

Astronomy of the Pacific

A BRIEF INTRODUCTION TO PACIFICA ASTRONOMY BY CHRIS SARA

Foreword

Astronomy is common to all cultures, with the relationship between the stars and people playing a pivotal part in societal development. Well before we thought of astronomy as a science, or before science was a concept, people were using the celestial bodies as a guide to their everyday lives. Every culture had a person who mapped the stars and philosophised about their meanings.

The people of the Pacific are a very good example of a culture that used the stars for many purposes. They were a marker of time, a navigational aid and a resting place for the souls of the dead. These applications were not unique to the Pacifica people. Long before people lived among the islands of our greatest ocean the Egyptians honoured the Sun and stars as gods. The Greeks and Romans continued these ways, the Chinese recorded supernova explosions, and there will be countless other examples.

Stories were shared from generation to generation with the knowledge of the heavens being a visual reference to oral knowledge. Regardless of where we are on Earth we have a view of the sky, and in the distance past that view was unobstructed by light pollution. Depending on where you are looking from dictates what and how you see the stars. For this reason, many cultures record stories about the same stars but from a different view. In the Southern Hemisphere we see the constellations upside down from those in the North who mapped and named them.

Today astronomy is a mainstream activity and we can all access equipment to make us astronomers. The mysteries are not as mysterious, but the wonder of the stars holds as much fascination as it did millennia ago. The stories surrounding the stars helped forge our knowledge and for all intensive purpose are as relevant to astronomy as anything we have discovered through physics and chemistry, because, for all we have discovered, we have no control over their motion and they are still the same simple points of light from the past that they have been for our entire existence.

Introduction

New Zealand / Aotearoa was settled some eight centuries ago. The people of Aotearoa are known as the Maori, and their ancestors voyaged across the Pacific Ocean to make Aotearoa home. The magnitude of their journey is tied strongly to astronomy. Their understanding of the stars, the path of stars through the sky and the relationship of objects such as Matariki (Pleiades, M45) to the Sun, Moon and time of year, were instrumental to their migration.

The immense knowledge of the people of Pacifica was handed down from generation to generation. Maps were tattooed on the skin of the seafarers and waka had compass bearings on the decks that guided the way. Currents and water temperature, birds and nature, combined with astronomy to create a knowledge that served the first explorers well. When the first Europeans eventually navigated their way to the Pacific, they found it hard to believe people could achieve what they did without the use of “modern” technology.

Sadly, much of this knowledge has long since stopped being passed down. Early settlers recorded some of the information, but as colonisation expanded and the reliance on traditions lessened this knowledge started to fade away. Light pollution within cities also played a part in laterally, obscuring, the stars and hence the reliance upon them.

Regardless of where we find ourselves today, and how this knowledge was used, nothing negates the fact that people centuries ago had the capability to navigate their way across the seas to start new lives. In fact, nearly all cultures, have used the stars in some part to steer the course of their development.

Pacifica Astronomy

If Aotearoa is your home, then the astrological history of the people of the Pacific is all our story. The stars were the map for the early travellers as they journeyed around the Pacific islands. The skilful use of the stars was a critical tool for finding land in an ocean of water, where human life was the price of failure.

My understanding of this knowledge is mostly from what I have read. People with ancestral knowledge have briefly shared their stories with me and that has fuelled my desire to learn and ultimately share the knowledge. At this time, I'm no expert, but I do understand that with passed down knowledge the truth has many tongues. No one story is the right truth as every story is told from a unique point of view. I must apologise if in my desire to share I clumsily give meaning to things beyond my given right, but I believe that it is the discussion of this knowledge that is important.

Navigating the Pacific

When the people of the Pacific headed out to create a new home their knowledge of the stars was very crucial. Knowing the stars and understanding how they relate to position was their greatest tool for navigation.

The way we navigate today is not completely removed from that of the people of Pacifica. A major difference between the seafarers of the Pacific 800 years ago and the early Europeans who ventured to this part of the world was the accurate keeping of time. By knowing the time placing your location on the Earth was much more accurate.

When referencing a stars position against the time of the day you can determine exactly where you are on the surface of the planet. European navigators travelled with clocks set to a "mean time" that they used to reference their position. The Pacifica navigators did not have a clock so this task was achieved by referencing the clues that nature provided.

