Maramataka: the Maori Moon Calendar

Mere Roberts
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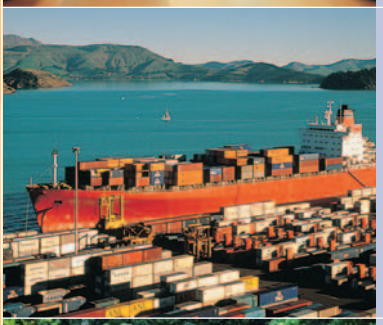

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Abstract

Measurement of time by means of the sun, moon and stars is an ancient practice. All societies originally depended on day/night length and the occurrence of the solstices as well as the movements of heavenly bodies across the night sky to determine seasons of the year.

Maramataka, or monthly calendars based on the phases of the moon were common practice in Polynesia. Here it formed the basis of the cultural life of the community, acting as an indicator of appropriate times for the onset or cessation of various activities. Foremost among these was their ability to foretell appropriate and inappropriate times for food gathering such as the planting and harvesting of crops and the catching of fish. This knowledge originally came from Eastern Polynesia to Aotearoa -New Zealand in the canoes of the ancestors, where it had to undergo adaptation to a southern hemisphere sky, seasons, and climate.

Following European settlement the maramataka became progressively replaced by timekeepers such as clocks and watches and a monthly calendar based on the annual movements of the sun. Accompanying its demise was the loss of knowledge and practices associated with the movements of the planets and stars, of the tides and of each moon night. Loss of land and resources including traditional horticultural crops accompanied by the drift to cities further resulted in loss of the maramataka knowledge associated with these food resources.

Early ethnographers recorded some of this knowledge while it was still in use among various tribes. More recently, there has been renewed interest in the traditional knowledge of indigenous peoples in general including Maori, particularly that concerning the environment. Motivated by concerns about the sustainability of natural resources and a desire to create technologies that are more environmentally as well as socially compatible, scientists are also becoming interested in understanding the scientific basis of traditional knowledge possessed by Maori.

This report provides a collation of 43 published and unpublished maramataka from various tribal sources. It aims to provide a preliminary analysis of the origin of the moon night names, and from an examination of the similarities and differences among each of these maramataka, it suggests the rationale for the sequential grouping of these names according to the phases of the moon. Brief comments are also made concerning the reasons for the different number of moon nights (ranging from 28 to 32) in the calendars included in this report.

Chapter 1
Introduction

1000 years of Maori horticulture in Aotearoa/New Zealand provides an important source of knowledge and understanding of the cultivation of food crops within a variety of geographical locations. Previous research by Roberts (2004) has demonstrated the scientific knowledge of Maori concerning natural resources including that encoded in conceptual devices such as the whakapapa of plants and animals (tatai taiao) and their associated narratives. Maramataka or moon calendars are another rich source of the scientific knowledge and technological practices of Maori. Any understanding of their conceptual basis and function must however, first be prefaced with some understanding of the traditional economic cycle of Maori.

Horticultural activities typical of each iwi were largely determined by the soils, climate, locality and other natural resources found in that region, as Firth (1973:68) notes in his important work on the "Economics of the New Zealand Maori". While horticulture was practiced in the North, the Bay of Plenty, East Coast, Taranaki, Nelson, Marlborough and Kaipohia, those iwi in the Taupo – Urewera region, and most of the South Island were primarily reliant on semi or uncultivated forest foods and fish including eels.

But as Tawney in his preface to Firth's 1973 book suggests, these observations should not be taken as support for the theory of environmental determinism; rather, "the economic activities of the Maori were developed, in short, within a framework set by the family, the tribe, the class system, the institution of property, the powers and duties of chiefs. To isolate it from these social institutions is to give a quite abstract and misleading picture…"

Monthly moon calendars introduced to Aotearoa by the Polynesian forebears and further adapted and refined here in Aotearoa clearly demonstrate this interweaving of essential economic activities aimed at food procurement, with social activities including ritual observances pertaining to that resource and their guardian atua (gods).

Published material on seasonal cycles and monthly calendars reinforce the importance of the timing of food related activities, around which were organized the many other cultural aspects of tribal life. Firth (1973:73-75) provides a "Seasonal calendar of work in food production" which describes the seasonal cycle of garden preparation, planting and harvesting of kumara, flax and ti as well as the appropriate times for fishing, hunting and gathering of other important food resources e.g. eel and other fin fish, birds, berries, kiore rat, and aruhe.

Monthly moon calendars are more specific than seasonal cycles in that they specify the actual days on which certain food related activities are or are not advised. There are several other aspects of interest in any analysis of these calendars, including the origin and meanings of the names of each moon night, the rational for their sequential arrangement and groupings in the calendar, the differences in the number of moon nights, and how the monthly moon calendar was synchronized with the sun-regulated seasonal cycle.

Similarities as well as the differences between tribal (and hence geographical) areas are also of interest. For example, horticultural activities feature strongly among the northern tribes, sea fishing among coastal tribes, forest foods (birds and rats) among inland peoples, and freshwater fishes particularly tuna (eels) among others. Because the exact geographical location of each maramataka is seldom given it is difficult to undertake a detailed

investigation of the relative influences of climate, available resources, and other biophysical and social variables on tribal similarities and differences.

However, the existence of numerous published examples of maramataka merits an investigation into their structure and function in order to reveal the knowledge contained within. The potential contribution of this knowledge to modern horticultural practices, particularly of Maori growers, provides a major rationale for this research. In addition, it offers students an educational resource on matauranga taiao – the scientific knowledge of Maori.

Chapter 2
Aim

Nga Mahi a Papa Tinaku is a research initiative involving an all-Maori group of scientists led by Associate Professor Hirini Matunga of the Lincoln University-based Centre of Research Excellence (CoRE) on Bioprotection. This group is undertaking research on traditional and modern horticultural practices of Maori, with the following aims:

- *To identify key horticultural concepts, principles and practices of traditional Maori horticulturalists*
- *To investigate growing practices involving a wide range of crops and production methods used by modern Maori growers*
- *To develop innovative knowledge and "best practice" for bio-protection of crops through a partnership approach between scientists and Maori growers*
- *To develop a conceptual framework that advances Maori growers economic and social development*
- *To ensure that Maori cultural values, principles and practices are recognised and valued.*

Maori agricultural and horticultural assets are currently valued at almost $3Billion. It is estimated however, that 40 per cent of Maori owned land is under-utilised. Innovation in developing these resources is required in ways which take account of the historical practices of Maori as horticulturalists, as well as incorporating modern scientific "best practice". It is also important to accept that any social and economic development must be environmentally sustainable. Maori values and beliefs which express principles of sustainability, such as kaitiakitanga, along with traditional knowledge and practices are being investigated as part of this research based on the premise that there is value in learning from the past, to better inform the present and future.

It is also recognised that this knowledge will in turn be informed by innovative bio-protection technologies that originate from mainstream science. Fulfilling obligations under the Treaty of Waitangi requires moving beyond the rhetoric of the Treaty, and often token consultation with Maori, to a serious effort to increase Maori research capacity. The Lincoln-based CoRE accepts that both world views can be complementary and productive of unforeseen innovations. Knowledge arising from this research will be used to increase Maori participation in the agri/horticultural sectors, and to assist Maori growers to increase their economic and social development.

Most importantly, it is intended that this research will not compromise Maori knowledge, values and principles but that any contribution they might make to research outcomes will be recognised, valued and rewarded.

Chapter 3
Methodology

Based on the above aims, the first author (Head of the Faculty of Science at Te Whare Wananga o Awanuiarangi) initiated a series of Wananga during 2005 to facilitate discussion on aspects of traditional Maori environmental knowledge. Because of their obvious horticultural importance, maramataka were chosen as the first topic for discussion. Three Wananga on this subject were held, involving staff and graduate students at the Wananga and invited guests.

Convened under the guidance of kaumatua Wiremu Tawhai (Whanau a Apanui) it was agreed that the first two Wananga would focus on the meaning of the names of each moon night. The third Wananga, attended by Hohepa Delamare (Whanau a Apanui) focused on the whakapapa (origin, history and relationships) of the marama/moon.

These three Wananga identified a need for some background research on the subject of maramataka, including its Polynesian origins.

A library and computer-based literature search was therefore undertaken with the aim of collating published examples of maramataka. Research conducted by Ropiha (2000) for a Master of Environmental Studies degree (Victoria University) based on material held in the Alexander Turnbull library provided an excellent starting point. This author found references to numerous maramataka in late 19th early 20th century waiata and in early 20th Century Maori newspapers. She also notes (p. 39) that maramataka are contained in the publications of Best; for example, in his 1959 monograph on The Maori Division of Time. Ropiha (ibid) searched three 19th century manuscripts in detail: one, written in 1893-94 by Hoani Nahe (Waikato) and two dated 1885 – 1901 by Hamiora Pio (Ngati Awa). Her thesis includes six maramataka from various sources. Five of these are included in Table 3 and their original sources are listed in Table 1. The sixth, a generic version provided by the Maori Language Commission, is not included here.

