and private manuscripts**

| **Name** | **Tribe/Location** | **Region** |
|---|---|---|
| Whānaupani SIMMONDS TEIMANA | Raukawa | Te Waotū, South Waikato |
| Ngira (Neil) SIMMONDS TEIMANA | Raukawa | Te Waotū, South Waikato |
| Hera (Richards) RATA | Te Uri Kopura | Matauri, Far North |
| Iwi NICHOLSON | Raukawa/Toarangatira | Levin, Manawhenua |
| Kiripuāwai TE AOMARERE | Raukawa | Otaki, Manawhenua |
| Hoani (John) WERETA | Tuwharetoa/Raukawa | Taumarunui, Taupō |
| Hori DEANE | Raukawa | Waotū, South Waikato |
| Wiremu KAA | Ngāti Porou | Tikitiki, East Coast |
| Rereata MAKIHA | Te Mahurehure | Auckland, Far North |

| | | |
|---|---|---|
| Bruce SMITH | Pikiahu-Waewae | Tokorangi, Manawatu |
| Peneti Bennett SIMMONDS | Raukawa | Te Puke, Bay of Plenty |
| Ruthana Okeroa BEGBIE | Raukawa | Putaruru, South Waikato |
| Andrew BEGBIE | Raukawa | Putaruru, South Waikato |
| Rupene WAAKA | Raukawa | Otaki, Manawhenua |
| Nigel TE HIKO | Raukawa | Tokoroa, South Waikato |
| Eastern Polynesian, Pacific - Knowledge Holders | | |
| Hinano Astrid DROLLETT | Tahiti | French Polynesian |
| Kura EDWARD | Aitutaki/Rarotonga | Petone, Wellington |

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**END NOTES**

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[1] Ref: Report of the 'Proceedings of the Fourth Symposium on Historical Records and Modern Science', 2014. National Astronomical Observatory of Japan, Tokyo, Japan.

[2] Co-author Simmonds attended the presentation by Tanikawa san at the ICOA-8 conference in China, March 2014. Taniwaka san's presentation and findings initiated this research.

[3] Sailing Direction: Buck, 1938:269; Winiata, 1950; Mitchell, 1944/2011:17. Many authors provide a raft of different directions purportedly given by Kupe. Directions were hugely variant and problematic. In spite of the many suspicious directions, New Zealand is such a large target the intrepid sailors were unlikely to miss (Lewis, 1978). Note: Peter Buck also known as Te Rangi Hiroa

[4] Ref: Evans, 2011: Records 200 traditional waka names as voyagers during the migration period.

[5] Ref: King, 2003:18 and Turnbull, McLaren, 1964:8: King states there is carbon-dating evidence that the Polynesian rat, had established in New Zealand 2,000 years ago. Turnbull/McLaren suggest probable early evidence of man discovered under pumice-layers of the Taupō volcanic shower about c180 AD.

[6] Tainui waka: Hoturoa, the captain of the Tainui had his son, Hotuopē, grandson, Hotumatapū and great grandson, Mōtai aboard. Te Arawa waka: The captain Tamatekapua had a number of siblings, a son, Kahumatamomoe, a grandson, Tawakemoetahangā and a great grandson, Uenuku-mai-Rarotonga. Tamatekapua also had a younger brother called Hatupatu. Hatupatu had a daughter, Tūparewhaitaita (Tūpare). Tūpare had a baby son, Uenuku-mai-Rarotonga (Uenuku), and the father was Tawake, the grandson of Tamatekapua (Gudgeon, 1894:46-51. JPS, Vol III)

[7] Personal communication - Rangimahora Mete, 1982/93. Six living generations: Rangimahora Mete's mother Ranginui Leonard died in 1984. Ranginui had six generations living including her own

[8] Genealogy information sources: Private manuscripts, or published material from: Piripi, 1974; Te Hiko, 2009; Rupene Waaka, 2011/17, Te Kaponga, c1912; Rangimahora, 1981; Flavell, 1989 and Gudgeon, 1894, JPS Vol III.

[9] Personal communication: Rangimahora Mete, 1986. A young puhi (virgin) of 3rd or 4th generation is 'married' to an old chief. Elder is generally, a great grandfather, grandfather or grand-uncle.

[10] Hatupatu Rock: The iconic rock is recognised by the New Zealand government. In April 2017 a ceremony was conducted in recognition of the site by Māori authorities and government officials: Media Release, 20 April 2017: New Zealand Transport Agency, *Restoration of Hatupatu Rock Complete*. https://www.nzta.govt.nz/media-releases/restoration-of-hatupatu-rock-complete/

[11] Hatupatu Legend: The legend has been Westernised for reader consumption over the past 150 years. However, the Māori version records that Hatupatu is traditionally and historically different to the Western version.

