

Lata's Wayfinding System and Climate Science

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Abstract

The cultural vision and history of Taumako extends far beyond their Duff Islands, the SE Solomons region, or the western Pacific. According to the people of Taumako, their ancestor Lata, was the first person to build and sail a voyaging canoe. Taumakans today are unique among Polynesian and Austronesian people in that they still build and navigate voyaging canoes using only the ancient designs, materials, and methods of Lata. Lata/Laka/La'a/Rata/Raka, etc, is a Culture Hero across Polynesia, and at least some islands where the ancient Austronesian migrants settled thousands of years ago. Lata's successes and mistakes help Taumakans, and us, learn who we are, and what to do and not do as we face global climate change and cultural wars. Taumako is full of sites where episodes of the Story of Lata happened...the islet where Lata was born, the rock Lata's father killed the father eel, the place where Lata stood with Hina to see if the tree he cut down was actually on Hina's land, the stones where Lata moored his voyaging canoe, where he sailed out and Hina blocked the entrance so he could not come back, where Lata picked his crew from out of the ocean, etc. Taumako was a crossroads of early Papuan settlers and Lapita pottery-making, migrants, and canoe technology that combines both Polynesian and Micronesian design features. The Story of Lata is lived today in the practice of the ancient Pacific voyaging arts. How can all this help them break out from colonialist borders and policies, make a living at the bottom level of the global economy, and/or survive climate change? What can we learn from Lata?

Key words: Lata, Pacific, ethnography, Austronesian

Introduction

Climate researchers use data about the past to understand what is changing now. Today, climate scientists lack ground-truthed data for natural phenomena of the Indian and Pacific oceans (BioScience, 2011).

However Austronesian voyagers colonized Oceania millennia before Europeans arrived, and some of their descendants still practice knowledge systems that offer useful data for climate science.

Taumakan Islanders of the Duff Islands of SE Solomons practice an ancient system of knowledge in everyday life on their island and in voyaging to other islands. That system is based on ecological and environmental patterns, and relationships between patterns of natural phenomena, as well as between Taumakans and natural elements.

Today the people of Taumako are isolated from the outside world by lack of electricity, phone service, WIFI, anchorage, or airstrip. So, they still depend upon ancient cultural ways to meet everyday needs. They speak Polynesian language and practice Polynesian customs. They are the only Polynesians who still make and sail voyaging canoes using only ancient designs, materials, methods, and tools. They are heirs of an ancient system of deep sea navigation that uses knowledge of natural phenomena rather than modern instruments. This ancient system provides data of rare specificity and complexity about relationships between patterns of wind, sea, sky, and spirit that are little known to science.

The Heirs of Lata

After European diseases killed all but 37 Taumakans in 1919, and colonial controls arrived in 1922, the number of voyaging canoes in the region dwindled from two hundred active vessels to a few relics in the 1960s. Extensive partnerships and networks between islands were lost.

The history and cultural vision of Taumakans extends far beyond their Duff Islands, the SE Solomons region, or the Western Pacific. Three thousand years ago, Taumako was a crossroads of Lapita pottery-making migrants (Leach and Davidson, 2014). Today Taumakan voyaging canoes and

navigation methods combine both Polynesian and Micronesian design features.

According to the people of Taumako, their ancestor, Lata, was the first person to build and sail a voyaging canoe (*vaka*). Lata is a voyaging Culture Hero to the people of thousands of Pacific and Indian Ocean islands. Lata's name varies, as Laka, La'a, Rata, Raka, etc. Today, some of the variants are known today as male, and others as female. Today, some places like Hawai'i, only remember short episodes in the Story of Lata. Taumakans tell the Story of Lata hour after hour, year after year, during building of *vaka*, and while making voyages to other islands.

Taumakans live their lives as characters in their Story of Lata. As such they are the present generation of an uninterrupted line of voyagers. Lata's successes, mistakes, and spiritual relationships with natural phenomena, help Taumakans learn who they are, and what to do, and not do, in life.

Duff Islands are full of sites where episodes of the original Story of Lata happened. These include the seaward platform on Tohua, and islet where Lata was born, the Kahula stream lava-rock home of the father eel who Lata's father killed and whose tail Lata suckled on after his parents died, the mountaintop where Lata stood with Hinora to look down and see if the tree he already cut down was actually on his or her ancestral land (*kainga*), the black stones beside Tohua where Lata moored his voyaging canoe, the entrance to TeVení, a hole in the reef where Lata sailed out and Hinora blocked so he could not come back, the ocean outside of TeVení where Lata picked his crew from after their canoe fell apart from being tricked by Lata telling them the wrong plant to use for their lashings, etc (George, 1999). The interactions of the characters, the natural phenomena they deal with, and the places, episodes, and themes of the

Story of Lata, are critical to Taumakan decisions about gardening, performing rituals, building voyaging canoes, and for way finding at sea.