Several unpublished examples were also provided during the course of this survey, and more have been volunteered to the authors, making it clear that a lot more research on this subject remains to be done; and that this represents "work in progress". However, because one of the authors (Weko) was awarded a Lincoln University summer studentship 2004/5 that necessitated a report on completion of the studentship, it was decided to publish this as a preliminary report.

Chapter 4
Results

This report contains a total of 44 maramataka, which with the exception of two personal communications, come from published sources provided in Table 1.

A preliminary analysis and discussion based on this sample follows.

4.1 Tribal and geographical origin

Table 2 lists the tribal origin and the number of maramataka obtained from that region. These range from the Chatham Islands to the "Far North" excluding South Island iwi, from whom none were located. The majority come from Kahungunu (15) and from Whanganui (7). Only one (no. 44, Table 3) from Best (1959:31. No.3) lacks a tribal or geographical origin.

4.2 Number of moon nights in each month

As shown in Table 3 the number of moon nights varies from 29 to 32. Eleven maramataka list 29 nights including all 7 from Whanganui, 3 from Kahungunu and 1 from Taranaki. A majority (27) contain 30 nights including 12 of the 15 from Kahungunu; four contain 31 nights (1 each belonging to Moriori, Ngati Awa; Waikato and the "Far North") and 2 contain 32 nights (from Ngati Porou and Hauraki).

4.3 Meaning of names

What follows are recorded references to the phases and appearance of the moon with respect to the different moon nights. Activities which are said to be favoured or not favoured on each night will be reported elsewhere. Numbers given in brackets below are of maramataka listed in Table 3. Where applicable, moon night names and their meanings contained within Tahitian calendars, and the appearance of the moon on those nights as recorded by Stimson (1928) from local informants are included for comparison with Maori names.

Whiro

Apart from seven Whanganui maramataka (nos. 24-30) and one from Ngati Hau (no. 31) all lists begin with Whiro. The eight exceptions begin with Nonihape (which shall be discussed below under Mutuwhenua) followed by Takatakaputei. There is however, a suggestion that Takatakaputei or Ngaromuia (refer to no. 28) may be synonymous with Whiro (refer to no. 11).

Differences of opinion exist in the literature as to whether Whiro is the night on which the moon remains invisible, or first becomes visible.

Assuming that Takatakaputei is synonymous with Whiro, support for the former opinion - that on a Whiro night the moon remains invisible - comes from two Whanganui maramataka. One (no. 24) recorded by Best (1959:36) says that on this night *"the moon moves in the underworld"* while the other (no. 30) recorded in Taylor (1974:177) says Takatakaputei is the

night when "*the moon revolves in the Reinga or Hades"*. (Note it is likely that these two maramataka are one and the same, apart from slight differences in spelling of the several moon night names). In another paper (Best 1928:103) is the comment that *"when the moon dies the wise people say takataka-putea kei roto i te rua e titakataka ana"* meaning that Takataka-putea is when the moon is in the abyss (rua) into which the heavenly bodies set and turn over and over i.e. 'titakataka ana' (Williams 1957:349 (4); 424). Two Kahungunu calendars (nos. 6 and 16), one from Tuhoe (no. 21) and one from Atiawa (no. 33) also refer in accompanying texts to the moon being unseen on a Whiro night. Notes explaining Whiro in the Tuhoe calendar (no. 21) say *"new moon, but not seen"*. Best's (1959:30) informant, Tutakangahau comments that *"it (the moon) acquires form on the Whiro night and its radiance is seen; it is actually seen on the Tirea night"* (the underline is the authors).

The alternative opinion is based on a Kahungunu source which states that Whiro is when *"the new moon appears*" (nos. 4 and 10; Best ibid 34, 36) and on a Ngati Raukawa informant who says Whiro is the *"first appearance of the new moon"* (no. 34; Best 1959:28).

It is interesting to note that the first moon night in the Tahitian calendar is Tireo and the second is called Hiro-hiti. when *"the moon has risen, she has revealed her form. This is the night when Hiro was born. The name itself comes from hiro, a sphere, globe, and hiti, to rise (of astral bodies)"* Stimson (1928:327,334). Williams (1928:356) provides two other Polynesian maramataka (one from Rarotonga, and one from Tahiti) both of which also begin with Tireo.

If Tireo in these Polynesian calendars is Tirea in Aotearoa, and Hiro (Iro) is Whiro, this may provide an explanation for the differences of opinion that exist (refer above) concerning whether Whiro is the night when the moon remains in the underworld or is the night when it is first seen. One explanation is that the names for the first two nights that came from Polynesia were transposed here in Aotearoa-New Zealand. The overwhelming predominance of Whiro as the first moon night of the maramataka in Table 3 confirms this suggestion. One exception is a maramataka from Ngati Hau (no. 31) where Nonihape/Tireo is given as the first night, and Takatakaputea/Oiro (possibly Whiro) is the second night. An alternative explanation is discussed below under Tirea.

Tirea

As explained above, the first moon night of the Tahitian calendar is called Tireo or Tirio. This name is translated as "*a flash; a radiation"* (Stimson 1928:334). This is a night when *"the radiations of the moon have become visible, it is a new moon and the moon rests upon the horizon"* (ibid: 326).

A Tuhoe account (no. 21) say Tirea is when *"feeble radiance of moon seen"* (Best 1959:30) while a Kahungunu calendar (no. 4) also recorded by Best (ibid: 34) says *"moon is seen very small"*; or (no. 16) as when *"the moon is slightly seen. New moon"* (Mitchell 1997:261).

Exceptions to this interpretation come from Whanganui. If as suggested Tirea in this region is synonymous with Whitikareia or Witikiraua, these iwi say this is the night when the moon *"begins to ascend from the underworld (Reinga)"* (Best ibid:36); (Taylor 1974:177). It is also suggested below that Nonihape may be synonymous with Mutuwhenua. If this is so then the Whanganui maramataka begins with two moonless nights: Nonihape (Mutuwhenua) and Takatakaputei (Whiro) when the moon is still in the underworld, followed by Witikiraua (Tirea) when it begins to ascend from the Reinga. These maramataka provide a second possible explanation for the differences of opinion noted above as to whether the moon is first

seen on a Whiro or a Tirea night. This is that in certain geographical areas such as Whanganui, observations of the moon's rise above the earth's horizon may be difficult or impossible, so that in these areas it is only on the Tirea (Witikiraua) night that it can be seen.

Hoata/Ohoata/Ohata

Both the Whanganui and all other maramataka for which comments exist record the moon as being *"visible", "plainly seen"* "*seen higher up"*; (Best ibid) and *"well shown on this night"* (no. 16: Mitira in Mitchell 1997:261). Stimson (ibid:334) translates Hoata/Hoatu as *"to throw out light"* and further comments *"the moon has appeared, thereafter she is visible, and she has shed her light"* (ibid:327).

Ouenuku, Okoro

Information concerning the appearance of the moon on these nights is lacking for the above maramataka from Aotearoa. This name does not appear in the Tahitian calendars recorded by Stimson (1928) or Williams (1928).

Tamatea nights

These mostly occur between nights 6-9. Again there is a paucity of information concerning the appearance of the moon on Tamatea nights. If however, the nights Mawetu, Tutahi and Otama correspond to the three Tamatea nights as is suggested in several of the lists from Whanganui (e.g. nos. 24, 28, 29) then these are nights on which *"it rises higher still"* and *"it grows larger"* according to Taylor (1974:177). Stimson (ibid:328) comments that in Tahiti on Tamatea night 9, *"the moon has begun to shine brightly"*.

Huna

In the majority of lists Huna occurs on night 10 (in 22/44 lists) or on night 11 (13/44). Notes associated with Mitira's list (no. 16) say on this night *"everything is hidden, as denoted by the name Huna or hidden"* (Mitchell 1997:262). In the Tahitian calendar Huna is translated by Stimson (1928:334) as *"to hide, conceal"*. He further notes that on this night *"the eyes of fish are hidden (closed); they are asleep"*.

Ari, Maurea, Mawharu

Nights 10–13 are most commonly given these names although exceptions occur (nos. 4, 13 and 14). Information about the appearance of the moon is scarce or lacking for these nights both in relation to the above maramataka and from Tahiti.

Ohua and Atua

These occur on nights 12-15 in the majority of maramataka in which both are named. Ohua comes before the Atua night; and if our assumptions are correct in equating the Tahitian word Hua with Ohua, and Maaitu with Aitua or Atua, then the same order is present in the Tahitian maramataka (Stimson 1928:329). A Tuhoe informant (Tutakangahau) says that *"it becomes round on the Ohua night; it is big on the Atua night"* (Best 1959:31) while others say "*Ohua or full-moon name"* and "*Ohua is the night of the full moon"* (Best ibid:35,44).