A broader approach was required to navigating as missing a target like New Zealand left you very few options to fall back on. The natural clues that can be used are things like water temperature and wildlife. The further south you sail the colder the water will be for example. If there are certain birds or fish around then you can be positive about the area you are in.

The use of storytelling was a way of passing on knowledge in many cultures that did not have a written language. Even today the use of storytelling is a useful way to recall information that is to be passed from generation to generation. The constellations have form that we relate to creatures and symbols and this helps us to navigate the night skies as astronomers today. We refer to this technique as "star hopping".

With the star map imbedded in their minds Pacifica navigators would know when to turn west or east. The setting of Matariki or the tail of Scorpio (perhaps seen as a hook) pointing to the water would be indicative of position when referenced to other factors in the voyage. This knowledge served the explorers of the Pacific very well, as is evidenced by their successful expansion of their world.

I have very briefly touched on navigation here, but the topic is large and encompasses techniques that are best addressed in a more targeted essay.

Astronomy for Settlers

In terms of navigation the stars were a marker in the journey across the great Pacific Ocean. However, as people settled on the land the knowledge of the stars grew more focused on planting and food supply. A calendar based on the stars, planets, constellations, Sun and Moon was the corner stone of life. A lunar calendar based on moon cycles of 28-30 days meant that the year was only 354 days long and not the 365.25 that it actually is. To compensate for this discrepancy an extra lunar cycle – or month – was added every 3 years, just as modern calendars have a leap day every 4 years. Without this adjustment the seasons would slowly drift out of sync with our orbit around the Sun.

This is indicative of a good understanding of astronomy and something common to people of great understanding throughout history. It is one of the wonders of humankind that the evolution of science, regardless of its name, is independently consistent with the observation of nature, regardless of location.

With a new found life and structure in place the stars still had an important place in the Maori culture. They guided the people in their timing of life and their presence would mark significance events. Stars were seen as the souls of the dead and therefore thanks were given in their honour. The celebration of Matariki is a tradition that was once a regular feature of Maori culture. With mainstream support it has a chance to return and offer us all a connection to the stars.

The Rise of Matariki

Matariki is one of the main spiritual astronomy events for Maori, but New Zealanders understanding of Matariki and what it represents to the Maori people has been very limited. The desire to give Matariki status has been growing for many years and it is now a holiday so is achieving a rightful place among the dates in the calendar. This should enable Matariki to command the respect Christmas, Easter, Anzac Day and Waitangi Day have in mainstream New Zealand. When Matariki was celebrated before the arrival of Europeans it was to acknowledge those who passed and to offer thanks; things common to many other public holidays, therefore Matariki is not out of place in the Aotearoa of today.

Across the Pacific, Matariki, in its various forms, continues to gain recognition. In Hawaii it was re-established in the early 1980's as the Makahiki festival to celebrate the setting and rising of Makali'i and relates to their god Lono.

Matariki was, before European settlement, a very important part of the Māori calendar. Matariki signalled the end and start of the year as it disappeared from the skies around May before being visible once more around June or July. During its time away from the night skies was a time to "rest", a time to enjoy the toil of the year past.

Matariki has a great spiritual significance to the people of Pacifica as it was a time to honour the deceased along with the appeasement and honouring of the gods. The way that the stars of Matariki were observed would be read as an indication of the coming seasons harvest and weather, and the well-being of the people.

The Stars of Matariki

The composition of Matariki has a number of interruptions. As with anything that has a mythical, or spiritual, background pinning down an absolute meaning can be difficult. Depending on your vantage point the number of stars that Matariki is comprised of will differ. Today we can clearly see the stars but it is the Maori understanding that we translate from the past that is of interest to me.

I have chosen to take my early learning from the book "*Matariki, The Star of the Year*", by author Rangi Matamua. I have found this book of great inspiration but I'm sure there are many other books and authors that will shed varying light on the subject. I will continue to research the differing stories but I'm sure the essence of the message will be common to all.

I have chosen the line of thought that relates to the image below that gives the Maori names for the stars. It was a genealogy recorded by Te Kokaua, an ancestor of Rangi Matamoa, from Ruatahuna. It defines the nine stars as representing the following individuals, that each has a defined role in the story of Matariki:



Matariki – mother, surrounded by her children. Rehua is the father who is seen in the sky as the star, European convention names, Antares. Matariki and Rehua are both associated with well-being and healing.

Pohutakawa – is associated with the dead and connects Matariki with the deceased.