Taumakan voyaging canoes (*vaka*) are made in the image of Lata and other characters in the Story of Lata. Each end of the *vaka* is carved into facial features of *Te Ube*, the bird who Lata befriended, and the teeth of Lata, which securely hold the carving of *Te Ube* into the back of which the mast is stepped (Fig. 1). The sail has slender extended tips, which are Lata's arms held overhead to catch the wind (Fig. 2). The entryway to the shelter is where the current day Lata (most senior wayfinder) sits in supervision of the crew and the elements.

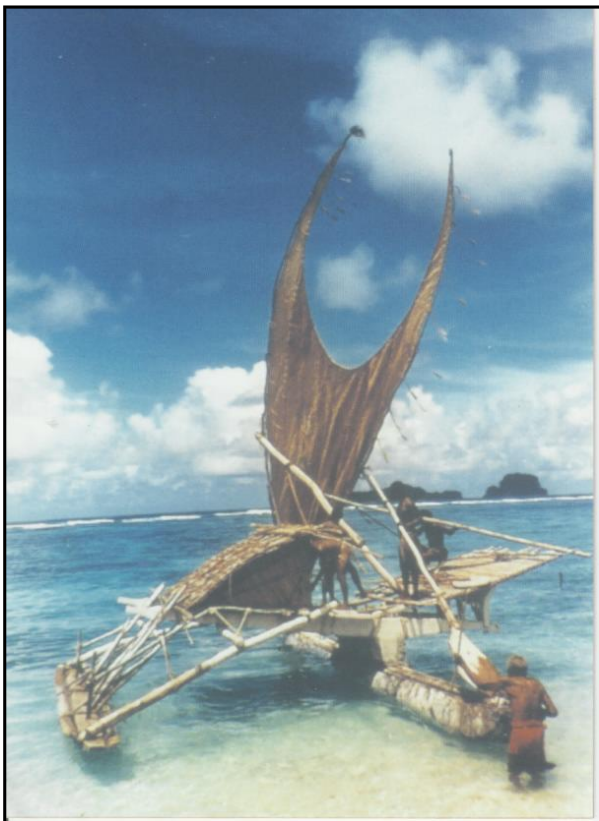


Fig. 1(left): Photo of Chief Kaveia instructing crew how to rig Te Puke voyaging canoe. (Michael Tauchert and Vaka Taumako Project)



Fig. 2: Photo of carving of Te Ube bird at end of Te Puke. (Michael Tauchert and Vaka Taumako Project)

Since the 1970's islanders from Hawaii, New Zealand, Cook Islands, and other more commercially developed islands have taken voyages using navigation methods that did not include modern instruments, such as compass, sextant, or electronics. Their "non-instrument" methods are traditionally inspired, and have centered on use of star paths to know the direction to islands. But the specific star path methods that most of these revival voyagers have used were created by Nainoa Thompson and Will Kyselka in Bishop Planetarium in the 1970's. They also rely on meteorology for their weather, engage modern vessels to escort them everywhere in case rescue is needed, and they construct their vessels with nylon, Dacron, fiberglass, epoxy, chainsaws, etc. These voyagers have traveled far, correcting several centuries of denial and misrepresentation of the true history of oceanic voyaging, and reviving pride among island peoples for the brilliant achievements of their ancestors. But it is clear that they cannot, or do not intend to, make voyages using only Lata's technology.

Taumakans today are unique among Polynesian and Austronesian peoples in that they still build their vessels and navigate using only Lata's technology. But Lata's vessels are only good for sailing interisland during certain seasons. If Lata's crew sails to another island then they must stay there until the right season comes to sail back to their island, which could be nine months later. Who will feed them and what will they do while they are waiting? How will they earn money to pay school fees for their children? Who will maintain their vessel if they are lucky and a ship comes that can bring them home? If and when they have transport to return to their *Vaka* then how will they get money to harvest some trees to replace certain parts, and to re-lash others?

Given these challenges, why do young Taumakans want to work hard at learning the ancient ways, rather than going off-island to make money? Don't they want their children to go to secondary and tertiary schools? Wouldn't they like to have a permanent house with a toilet rather than a leaf house and the ocean? How can their heritage help them cross colonial nation-borders between them and nearby islands, and policies that make it impossible for them to make a living at the bottom level of the global economy? How will perpetuating ancient practices help them survive climate change?