Hotu

There is an absence of information from Aotearoan maramataka concerning the moon's appearance on this night.

In the Tahitian calendar a "Hotu" moon (night 15 in their calendar) follows on from the "Hua" (= Ohua?) and "Maaitu" (= Atua? - see above) nights. Concerning Hotu, Stimson (ibid:330) records that "*the moon has increased and reached her full development; before the sun has set the moon has risen".* The following night in the Tahitian calendar is called Mara'i, when *"as the sun sets the moon rises".*

Turu (Oturu)

Turu is most commonly found on nights 15, 16 or 17 and according to a Kahungunu calendar (no. 6) on this night *"the moon is now filled out."* Of interest in relation to the above observation from Tahiti is a further comment also from Kahungunu (no.10) that *"the moon rises as the sun sets"* on the Turu night (Best ibid:37).

Rakau-nui and Rakau-matohi

Rakau-nui occurs most commonly on nights 16, 17 or 18 followed by Rakau –matohi. In the Tahitian calendar, the nights which follow Turu are called "Ra'au-mua (or Ra'au-tahi or Ara'au-mua) then Ra'au-roto (or Ara'au-roto) then Ra'au-muri (or Fa'aoti-ra'au or Ara'au-muri). These three appear to equate to Rakau-nui and Rakau-matohi in the Aotearoan calendars. On the first of these two nights according to three Kahungunu calendars *"the moon is circular",* "*the moon is filled out"* or *"the moon appears large and of a red colour"* (Best ibid: 33, 35, 37 respectively).

On a Rakaumatohi night *"the moon now wanes", "The moon is now gapped"* (Best ibid:35, 37). Elsewhere this author notes that Rakau -matohi is the 18th night and marks the commencement of the waning of the moon; the word 'tohi' denotes the waning of the moon (Best 1986:114).

Takirau and Oike

In nearly every maramataka these two nights follow Rakaumatohi and precede the Korekore nights. In two lists in Table 3 (nos. 41 and 42 from Te Rarawa and Nga Puhi respectively) Oika is missing, and in another two the order is reversed (no. 31 from Ngati Hau and no.36 from Waikato). According to an Atiawa source (no. 33; Roskruge 1999), during a Takirau night *"the moon is loosing its brightness".* On the Ohika (? Oike) night *"the moon begins to wane"* (no. 30, Taylor 1974:177).

Korekore nights

These most commonly occur between nights 20-24 and the majority of maramataka contain three such nights. However, two maramataka contain four Tamatea moons (nos. 16 and 33) while in two others they are completely absent (nos. 17 and 27). Observations about the moon's appearance are lacking from Aotearoa, but Stimson (1928:334) records that *"ore'ore means "to be lacking, missing, be not"* and that these are nights when the fish have disappeared (ibid.332).

Tangaroa nights

A majority of the maramataka contain three Tangaroa nights, usually between nights 23-27 in the calendar. Two lists include both Tangaroa-kiokio and also Kiokio (nos. 2 and 3) while others list either one or the other but not both nights. Six (nos. 2, 3, 23, 29, 40 and 42) list four Tangaroa nights. There is only one report on the appearance of the moon at this time which notes that Tangaroa a roto is the night when the moon *"sinks into the sea"* (no. 30; Taylor 1974:177). The Tahitian calendar contains three Tangaroa nights: Ta'aaroa-mua (night 24; "*a night when Ta'aroa remains awake"*) Ta'aaroa-roto (night 25) and Ta'aaroa-muri (night 26) (Stimson 1928:332).

Otane, Orongo, Mauri, Omutu, Mutuwhenua

Only 10 of the 44 maramataka list all five of these names. Instead a majority provide the first three and either Omutu or Mutuwhenua. Several calendars (3, 5, 22 and 37) suggest that these last two moon nights are interchangeable.

A similar sequence occurs in the Tahitian calendar i.e. Taane, Ro'oo-nui, Ro'oo-maauri then Mutu (Motu; Maauri-mate). The Ro'oo-maauri night is when "*the moon has nearly set"* while the next night (Mutu) is when *"daylight has trodden upon the moon, the moon has set"* (Stimson 1928:333).

There are no records for the moon's appearance on the Otane or Orongo nights. But Mauri is said to be a night on which *"the moon is now darkened",* when *"the dark (hinapouri) phase of the moon commences; the moon is obscured by the sun"* while Mutuwhenua is described by Kahungunu sources as a night when "*the moon has expired*", or when "*the moon is overcome by the sun. It is carried away by the sun into darkness…"* (nos 4 and 10; Best 1959: 35, 37). Other tribal sources say this is when *"the world is in darkness"* (no. 34; Roskruge 1999), or when the *"moon is dead"* (no.16; Mitira in Mitchell 1997).

In the Whanganui calendars (nos. 24–30) only Omutu is named at the end of the maramataka, and Taylor (1974:177) says that this is when *"the moon disappears".* However, notes recorded by Taylor (ibid) suggest that in the Whanganui area Nonihape may be synonymous with Mutuwhenua, because it is also described as a night when *"the moon disappears; sinks into the underworld"* (no. 24; Best ibid:36) and by Taylor (1974:177) as when *"the moon is in the Reinga".* But rather than placing it at the end of the maramataka, Nonihape (Mutuwhenua) is put at the beginning.

Thus in the Whanganui maramataka Mauri is when the moon sinks into the underworld followed by three moonless nights: Omutu, Nonihape/Mutuwhenua, and Takatakaputei/Whiro. On the Witikiraua/Tirea night the moon begins to ascend from the underworld.

Other tribal maramataka also agree that Mauri is the night on which the moon sinks and disappears; and that Omutu and Mutuwhenua are moonless nights. But as noted above under Whiro and Tirea, they disagree on whether it is the former or the latter night on which the moon itself (and not simply its radiance) is first seen.

4.4 Order and grouping of nights in relation to the moon's phases

The 43 maramataka presented here reveal a generic consistency despite their different tribal and geographical origins and variations in names and sequence. What emerges is an apparent grouping of the nights in relation to the phases of the moon; these are identified as follows:

1. New moon to first quarter (shown in pale yellow in Table 3).

This phase includes the new moon nights and the Tamatea nights. Depending on which maramataka is consulted this includes 6-8 moon nights, which also agrees with the number of nights in the first phase of a modern (2005) calendar. This phase can be further divided into two as follows:

a. The nights of the new moon

With a few notable exceptions (nos. 24–31) most maramataka begin with Whiro, followed by Tirea, Hoata, Oue /Ouenuku then Okoro. As discussed above differences of opinion exist as to whether Whiro is when the moon is still in the underworld and hence unseen, or is the night on which only its radiance is seen, or when the first glimpse of the moon itself is first seen. We have chosen to put Whiro in dark blue to signify that it is still in the underworld, and that Tirea is the night on which the moon itself is first seen above the horizon. These moon nights which precede the Tamatea nights mark the first phase of the new moon; but it is noted that Pine Taiapa (1960) includes the first Tamatea night (Tamatea aio) in this phase.

b. The Tamatea nights

These generally occur between nights 6–9 in the maramataka presented in Table 3. Exceptions include the Whanganui and Taranaki lists (nos. 24-32) and two Kahungunu lists (nos. 14 and 17). In most the sixth moon night is typically called Tamatea tutahi (but see no. 37). This is followed in the majority of cases by three more Tamatea nights.

In one Kahungunu exception (no. 17) nights 6 and 7 are Korekore mua and Korekore muri respectively, followed by a Tamatea. Interestingly in the Tahitian calendar night 7 is called Ore'ore mua, (or Ore'ore tahi or Tamatea –mua) while night 8 is Ore'ore-muri (or Tamatea-roto) and night 9 is Tamatea, or Tamatea-muri.

Ore'ore (meaning to be lacking or missing) is also used for nights 21, 22, and 23 in this calendar (Stimson 1928:328, 332). This equates to the Kore kore nights of the Maori calendar.

2. First quarter to full moon (bright yellow in Table 3).

The remaining nights of the waxing moon's first quarter are said by Pine Taiapa (1960) to include Ariroa, Huna, Maurea, Mawharu, Ohua, Atua and Turu (no. 18.)

As indicated above, many informants refer to Ohua as the night of the full moon. Elsewhere (Best 196:104) it is said that *"when it* [the moon] *is circular it is Ohua; when it is at its greatest it is Atua; when it begins to decline it is Rakau-matohi".* Based on this and other observations above concerning Rakaunui it is suggested that this moon night also be included

as one of the nights of the full moon. These occur between nights 12–18 in maramataka and between 14-16 in the 2004/5 calendar.