Tupuanuku – is associated with food that is grown in the ground. In May, all food has been harvested by the time Matariki sets in the west. Winter is on the way.

Tupuarangi – is associated with food that comes from the sky, the birds. When Matariki rises again in the east with the Sun, kereru were harvested, cooked and preserved in their fat.

Waiti – is associated with fresh water and the creatures that live in it. The migration of lamprey occurs when Waiti rises in the morning sky.

Waita – is associated with the ocean, and the food of the ocean.

Waipunarangi – is associated with the rain and links the Matariki cluster to rain.

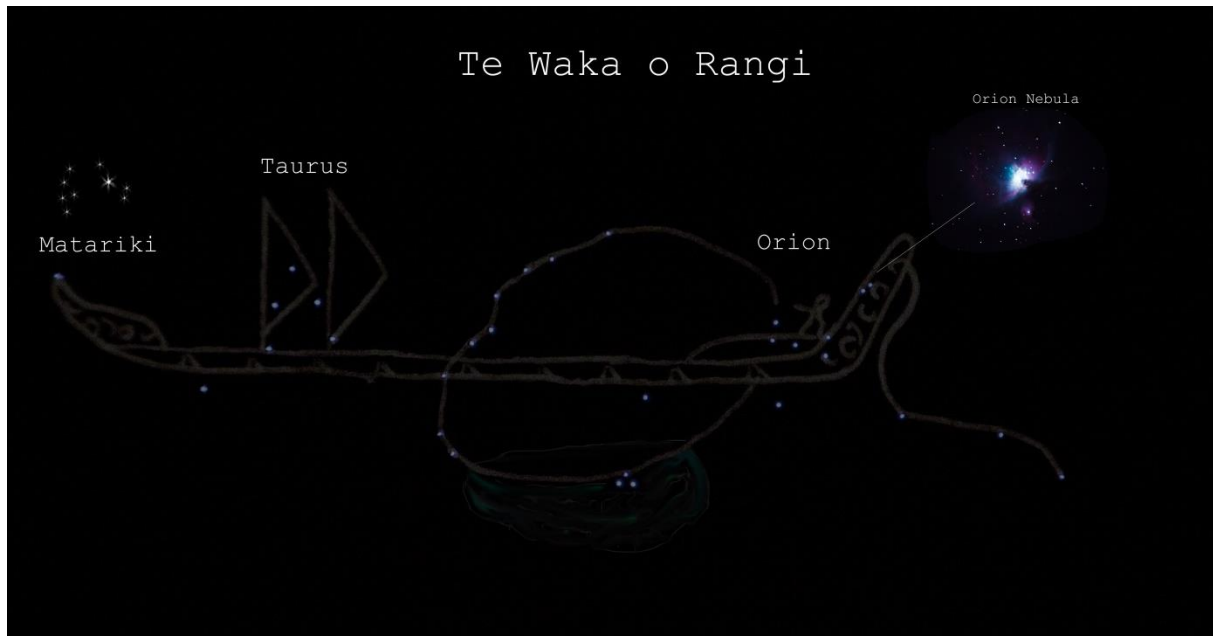
Ururangi – is associated with the winds.

Hiwa-i-te-rangi – is associated with prosperity. Maori would send their desires and dreams to the star in the hope they would be fulfilled.

The way the stars presented themselves defines how good the year will be, in terms of health, harvest, weather and so on. Seeing the stars clearer appears to generally be better than seeing them faint or obscured. In astronomy we refer to the visual quality of stars as "seeing". The ability of the people to delineate the cluster is a story in itself. The eyesight of the Maori was possibly better and the skies would definitely have been clearer. The setting and rising of Matariki was also when the air was cooler, which is better for astronomy as there are fewer disturbances.

Te Waka o Rangi

Matariki is also represented with the stars of the constellations Orion and Taurus to form Te Waka o Rangi, Taramainuku's canoe. As the waka sets towards the west, with Matariki at the bow, Taramainuku casts his net to haul those who have passed that day. The celebration of Matariki is a time to remember those who passed during the year. This was an important aspect to the observation of Matariki.