Furthermore, what can outsiders learn from the heirs of Lata? Can people who are fully dependent on the global economy and its petrochemical and electronic technologies, learn something to help them stop their polluting and warlike ways, and possibly save what is left of the planet for all of our children?

Perpetuation of Lata's Voyaging Vessels

In 1996, the Vaka Taumako Project was officially started as a research project under the Ministry of Education of Solomon Islands. It was the idea of the Paramount Chief of Taumako, Koloso Kaveia, who was a very experienced voyager on Lata's vessels, and then on a trading scow, for many years. He, and other elders of Taumako, wanted to teach a new generation how to build and sail a *Te Puke*, which is the design of vessel that Lata is most known for. He also wanted that knowledge documented for future generations.

In 1997 the *Te Puke* named "Vaka Taumako" was launched. In 1998 it sailed to Nifiloli, in the Outer Reef Islands, and in 2000 it sailed back to Taumako. The biggest challenges of those voyages included the lack of safe places to keep the vessel on other islands. People of other islands have more money-based economies, with ships coming monthly, airstrips, and phone service. Taumakans need their own transport to relieve their isolation.

During his nineties Kaveia planned to lead a voyage from Taumako to Vanuatu. But he passed away in 2009. Several voyages were made in 2012, and again in 2013, and another one in 2017. In every case there was barely enough food for the crew, and the return transport to Taumako was delayed for weeks. Despite the hardships they continued to work on making new *vaka* and more voyages. The costs of delayed transport ate up what had been set aside to pay the school fees of their children. So, why do they persist?

The positive results of these voyages have included at least one inter-island marriage by a crew member for each voyage, and some sort of reconciliation (*Heihei Lavo*) over events that took place generations back,

when voyaging canoes were stopped by government and missionary policies, WWII, and other colonial impacts. Another result is that through voyaging each crew members gains, or proves, a good relationship with patterned phenomena of the wind, sea, stars, and with their voyaging ancestors. The leader of a voyage becomes a present day Lata.

Lata's crew is celebrated for its accomplishments at home and throughout Solomon Islands. *Te Puke* are featured on both provincial and national icons, and Taumakans regard the leader of a voyage on a *Te Puke*, as singularly qualified to be the Paramount Chief of Duff Islands.

Knowing what Lata knew qualifies one to give advice on gardening, weather, fishing, social events, naming of newborns, spiritual activities, and so many other disciplines that are practiced by Duff Islanders. Old people reward voyaging students with appropriate knowledge and resources for voyaging, because they know that voyaging can provide the inter-island communications that are necessary to survival and the joy of renewing ties with close relatives who may not have been contacted in many decades. The voyagers themselves become responsible to share their knowledge, and inform others of changes in natural patterns that they observed.

When there are natural disasters, such as the King Tides and ferocious cyclones that are coming more frequently, there is more need for a vessel that can sail over the reef and right up onto the beach...to carry sago palm leaves to roof and wall houses, betel nut for social sharing, pigs for feasting events such as weddings and funerals, and many other goods necessary to the wellbeing and relationships between people of different islands and atolls.

Children of Taumako are told bedtime stories whose characters are navigational stars. Stories of the giants (*Pakhola*), the old woman of the forest (*Hinora*), and the fresh water eel who was killed by Lata's father, are filled with references and meanings about voyaging. The winds that come from different directions and bring different weather and plants and animals into the center of Taumako life, are themselves main characters in the Story of Lata. Though they are not often named as such in the storytelling, the interrelationships of these winds with other phenomena are critical to finding the way to other islands. They are also the basis for correlating and calibrating many other natural phenomena that Lata used to find the way.

Lata's Navigation (Wayfinding) System

From the 1970's onward, Pacific navigation researchers focused on the use of stars as the basic method of finding land without modern instruments (Lewis, 1972). More recently, some natural navigation researchers have centered 'stick charts' and 'wave piloting' in the Marshall Islands (Genz, 2016). They hypothesized that knowledge of swell patterns between the Ratak and Ralik island chains were the primary phenomena used for navigation there.

Although the Taumakan heirs of Lata use both stars and swell patterns extensively, they organize their navigational technology differently. They prioritize knowledge of wind, and its relationships with all other natural phenomena. Taumakans regard winds, not stars, as primary, to their navigation methodology.

Taumakans use a systematic model of way finding that does not privilege asterisms (including stars, star groups, dark places in the sky, and star paths) above other phenomena. Taumakans use Lata's mental model to

link the position of the wind around the horizon with phenomenal patterns that occur (when the wind is in that position).