3. Third quarter: the nights of the waning moon (pale blue in Table 3).

Rakaumatohi is when the moon begins to wane and it continues to do so during Takirau and Oike/Ohika. These are followed by the Korekore nights which range from two to four and mark the 3rd quarter of the moon. This occurs between 20-24 days in most maramataka, and between 21-23 nights in the 2004/5 calendar.

In most cases the last of the Korekore nights is called Korekore piri (or whakapiri ki nga Tangaroa) and leads into the Tangaroa nights.

4. Last quarter nights (dark blue in Table 3).

Tangaroa nights range in number from two to four, the last of which is frequently called Tangaroa kiokio or if not, is followed by a Kiokio night. Two moon nights, Otane and Orongonui then follow, when the moon sinks further into the sea before Mauri marks the beginning of the moon's dark phase.

Omutu and/ or Mutuwhenua (Nonihape in the Whanganui maramataka) in most areas are the time of the month when the moon is unseen, and said to be traveling in the underworld. According to one of our interpretations above, depending on the geographical region, moonless nights may either be 2 (Omutu and Mutuwhenua) or 3 (Omutu, Mutuwhenua/Nonihape and Whiro/Takatakaputei).

If our suggestion that the unrestricted ability to observe moonrise above the actual horizon is responsible for these differences, then it can be predicted that on the east coast Whiro is most likely to be said to be the night on which the moon is first seen. Conversely in inland regions with views restricted by mountains, sightings of the moon itself may only be possible when the moon rises higher in the night sky as on a Tirea night. Whanganui maramataka appear to confirm this suggestion.

Chapter 5
Discussion

In the Maori world all things have a celestial origin. While tribal accounts may differ there is a generic consistency in the cosmogonical accounts that trace descent of all things from a Sky father (Ranginui) and an Earth mother (Papatuanuku). From their many children sprang all of the phenomena, seen and unseen in this world. These lines or layers of descent, called whakapapa, not only identify origins but in their entirety, also depict the interconnected relationships between all things. The whakapapa of the moon, Te Marama, is shown in Table 4. This version comes from Hamiora Pio of Ngati Awa as given to Best (1928). Tangotango is the cause or origin of the alternation of light and day, while Wainui is the origin of water. In another version (Best 1995) Tangotango takes Moe-ahuru (Hine-te-ahuru) to wife, and their offspring were the sun, moon and stars. Reference is made to Marama i whanake, the waxing moon and to Marama titaha, the waning moon. Te Marama then took two sisters as his wives: Rona and Tangaroa-a-roto, both of whom were the daughters of Tangaroa ("god"of the sea and the tides). Rona is the person seen in the moon, while Tangaroa-a-roto symbolises the close connection of the moon with the tides.

Of utmost importance to Maori was the role of the moon as a time keeper. This importance is demonstrated by the presence of a monthly calendar (maramataka) based on the number of nights taken by the moon to complete a revolution of the earth. It was also used to mark the onset of the new year.

For example, on the east coast of the North Island the appearance of the first moon after the rising of Matariki (Pleiades) above the eastern horizon marked the arrival of the New Year. In the far north, the South Island and the Chatham Islands it is the appearance of the star Puanga or Rigel which marks the onset of the new year. Along with the presence or absence of stars and the flowering times of plants, the phases of the moon were (and still are) used by Maori to indicate the seasons of the year.

All human societies particularly in temperate climates have and do make use of a variety of seasonal indicators to predict the season of the year. Seasonal changes can be measured in various ways, including division into a "wet" and a "dry" season typical of tropical regions. In temperate regions the equinoxes (vernal or spring, and autumnal) which in the Southern Hemisphere occur in September and March respectively, when the sun is above and below the horizon for equal lengths of time and thus the lengths of day and night are equal, help divide the year into four rather than two seasons.

There are several reasons why some societies adopted the moon rather than the sun as the primary time keeper and basis for a monthly calendar. Most obvious is the fact that the phases of the moon are readily seen from earth by the naked eye.

Oceanic peoples such as the Polynesians were thoroughly conversant with the moon and other planets and stars in the night sky, upon which their voyaging and navigational skills were dependent. They would also have observed that the moon regulates the tides and together these would have contributed to their time keeping skills. Horticultural and fishing activities also required the ability to predict the right times to plant and harvest, and to know when migratory species were present or absent.

However, use of the lunar month or maramataka of 30 nights as the basis for an annual calendar poses two problems. One is that the actual time taken from one new moon to the

next is on average only 29 and 1/2 days (total 354 days in a year) so continual use of a 30 day maramataka would soon become out of phase with the moon's actual cycle. The second problem is that total number of nights in one year for a 30 day maramataka equals 360 days, leaving a shortfall of 5 days in each solar year which over a six year period would result in one month out of alignment with the sun's seasonal cycle. Inevitably over several years this necessitated some form of correction in order to maintain synchronicity with the onset of each season. Hence the Egyptian year which was divided into 12 months of 30 days each, had an additional five days added for a ceremonial agricultural festival (Best 1959:7). This same adjustment was also used by the Hawaiians (Best ibid:12).

In temperate climates particularly among settled agricultural societies, the importance of the sun (actually the day length) in determining the seasons of the year led to efforts to use it as the basis for an annual calendar. One of the earliest was the Julian calendar introduced by Julius Caesar in 46 BC. This was based on the sidereal year (the period of revolution of the earth around the sun, or 365.25 days). Because their calculations were not entirely accurate, the Romans introduced a leap year of 366 days every 3 years. This calendar was later replaced by Pope Gregory XIII in 1582 in all Roman Catholic countries and in Britain and her colonies in 1752. The Gregorian calendar was based on the tropical rather than the sidereal year, i.e. on the time taken for two successive passages of the sun through the vernal equinox; equalling 365.24 days.

Maori also recognized the problems associated with use of the moon calendar and provided several possible solutions. One (mentioned above) is that they did as their Eastern Polynesian ancestors did, and added some moon nights to the year to maintain seasonal synchronicity. Another method was to include an additional thirteenth month every few years. Best (1959:12) notes that some Maori informants provided him with lists of 13 month names, while 13 month names were also collected at Tahiti.

Maintaining monthly synchronicity with the moon phases may have involved both addition and/or deletion of moon nights. An example of the latter comes from the Reverend Metara te Ao-Marere of Otaki, who provided a maramataka obtained from Mita te Tai (no. 35). In his own notebook containing symbols pertaining to fishing activities on each moon night, the Reverend comments *that "sometimes the full moon (Ohua) appeared on the 16th night, or even on the 17th, in which latter case the 15th, 16th and 17th nights would all be called Ohua, and several of the final nights names of the list would be dropped for that month. This would be for the purpose of balancing the lunar month"* (quoted in Best 1986:113). These practices help explain the variations observed in Table 3 in the number of days in the various maramataka.

None of the above detracts from a major function of maramataka in each locale: which was to determine which activities were appropriate or not on a daily as well as a seasonal basis. It is the intention of another report to explore this aspect in more detail, but some general comments are made here as a preliminary to some of the questions that remain to be addressed.

One question concerns whether the same maramataka was used continuously throughout the year, with some minor adjustments e.g. addition or deletion of a moon night.

Or was there more than one maramataka for a particular area, each of which incorporated the different activities appropriate for that month/season; and if so did these have the same or different numbers of days?

Alternatively if only one maramataka was used in a particular area, common sense dictates that certain activities prescribed for particular moon nights would not have been repeated each month of the year but only carried out during the appropriate season of the year (e.g. the planting or harvesting of the kumara).

To our knowledge no record exists of a list of 12 or 13 different monthly maramataka pertaining to one person or location, which suggests that only one was used by a local group throughout the entire year, with adjustments being made to ensure seasonal synchronization and adaptation to the various changes in the availability of local resources. This conclusion needs to be tested with more research and evidence from published and unpublished sources, including interviews with living exponents of this ancient tradition based on the phases of the moon.

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Table 1

List of published and unpublished sources of each maramataka listed in Table 3. The numbers listed below in the left hand column refer to the number above each of the maramataka in Table 3.