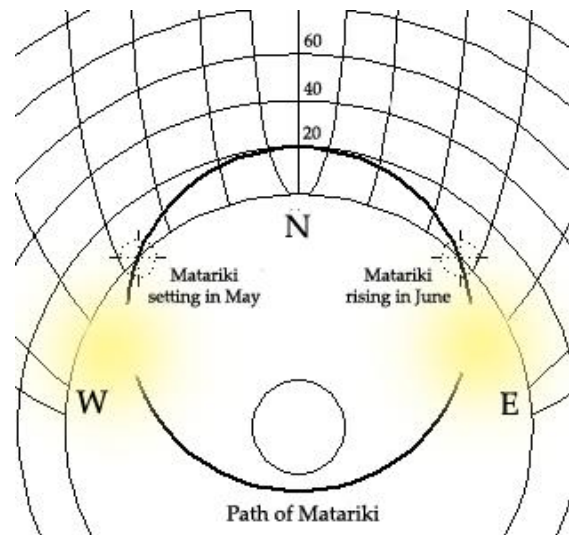
Taramainuku would suspend the soles of the dead in a place known as Te Hao o Rua, or what is better known as Orion's nebula. At the end of the year when the bow of Te Waka o rangi sets with the Sun in the west the soles of the dead would be thrown to the sky where they would live again as the stars.

The sea and fishing are an intrinsic part of Maori mythology. With being a people that lives in a world that is has lands separated by large swales of water this is very understandable. The way the Sun appears to come and go from the sea adds wonderful imagery to the tales.

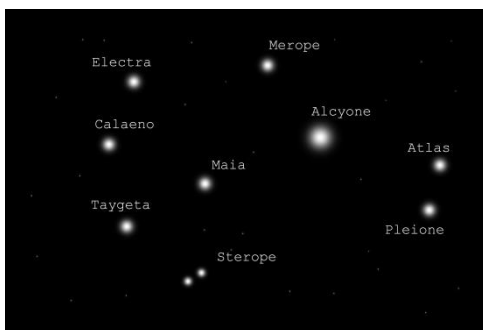
As an aside, I created the Te Waka o Rangi image by using a black card and a light box. The stars are produced with pinholes, while the waka is drawn on the card. I used techniques that are used for astrophotography to capture an image and added the net and labels in Photoshop.

Astronomy of Matariki

From a pure astrological viewpoint for us in the deep south of Rakiura, Matariki never rises more than 20 degrees above the horizon so can be a difficult object to observe. As the Māori year comes to an end Matariki's visibility in the night sky draws shorter and shorter as it follows the setting Sun beneath the horizon closer each day. When Matariki is once more visible, it is with the Sun in the east. The visibility of Matariki will draw longer each day as it continues to rise earlier before the Sun.



The above diagram shows the path Matariki takes in the sky above Rakiura. Because we are at latitude 47° south the cluster of Matariki arcs low in the sky towards the north. Nearing the time before it is completely set we only get a few minutes of visibility at twilight.



Greek names for the stars of Pleiades

Matariki is the name given to the cluster of stars that the Greek astronomers referred to as the Pleiades. The cluster would have appeared the other way up to the Greeks.

In Japanese culture it is named Subaru. The symbol for the Subaru car company is in fact the star formation of Matariki.



The astronomer Charles Messier (1730-1812) catalogued many cosmic objects and referenced Matariki as M45.

For the best observation you need a clear view to the west, but be aware, you are looking towards a setting Sun and care must be taken not to incidentally gaze upon the Sun.

Summary

European influences have eroded much of the knowledge, or wisdom, that was important to Māori in Aotearoa. Sadly, this is not unique to Māori, as where ever European settlement has occurred; the tradition knowledge has suffered. This is for many reasons, that can include, cultural cleansing, technologies, light pollution, apathy, the integration of cultures, education, misunderstanding and ignorance.

As a nation we are now looking to the past to find a way forward. For Matariki to be reinstated within our lives is a sign of how far we are coming in developing a greater understanding of multiple cultures tied to one land. It is a celebration that we are all invited to be part of and is a good reason to promote dark skies thinking.

If nothing else, the beautiful stories that have been told to explain the existence of the stars make them worth sharing as part of any astronomer's journey. To study the Universe without consideration of all the knowledge that it consists of, surely lessens the experience.

For this reason, I have started to expand my knowledge of Matariki and the general understanding of Māori astronomy. My source is reading, talking and listening to people that have dedicated their lives to this knowledge; can I do it justice, possibility not, but I'm willing to try and through sharing, knowledge can only be expanded.

As a person who enjoys the science and spiritual facets of astronomy, Matariki is my path to both.

"Having a purpose for an activity gives that thing meaning beyond enthusiasm."

- Chris Sara 2022