So by knowing the wind position a Taumakan wayfinder knows which phenomena are useful for what voyaging routes, and which phenomena work together or provide alternatives to others. Asterisms are important because the wind positions that the asterisms rise and set in are indicative of what other phenomena are useful.

Te Nohoanga Te Matangi

The organizational image, i.e. basic data organizer, of this ancient system is a model of 32 named wind positions that are located equi-distant from each other around the horizon (Fig. 3). From the geographically widespread documentation of what English speakers have called “wind compasses” throughout the Pacific and Indonesia, it seems likely that voyagers figured out this system long ago.

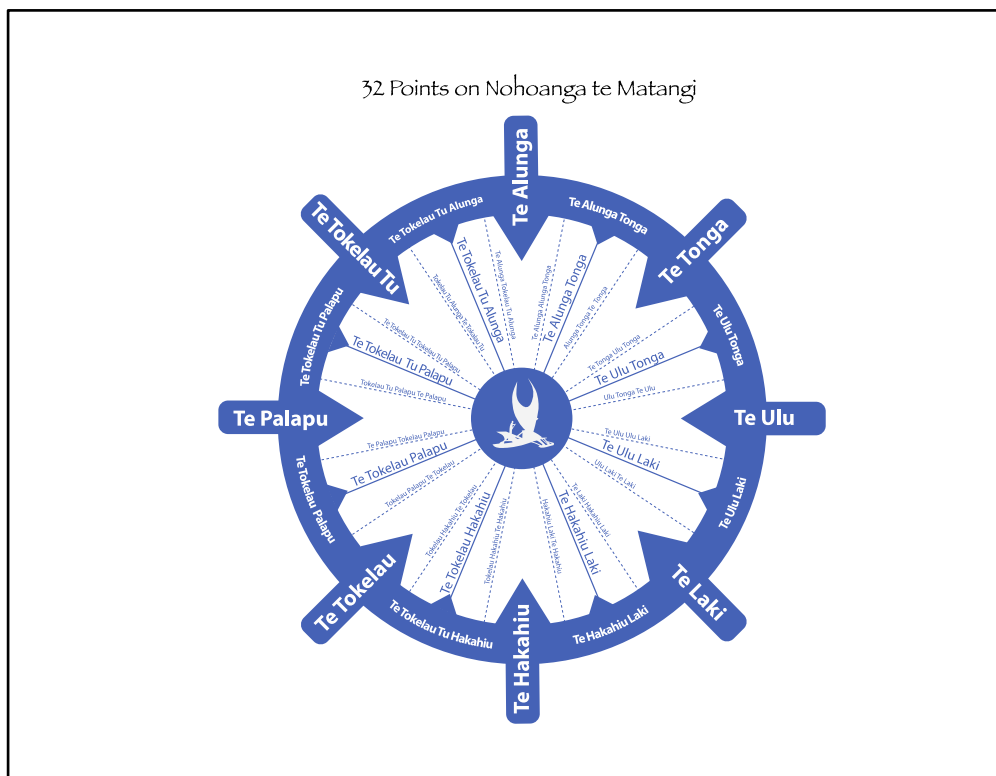


Fig. 3: TNTM Diagram 8/16/32 Named Wind Positions.

The Taumako wind-based system is called “*Te Nohoanga Te Matangi*” (*TNTM*). *TNTM* translates into English as “the wind positioning system” or “the life of the winds.” The eye of the wind can sit (*noho*) in, or move through, the various positions. The 32 named *TNTM* positions surround the observer around the horizon, and each *TNTM* position is located at equal distances from its neighboring position.

TNTM Opposite Partners

Each *TNTM* wind position is paired with the position that is located opposite to it on the horizon (Fig. 4). Taumakans do not learn the 32 positions one by one, sequentially in a circle. They learn them in opposite pairs, or “partners.”

There are 16 partners in the 32 wind positions. But most people just deal with the 4 partners that comprise the basic 8 wind positions. After a person learns the relevant partners for any voyage, then they know what is in front of them and behind them, no matter which position they are headed for. Thus, the partner of *Te Alunga* is *Te Haka Hiu*, and the partner of *Te Tonga* is *Te Tokelau* (Fig. 3).