[12] Māori School teacher: Joe Stevens taught at Tauhara primary school in Taupo during the 1960s. He was a fluent speaker of Māori and respected by Māori parents.

[13] Original people: Historians are still arguing over who were the original peoples of the central volcanic region.

[14] Ruapehu: Ruapehu is an active volcano, the highest mountain peak in the North Island, at 2,797 metres.

[15] Final destinations: The descendants of Tainui settled at Kāwhia (West Coast) and Te Arawa settled at Maketū (Bay of Plenty - East Coast) before spreading out to settle the wider inland regions.

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16 Kaingāroa Plains: The plains were originally barren of trees. Following the great depression (1920/30s) millions of trees were planted across the Kaingāroa plains. The 2,900 square kilometre man-made, forest plantation was the largest in the world.

17 Personal communication: Rev Rahu Katene, 31/03/2018. Rev Rahu Katene is a descendant of Ngātoroirangi and his wife Kearoa.

18 Tongariro: The names of the most prominent peaks were named Ruapehū, Ngāuruhoe and Tongariro following Ngātoroirangi's ascent. Tongariro means 'the South wind will not let me go.'

19 Atiamuri: This is a logical route to journey to Taupō from Maketū because there are plentiful food sources at that time.

20 Ref: Paipera Tapu (Holy Bible), 1968: Matiu 3:Upoko 3:16. The Maori bible's proverb is adapted to illustrate the meaning of 'taupō'.

21 Patuapaiārehe (fairy people): The 'fairy people' may have been inhabitants that had arrived preceding the Te Arawa. They may have settled the central volcanic plateau from an earlier Eastern Polynesian migration to Aotearoa-New Zealand.

22 Personal communication: Ruthana Begbie, July 1983, Hori Deane, 11 May 2014 confirmed importance of Karangāhapē Cliffs to Tainui and Raukawa tribes.

23 Ref: 'What 3 Words' software application to identify the GPS locations: https://map.what3words.com/ Specific GPS location for Hatupatu is at: http://w3w.co/resembled.redeemer.sulkily and Tia's GPS location is at: http://w3w.co/scrub.sightseeing.rhinos and Ngātoroirangi's GPS location is at : http://w3w.co/dishing.winking.gridded

24 Personal communication: Tanikawa san: Email; 23 May 2015: Tanikawa san provided evidence of six solar eclipse events over the North Island between 1301 AD through to 1485 AD.

25 Ref: https://eclipses.gsfc.nasa.gov/SEsearch/SEsearchmap.php?Ecl=14091009/ Original map amended to show improved 'Delta T' findings by Tanikawa san (co-author).

26 Rarotonga stopover: Ref: Biggs, Jones 1995:32 – Tainui and Te Arawa stopped at Rarotonga. According to Te Rangi Hiroa (1977:37). Ueneke-mai-Rarotonga is Tamatekaupua's great grandson. The name Ueneke-mai-Rarotonga, means 'Uenuku from Rarotonga', strongly suggests Te Arawa did stop at Rarotonga.

27 Personal communication: Hinano Astrid Drollet, email: 26/11/2016. Buck, Winiata and others misspelt the traditional name. Drollet, a linguist from Tahiti identifying the correct spelling and meaning of 'te tau ururroa' (the long breadfruit season). Maori had forgotten the name 'uru' for breadfruit because it does not grow in New Zealand. However the name 'uru' is known in traditional waiata, or songs.

28 Ref: WolframAlfa, Computational database: https://www.wolframalpha.com/ and Phases of the Moon application to acquire extrapolated Gregorian calendar dates

29 Personal communication: Rereata Makiha, 2008: Raoul Island (Kermadec Islands): The traditional Māori name is Rangitahua, meaning 'fire in the sky'. Raoul Island is an active volcano. This suggest the voyagers may have seen volcanic activity. The Polynesian travellers may have also deliberately light (tahua) fires as a directly marker beacon. Raoul Island is 1,000 km's North-East of New Zealand.

30 Ref: Jones, Biggs, 1995:52: Jones states the arrival is at Kāwhia (on the West Coast) in 26 days. This is an apparent error. Tainui arrived on the East Coast 'in the dark of the moon' [a new moon] aligns with the 26-day sailing duration from Rarotonga.