Number	**Source(s)**
One	Best, E. (1959), *The Maori Division of Time,* p. 39 (No. 9). Government Printer, Wellington, New Zealand.
	Williams, H. W. (1928), *The Journal of Polynesian Society – The nights of the moon,* v. 37: 355 (No. 31). Thomas Avery and Sons Ltd, Sydney, Australia.
	The Journal of Polynesian Society, v. 7: 88. Polynesian Society.
Two	Smith P. (1997), *Lore of the Whare Wananga*, Reprint, Pt 1, v. 3:169. Waikato Print, Hamilton, New Zealand.
	Williams, H. W. (1928), *The Journal of Polynesian Society – The nights of the moon,* v. 37:354 (No. 28). Thomas Avery and Sons Ltd, Sydney, Australia.
Three	Best, E. (1959), *The Maori Division of Time,* p.31-32 (No. 4). Government Printer, Wellington, New Zealand.
Four	Best, E. (1959), *The Maori Division of Time,* p.34-35 (No. 6). Government Printer, Wellington, New Zealand.
Five	Williams, H. W. (1928), *The Journal of Polynesian Society – The nights of the moon,* v. 37:351 (No. 19). Thomas Avery and Sons Ltd, Sydney, Australia.
Six	Williams, H. W. (1928), *The Journal of Polynesian Society – The nights of the moon,* v. 37:351 (No. 20). Thomas Avery and Sons Ltd, Sydney, Australia.
	Best, E. (1959), *The Maori Division of Time,* p.32 (No. 5), Government Printer, Wellington, New Zealand.
Seven	Williams, H. W. (1928), *The Journal of Polynesian Society – The nights of the moon,* v. 37:352(No. 22). Thomas Avery and Sons Ltd, Sydney, Australia.
Eight	Williams, H. W. (1928), *The Journal of Polynesian Society – The nights of the moon,* v. 37:352 (No. 23). Thomas Avery and Sons Ltd, Sydney, Australia.
Nine	Williams, H. W. (1928), *The Journal of Polynesian Society – The nights of the moon,* v. 37:352 (No. 24). Thomas Avery and Sons Ltd, Sydney, Australia.
Ten	Williams, H. W. (1928), *The Journal of Polynesian Society – The nights of the moon,* v. 37:353 (No. 25). Thomas Avery and Sons Ltd, Sydney, Australia.
	Best, E. (1959), *The Maori Division of Time,* p.36 (No. 8). Government Printer, Wellington, New Zealand.

Eleven	Williams, H. W. (1928), *The Journal of Polynesian Society – The nights of the moon,* v. 37:353 (No. 26). Thomas Avery and Sons Ltd, Sydney, Australia.
Twelve	Williams, H. W. (1928), *The Journal of Polynesian Society – The nights of the moon,* v. 37:353 (No. 27). Thomas Avery and Sons Ltd, Sydney, Australia.
Thirteen	Williams, H. W. (1928), *The Journal of Polynesian Society – The nights of the moon,* v. 37 (No. 29) p. 354, Thomas Avery and Sons Ltd, Sydney, Australia.
Fourteen	Tomoana, P. (1922), *Te Toa Takitini,* April 1, Maori Newspapers, Alexander Turnbull Library, National Library of New Zealand.
	Ropiha, J. (2000), Figure 3 in*: Traditional Ecological Knowledge of the Maramataka – Maori Lunar Calendar*.. Thesis submitted to the Institute of Geography, School of Earth Sciences, Victoria University.
Fifteen	Best, E. (1986), *Fishing methods and devices of the Maori*, p. 249,-250, Reprint. Government Printer, Wellington, New Zealand.
	Ropiha, J. Figure 5 in: *Traditional Ecological Knowledge of the Maramataka – Maori Lunar Calendar.* Thesis submitted to the Institute of Geography, School of Earth Sciences, Victoria University.
Sixteen	Mitchell, J. H. (1997), *Takitimu : a history of Ngati Kahungunu,* pp. 260-265. Kiwi publishers, New Zealand.
Seventeen	Williams, H. W. (1928), *The Journal of Polynesian Society – The nights of the moon,* v. 37:354 (No. 30). Thomas Avery and Sons Ltd, Sydney, Australia.
Eighteen	Taiapa, P. (1960), *Concise Maori Almanac, 1960-61 – Plant and Fish by the phases of the moon.* Gisborne Herald.
Nineteen	Williams, H. W. (1928), *The Journal of Polynesian Society – The nights of the moon,* v. 37:350 (No. 18). Thomas Avery and Sons Ltd, Sydney, Australia.
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Thirty Williams, H. W. (1928), *The Journal of Polynesian Society – The nights of the moon,* v. 37:346 (No. 6). Thomas Avery and Sons Ltd, Sydney, Australia.

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Table 2
Tribal origin of the Maramataka

Iwi or Location	**Number**
Atiawa	1
Far north	1
Hauraki	2
Kahungunu	16
Moriori	1
Nga Puhi	1
Ngati Awa	2
Ngati Hau	1
Ngati Porou	2
Ngati Raukawa	2
Ngati Whatua	1
Rarawa	1
Tuhoe	2
Waikato	2
Whanganui	7
Unknown	1

Table 3
Maramataka

Table 3 - List of Maramataka including tribal &/or geographical origins and original source

	One	Two	Three	Four	Five
1	Owhiro	Whiro	Whiro	Whiro	Whiro
2	Otere	Tirea	Tirea	Tirea	Tirea
3	Ohewata	Hoata	Hoata	Hoata	Hoata
4	Oua	Oue	Oue	Ouenuku	Oue
5	Okoro	Okoro	Okoro	Okoro	Okoro
6	Tamate tutahi	Tamatea-tutahi	Tamatea-tutahi	Tamatea-ngana	Tamatea tutahi/Tamatea a ngana
7	Tamate turua	Tamatea-turua	Tamatea-turua	Tamatea-kai-ariki	Tamatea turua/Tamatea a hotu
8	Tamate nui	Tamatea-tutoro	Tamatea-tutoru	Huna	Tamatea tutoru/Tamatea a io
9	Tamate hokopa	Tamatea-tuwha	Tamatea-tuwha	Ari-roa	Tamatea tuwha/Tamatea whakapa
10	Ohuna	Huna	Huna	Maure	Huna/Hune
11	Howaru	Ari	Ari	Mawharu	Ari
12	Hua	Mawharu	Mawharu	Ohua	Maure
13	Mawharu	Atua	Atua	Hotu	Mawharu
14	Outua	Ohua	Ohua	Atua	Ohua
15	Ohotu	Oturu	Oturu	Turu	Atua mate o Hotu
16	Maure	Rakau-nui	Rakaunui	Rakau-nui	Oturu
17	Oturu	Rakau-matohi	Rakau-matohi	Rakau-matohi	Rakau nui
18	Rakau nui	Takirau	Takirau	Takirau	Rakau matohi
19	Rakau motohe	Oike	Oike	Oike	Takirau
20	Takirau	Korekore-tutahi	Korekore-tutahi	Korekore-te-whiwhia	Oike
21	Oika	Korekore-turua	Korekore-turua	Korekore-te-rawea	Korekore tutahi
22	Korekore tutahi	Korekore-tutoro-piri-ki-nga-Tangaroa	Korekore-tutoru	Korekore-hahani	Korekore turua
23	Korekore turua	Tangaroa-a-mua	Tangaroa-a-mua	Tangaroa-amua	Korekore whakapiri/Korekore piri
24	Korekore hokopau	Tangaroa-a-roto	Tangaroa-a-roto	Tangaroa-aroto	Tangaroa mua
25	Tangaro a mua	Tangaroa-kiokio	Tangaroa-a-kiokio	Tangaroa-kiokio	Tangaroa roto
26	Tangaro a roto	Kiokio	Kiokio	Otane	Tangaroa kiokio/kiokio
27	Tangaro kiokio	O-Tane	Otane	Orongonui	Otane
28	Otane	O-Rongonui	Orongonui	Mauri	Orongonui
29	Orongonui	Mauri (Maurea)	Mauri	Omutu	Mauri
30	Orongomori	Mutu-whenua	Mutuwhenua/Omutu	Mutuwhenua	Mutuwhenua/Omutuwhenua
31	Omuti				
32					
	Moriori	Ngati Kahungunu	Takitumu	Kahungunu	Ngati Kahungunu
	Mair	Te Matorohanga	Best, E.	Best, E.	per. W.L.W.

	Six	Seven	Eight	Nine	Ten
1	Whiro	Whiro	Whiro	Whiro	Whiro
2	Tirea	Tirea	Tirea	Tirea	Tirea
3	Hoata	Hoata	Hoata/Aurei	Hoata	Hoata
4	Oue	Oue	Ue	Ue	Oue
5	Okoro	Okoro	Koro	Koro	Okoro
6	Tamatea kairariki	Tamatea tutahi a ngana	Tamatea tutahi	Tamatea tutahi	Tamatea ariki
7	Tamatea turua	Tamatea turua a hotu	Tamatea turua	Tamatea turua	Tamatea a ngana
8	Tamatea	Tamatea tutoru kaiariki	Tamatea tutoru	Tamatea tutoru	Tamatea a io
9	Tamatea whakapau	Tamatea tuwha whakapa	Tamatea tuwha	Tamatea tuwha	Tamatea whakapau
10	Hune	Huna	Huna	Hune	Huna
11	Ari	Ari	Ari	Ari	Ariroa
12	Maure	Mawharu	Maure		Mawharu
13	Mawharu	Ohua	Mawharu	Mawharu	Maurea
14	Atua	Atua	Ohua	Atua	Atua whakahaehae
15	Hotu	Hotu	Atua	Ohua	Turu
16	Oturu	Maure		Hotu	Rakau nui
17	Rakau nui	Turu	Turu	Turu	Rakau matohi
18	Rakau matohi	Rakau nui	Rakau nui	Rakau nui	Takirau
19	Takirau	Matohi	Rakau matohi	Rakau matohi	Oika
20	Oike	Takirau	Takirau	Takirau	Korekore
21	Korekore tutahi	Oike	Oike	Oike	Korekore turua
22	Korekore turua	Korekore	Korekore	Korekore	Korekore piri ki nga Tangaroa
23	Korekore piri ki nga Tangaroa	Korekore whakatehe	Korekore piri	Korekore piri	Tangaroa a mua
24	Tangaroa a mua	Tangaroa mua	Tangaroa mua	Tangaroa mua	Tangaroa a roto
25	Tangaroa a roto	Tangaroa roto	Tangaroa roto	Tangaroa roto	Tangaroa kiokio
26	Kiokio	Kiokio	Kiokio	Kiokio	Otane
27	Otane	Otane	Otane	Otane	Orongonui
28	Orongonui	Orongonui	Orongonui	Orongonui	Mauri
29	Orongomauri	Mauri	Mauri	Mauri	Omutu
30	Mutuwhenua	Mutuwhenua	Mutuwhenua	Mutuwhenua	Mutuwhenua
31					
32					
	Kahungunu White, J.	Kahungunu - Te Reinga per. Matenga Ngoingoi	Kahungunu - Paritu per. Timoti Pereki	Kahungunu - Mahia per. Enoka Te Apaiwaho	Kahungunu Judge Fenton

	Eleven	Twelve	Thirteen	Fourteen
1	Whiro/Ngarokanuia		Whiro	Ouenuku
2	Tirea/Whitikareia	Tirea	Tireo	Okoro
3	Hoahoata		Ohoata	Tamatea-aio
4	Ouenuku	Oue	Ouenuku	Tamatea-whakapau
5	Okoro	Okoro	Okoro	Huna
6	Tamatea tutahi	Tamatea tutahi	Tamatea tutahi	Ariroa
7	Tamatea turua	Tamatea turua	Tamatea turua	Maure
8	Tamatea whakapa	Tamatea tutoru	Tamatea whakapa	Mawharu
9		Tamatea tuwha	Ohuahuapo	Ohua
10	Ari	Hune	Ohuahuaao	Hotu
11	Huna	Ari	Ariaripo	Atua
12	Mawharu		Ariariao	Turu
13	Ohua	Atua	Mawharu	Rakaunui
14	Atua	Hotu	Hotu	Rakau-ma-tohi
15	Maure	Maure	Atua	Takirau
16	Turu	Turu	Maure	Oike
17	Rakau nui	Rakau nui	Turu	Korekore-hahani
18	Rakau matohi	Rakau matohi	Rakau nui	Kore-kore-piri-ki-Tangaroa
19	Takirau	Takirau	Rakau matohi	Tangaroa-a-mua
20	Oike	Oike	Takirau	Tangaroa-a-roto
21	Korekore tutahi	Korekore tutahi	Oike	Tangaroa-kiokio
22	Korekore turua	Korekore turua	Korekore tutahi	Otane
23	Korekore whakapiri ki nga Tangaroa	Korekore whakapiri	Korekore turua	Orongonui
24	Tangaroa mua	Tangaroa mua	Korekore whakapiri ki te Tangaroa	Mauri
25	Tangaroa roto	Tangaroa roto	Tangaroa a mua	Omutu
26	Kiokio	Kiokio	Tangaroa a roto	Mutuwhenua
27	Otane	Otane	Kiokio	Whiro
28	Orongonui	Rongonui	Otane	Tirea
29	Mauri	Mauri	Mauri	Hoata
30	Mutuwhenua	Omutu	Omutu	Ouenuku
31				
32				
	Kahungunu - Waipawa per. Hori Ropiha	Kahungunu per. S. Locke	Kahungunu? Sir G. Grey's M.S.	Kahungunu per. Paraire Tomoana

	Fifteen	Sixteen	Seventeen	Eighteen	Nineteen
1	Whiro	Whiro	Whiro	Whiro	Whio
2	Tirea	Tirea	Ohoata	Tirea	Tirea
3	Hoata	Hoata	Tutahi	Hoata	Hoata
4	Oue	Uenuku	Turua	Oue	Oue
5	Okoro	Okoro	Uenuku	Okoro	Okoro
6	Tamatea	Tamatea-a-hotu	Korekore mua	Tamatea-aio	Tamatea
7	Tamatea	Tamatea-a-ngana	Korekore muri	Tamatea-kaiariki	Tamatea ngana
8	Tamatea	Tamatea-aio	Tamatea	Tamatea-angana	Tamatea a io
9	Tamatea	Tamatea-kai-ariki	Huna	Tamatea-tuhaha	Tamatea whakapau
10	Huna	Huna	Ari	Ariroa	Huna
11	Mawharu	Ari	Mawharu	Huna	Ari
12	Maurea	Maure	Maure	Maurea	Maru
13	Atua	Mawharu	Hua	Mawharu	Maurea
14	Turu	Ohua	Whetu/Hotu	Ohua	Atua
15	Rakaunui	Turu	Turu	Atua	
16	Rakau-matohi	Rakaunui	Rakau mua	Turu	
17	Takirau	Rakaumatohi	Rakau nui	Rakaunui	Rakau nui
18	Oike	Takirau	Aniwa	Rakaumatohi	Rakau matohi
19	Korekore-tutahi	Oike	Matahi	Takirau	Takirau
20	Korekore-turoto	Korekore-hahani	Takirau	Oike	Oike
21	Piri-ki-korekore	Korekore-whiwhia	Oike	Korekore-whiwhia	Korekore
22	Tangaroa-a-mua	Korekore-rawea	Piri	Korekore-rawea	Korekore turua
23	Tangaroa-turoto	Korekore-piri-ki-tangaroa	Tangaroa a mua	Korekore-piri-ki-nga-Tangaroa	Korekore whakapiri
24	Tangaroa-kiokio	Tangaroa-amua	Tangaroa roto	Tangaroa-a-mua	Tangaroa a mua
25	Otane	Tangaroa-aroto	Kiokio	Tangaroa-a-roto	Tangroa a roto
26	Orongonui	Otane	Tane	Tangaroa-whakapau	Tangaroa kiokio
27	Mauri	Orongonui	Rongonui	Whariki-kiokio	Otane
28	Omutu	Omutu	Mauri	Otane	Orongonui
29	Mutuwhenua	Mutuwhenua	Mutu	Orongonui	Mauri
30				Mauri	Omutu
31				Omutu	
32				Mutuwhenua	
	Ngati Kahungunu ki Wairarapa	Ngati Kahungunu	Kahungunu?		Ngati Porou
	Nepia Pohuhu	Tiaki Mitira	C.E. Nelson	Ngati Porou per. Pine Taiapa	per. Hone Parehuia

	Twenty	Twenty-one	Twenty-two	Twenty-three
1	Whiro	Whiro	Whiro	Whiro
2	Tirea	Tirea	Tirea	Tirea
3	Hoata	Hoata	Hoata	Hoata
4	Oue	Oue	Ouenuku	Oue
5	Okoro	Okoro	Okoro	Okoro
6	Tamatea-tutahi	Tamatea-tutahi	Tamatea ngana	Tamatea
7	Tamatea-anana	Tamatea-ngana	Tamatea kani	Tamatea
8	Tamatea-aio	Tamatea-aio	Tamatea kaiariki	Tamatea
9	Tamatea-kaiariki	Tamatea-kaiariki-whakapau	Tamatea a io/Tamatea whakapau	Tamatea
10	Ari-matanui	Ari-matanui	Huna	Ari
11	Huna	Huna	Ari	Huna
12	Mawharu	Mawharu	Maure	Mawharu
13	Maure	Maure	Mawharu	Atua
14	Ohua	Ohua	Ohua	Turei
15	Atua	Atua	Hotu	Rakaunui
16	Hotu	Hotu	Atua	Raka
17	Turu	Turu	Turu	Takirau
18	Rakau-nui	Rakau-matohi	Rakau nui	Oike
19	Rakau-matohi	Rakau-matohi	Rakau matohi	Korekore
20	Takirau	Takirau	Takirau	Korekore
21	Oike	Oika?	Oike	Korekore
22	Korekore	Korekore-whakatehe	Korekore whiwhia	Tangaroa
23	Korekore-piri-ki-te-Tangaroa	Korekore-piri-ki-nga-Tangaroa	Korekore rawea/Korekore hahani	Tangaroa
24	Tangaroa-amua	Tangaroa-a-mua	Korekore piri ki te Tangaroa	Tangaroa
25	Tangaroa-aroto	Tangaroa-a-roto	Tangaroa a mua	Tangaroa
26	Tangaroa-kiokio	Tangaroa-kiokio	Tangaroa a roto	Otaane
27	Otane	Otane	Tangaroa kiokio	Orongo
28	Orongonui	Orongonui	Otane	Mauri
29	Mauri	Mauri	Orongonui	Onuitu
30	Mutuwhenua	Mutuwhenua	Mauri	Mutu
31			Mutu/Mutuwhenua	
32				
	Tuhoe	Tuhoe	Ngati Awa	Ngati Awa
	Best, E.	Best, E.	Himiona Tikitu	per. John Hohapata-Oke

	Twenty-four	Twenty-five	Twenty-six	Twenty-seven	Twenty-eight	Twenty-nine
1	Nonihape	Nonihape	Nonihape	Nonihape	Noniape	Nonihape
2	Takataka-putea	Takatakaputei	Takatakaputei	Takatakaputei	Takatakaputei ngaromuia	Ngaromuia/Ohowata
3	Whitikiraua	Witikirawe	Witikiraua	Witikiraua	Witikiraua	Witikirawa/Tireo
4	Ohoata	Mawetu	Ohata	Ohata	Ohiro	Oenguku
5	Ouenuku	Tuhahi	Owenguku	Ohiro	Ohawata/Tireo	Okoro
6	Mawete	Wakapou	Mawetu	Ohowata	Owenguku	Tamatea tutahi
7	Tutahi	Hotama	Tutahi	Tuhahi	Mawetu/Tamatea	Tamatea turua
8	Otama	Pa	Wakapou	Mawetu	Tamatea tuatahi	Tamatea wakapa
9	Pa	Ari	Pa	Pa	Pa/Tamatea wakapa	Ari
10	Ari	Huna	Ari	Wakapou	Hari	Hua
11	Hune	Mowaru	Hua	Ari	Huni	Hune
12	Mawaru	Hua	Huna	Huni	Mawaru	Mawaru
13	Hua	Atua	Mawaru	Mawaru	Hua	Whiro
14	Atua	Otu	Atua	Hua	Atua	Otu
15	Kiokio	Maure/Mahure	Otu	Atua	Otu	Atua
16	Rakau nui	Oturu	Mahire	Otu	Oturu	Turu/Rakau nui
17	Rakaumatohi	Rakau nui	Rakau nui	Oturu	Rakau nui	Matohe
18	Takirau	Rakau matoke	Rakau matohe	Rakau nui	Rakau matohe	Takirau
19	Ohika	Takirau	Takirau	Rakau matohe	Takirau	Oeke
20	Korekore	Ohika	Ohika	Takirau	Ohika	Korekore/koreha
21	Kore kore tutahi	Korekore tutahi	Korekore tahi	Ohika	Korikori tuhahi	Korekore piri
22	Kore kore wakapou	Korokoro wakapou	Korekore wakapou	Tangaroa	Korikori wapou	Piri Tangaroa
23	Tangaroa a mua	Tangaroa a mua	Tangaroa a mua	Tangaroa a mua	Tangaroa a mua	Tangaroa a mua
24	Tangaroa a roto	Roto	Roto	Tangaroa a roto	Tangaroa a roto	Tangaroa a roto
25	Kiokio	Kiokio	Kiokio	Kiokio	Kiokio	Tangaroa a Kiokio
26	Otane	Otane	Otane	Otane	Otane	Otane
27	Rongo mai	Rongonui	Rongonui	Rongonui	Rongonui	Rongonui
28	Mouri	Mouri	Mouri	Mouri	Mouri	Mauri
29	O mutu	Ohomutu	Ohomutu	Oamutu	Oamutu	Mutu
30						
31						
32						
	Okirihau (Whanganui)	Whanganui	Whanganui	Whanganui	Whanganui	Whanganui
	Wi Kingi	Taylor	Taylor	Taylor	Taylor	Taylor

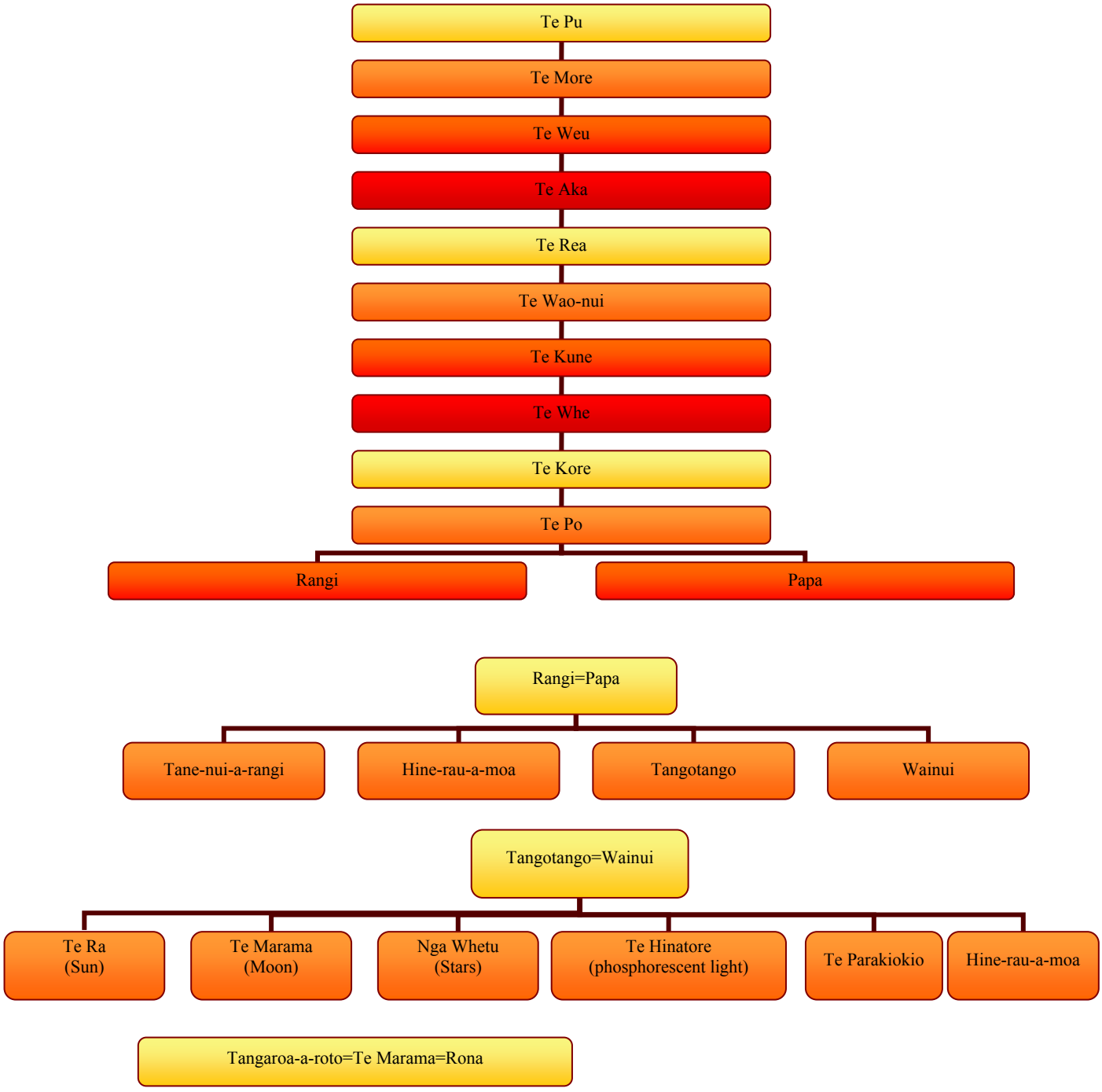
	Thirty	Thirty-one	Thirty-two	Thirty-three	Thirty-four
1	Nonihape	Nonihape/Tireo	Owhiro	Whiro	Hohoata
2	Takatakaputei	Takatakaputea/Oiro	Ohoata	Tirea	Whitikareia
3	Witikiraua	Whitikaraua/Oata	Ouenuku	Haohaota	Ouenuku
4	Ohoata	Ouenuku	Mawete	Ouenuku	Okoro
5	Ouenuku	Mawete	Tutahi	Okoro	Tamatea tutahi
6	Maweti	Otama	Whakapou	Tamatea-kaiariki	Tamatea turua
7	Tutahi	Tamatea	Otama	Tamatea-angaanga	Whakapa
8	Otama	Tutai	Pa	Tamatea-aio	Huna
9	Pa	Pa	Ari	Tamatea-whakapau	Ngana
10	Ari	Ari	Huna	Ari	Ari
11	Hune	Huna	Mawharu	Huna	Mawharu
12	Mawaru	Mawharu	Ohua	Mawharu	Hotu
13	Hua	Oua	Atua	Atua	Mauri
14	Atua	Atua	Hotu	Turu	Atua
15	Kiokio	Hotu	Maure	Rakaunui	Turu
16	Rakau nui	Maure	Turu	Rakaumatohi	Rakau nui
17	Rakau matohi	Oturu	Rakau nui	Takirau maheahea	Rakau matohi
18	Takirau	Rakau nui	Matohi	Oike	Takirau
19	Ohika	Matohi	Takirau	Korekore-te-whiwhi	Oika
20	Korekore	Oika	Oika	Korekore-te-rawea	Korekore tutahi
21	Korekore tutahi	Takirau	Korekore tutahi	Korekore-turoa	Korekore turua
22	Korekore wakapou	Korekore tutahi	Korekore whakapou	Korekore-piri-ki-nga-Tangaroa	Piri
23	Tangaroa a mua	Korekore whakapou	Tangaroa	Tangaroa-piri-a-mua	Tangaroa a mua
24	Tangaroa a roto	Tangaroa mua	Roto	Tangaroa-piri-a-roto	Tangaroa a roto
25	Kiokio	Roto	Kiokio	Tangaroa-piri-a-kiokio	Kiokio
26	Otane	Kiokio	Otama	Ao Tane	Potane
27	Rongomai	Otane	Rongonui	Orongonui	Rongonui
28	Mouri	Rongonui	Mouri	Mauri	Mauri
29	Omutu	Mouri	Omutu	Omutu	Omutu
30		Omutu		Mutuwhenua	Mutuwhenua
31					
32					
	Whanganui Taylor	Ngati Hau Kepa Rangihiwinui	Ngati Ruanui, Taranaki per. S.P.S.	Atiawa Nick Roskruge	Ngati Raukawa per. S.P.S.

	Thirty-five	Thirty-six	Thirty-seven	Thirty-eight
1	Whiro	Whiro	Atarau/Pewa	Whiro
2	Tirea	Tireo	Ahora/Tirea	Tirea
3	Ohoata	Hoahoata	Aurei	Hoahoata
4	Oue	Ouenuku	Oue/Ue	Ouenuku
5	Okoro	Okoro	Akoro/Okoro	Okoro
6	Tamatea	Tamatea tutahi	Ananga/Tamatea-tutahi	Tamatea-kaiariki
7	Tamatea-ngana	Tamatea turua	Ahotu/Tamatea-turua	Tamatea-kani
8	Tamatea-aio	Tamatea tutoru	Aio/Tamatea-tutoru	Tamatea-Ngana
9	Tamatea-whakapau	Tamatea whakapa	Kai-ariki/Tamatea-tuwha	Tamatea-More
10	Huna	Ari	Hune/Ngahuru	Ari
11	Ari	Huna	Ari	Hune
12	Hotu	Ohua	Mare	Ohua
13	Mawharu	Mawharu	Mawharu	Mawharu
14	Atau	Hotu	Ohua	Hohi
15	Ohua	Atua	Atua-mate-o-hotu	Atua
16	Turu	Maure	Oturu	Maure
17	Rakaunui	Turu	Rakaunui	Turu
18	Rakau-matohi	Rakau nui	Rakau-matohi	Rakau-nui
19	Takirau	Rakau matohi	Takirau	Rakau-ma-tohi
20	Oike	Oike	Oike	Takirau
21	Korekore	Takirau	Korekore	Ongohi
22	Korekore-turua	Korekore tutahi	Korekore-ngana	Korekore-te-whiwhi
23	Korekore-whakapiri-ki-nga-Tangaroa	Korekore turua	Korekore-piri	Korekore-te-rawea
24	Tangaroa-a-mua	Korekore piri ki nga Tangaroa	Tangaroa-mua	Korekore-piri-ki-nga-Tangaroa
25	Tangaroa-a-roto	Te ngaro a mua	Tangaroa-roto	Tangaroa-a-mua
26	Tangaroa-kiokio	Te ngaro a roto	Kiokio	Tangaroa-a-roto
27	Otane	Te ngaro a kiokio	Otane	Tangaroa-a-kiokio
28	Orongonui	Aotane	Orongo-nui	Otaane
29	Maurea	Rongonui	Mauri	Orongonui
30	Mutu	Mauri	Omutu-mutu-whenua	Mauri
31		Mutu		Omutu
32				Mutu-Whenua
	Ngati Raukawa, Otaki	Waikato	Waikato	
	Mita te Tai	per. A. S. Atkinson	Baucke	Hauraki Hoani Nahe

	Thirty-nine	Fourty	Fourty-one	Fourty-two	Fourty-three	Fourty-four
1	Whiro	Whiro	Whiro	Whiro	Whiro	Whiro
2	Tirea	Tirea	Tireo	Tirea	Tirea	Tirea
3	Hohoata	Ohoata	Hoahoata	Whawhaata	Hoata	Hoata
4	Ouenuku	Oue	Oue	Oue	Oue	Oue
5	Okoro	Okoro	Tamatea ngana	Okoro	Okoro	Okoro
6	Tamatea-tutahi	Tamatea ngana	Tamatea	Tamatea a ngana	Tamatea-tutahi	Tamatea-tutahi
7	Tamatea-turua	Tamatea	Tamatea a io	Tamatea	Tamatea-turua	Tamatea-turua
8	Tamatea-whakapau	Tamatea io	Tamatea whakapau	Tamatea io	Tamatea-tutoru	Tamatea-tutoru
9	Huna	Tamatea whakapau	Huna	Tamatea whakapau	Tamatea-tuwha	Tamatea-tuwha
10	Ariroa	Huna	Ari	Huna	Huna	Huna
11	Mawharu	Ari	Hotu	Ari	Ari	Ari
12	Ohua	Mawharu	Mawharu	Hotu	Mawharu	Maure
13	Maurea	Maure	Atua	Tamawharu	Maurea	Mawharu
14	Hotu	Atua	Ohua	Atua	Ohua	Ohua
15	Atua		Oturu	Ohua	Oturu	Atua
16	Turu	Rakau nui	Rakau nui	Oturu	Rakau-nui	Oturu
17	Rakaunui	Matohi	Rakau matohi	Rakau nui	Rakau-matohi	Rakau-nui
18	Rakau-matohi	Takerau	Takirau	Rakau matohi	Takirau	Rakau-matohi
19	Takirau	Oiki	Korekore	Takirau	Oike	Takirau
20	Oike	Korekore tutahi	Korekore turua	Korekore	Korekore-tutahi	Oike
21	Korekore-tu-tahi	Korekore turua	Korekore whakapiri	Korekore turua	Korekore-turua	Korekore-tutahi
22	Korekore-tu-rua	Korekore whakapau	Tangaroa a mua	Korekore whakapiri	Korekore-tutoru	Korekore-turua
23	Korekore-piri-ki-nga-Tangaroa	Tangaroa a mua	Tangaroa a roto	Tangaroa a mua	Tangaroa-a-mua	Korekore-piri-ki-nga-Tangaroa
24	Tamatea-a-mua	Tangaroa a roto	Tangaroa kiokio	Tangaroa a roto	Tangaroa-a-roto	Tangaroa-roto
25	Tamatea-a-roto	Tangaroa kiokio	Tangaroa whakapau	Tangaroa kiokio	Tangaroa-kiokio	Tangaroa-kiokio
26	Okiokio	Tangaroa whakapau	Otane	Tangaroa whakapau	Otane	Tangaroa-whakapau
27	Otane	Otane	Orongonui	Otane	Orongo	Otane
28	O Rongonui	Orongonui	Mauri	Orongonui	Mauri	Orongonui
29	Mauri	Mauri	Mutuwhenua	Mauri	Omutu	Mauri
30	Mutuwhenua	Mutu	Hui te rangiora	Mutuwhenua	Mutuwhenua	Mutuwhenua
31					Takataka-putea	
32						
	Hauraki-Ngati Pare, Ngati Tamatera per. Hiringanuku Ngamane	Ngati Whatua Te Wikiriwhi Hemana	Rarawa Wi Tana Papahia	Ngapuhi Renata Tangata	Far North Best. E.	Unknown Best, E.

Table 4
He Whakapapa mo te Marama

He Whakapapa mo te Marama (Best 1928 JPS 37:(Hamiora Pio)



Tangotango: origin of alternation of night meets day.
Wai-nui: origin/personification of water.

RESEARCH REPORT

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266 Public Understandings of Biotechnology in New Zealand: Factors Affecting Acceptability Rankings of Five Selected Biotechnologies
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149 Papers Presented at the 8th Annual Conference of the NZ Agricultural Economics Society. Blenheim 2002

150 Papers Presented at the 9th Annual Conference of the NZ Agricultural Economics Society. Blenheim 2003

151 Papers Presented at the 10th Annual Conference of the NZ Agricultural Economics Society. Blenheim 2004

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