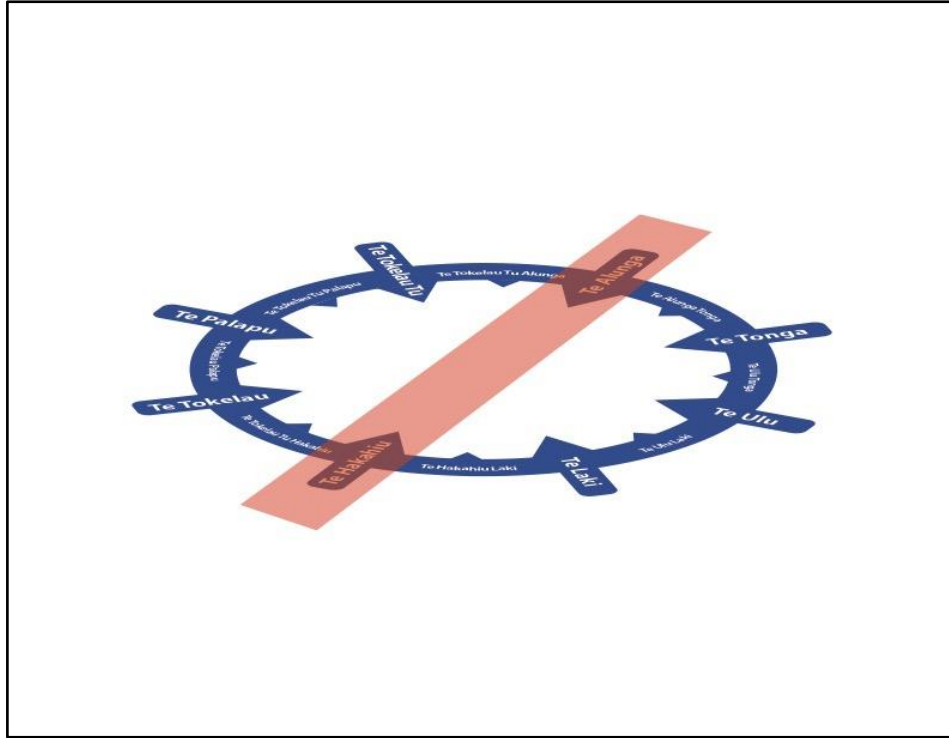


Fig. 4: TNTM Diagram opposite Pair. (Partners)

TNTM works like a slide rule (mechanical analog computer) that recognizes patterns in a variety of natural phenomena, and organizes those patterned natural phenomena into spatial, temporal, and spiritual relationships.

The relationships contained in these *TNTM* linkages are based on knowledge about natural and spiritual phenomena, and relationships between them.

Such linkages include storm winds (natural) and beneficial or dangerous interventions of ancestors (spiritual). For example, it is not surprising that cyclonic west winds come in the strongest wind positions of the cyclone season (*Te Hakahiu* to *Te Tokelau*) (Fig. 5). But if a *Te Alunga* or *Te Tonga* winds are weak during the middle of the tradewind season, then it indicates that there has been disrespectful behavior toward ancestors. Ancestors include winds, rocks, stars, animals, and other natural

elements. So disrespectful behavior to these elements can cause climate change.

*Fig. 5(left): .
TNTM Diagram
Sunrise and
Sunset Positions
Annually.*

The late Te Alki Koloso Kahia Kaveia of Taumako told, and showed, me these explanations of *TNTM*. As a master of *TNTM*, Kaveia did a lot of “weather work,” e.g. prediction and modifications. Prediction included telling when the best wind for a voyage would come the next year. Modifications included stopping rain, and changing the wind position (but not the season). He also used *TNTM* to control dangerous seas, heal illnesses, plan ritual events, facilitate gardening, and control communications with colonial powers, (as Paramount Chief for about 35 years).

Kaveia remembered all this information, without making diagrams. But he invited and approved the diagrams I made. Furthermore he wanted them shared with his descendants who want to learn how Lata made voyages, and with anyone who wanted to learn how Lata found the way to other islands. Here are diagrams that my colleague, industrial designer Daniel Jackson, and I made to illustrate Kaveia's teachings about *TNTM*.

The head position of the system is named *Te Alunga*, which translates in English to "the pillow." In other words, *Te Alunga* is where you lay down your head. *Te Alunga* is also the defining wind position of the trade wind season, and its location on the horizon is where the sun rises during the winter solstice (Fig. 5). *Te Tonga* is a variation of what Hawaiians call *Kona* (Hawaiian Kumu, Roselle K. Bailey, pers. comm.), but since *Te Tonga* is a sunrise position it is not easy to know why it is linked with a term that is used for the dry west side of Hawaiian islands. Perhaps it is because when *Te Tonga* blows the west sides of island become dry. *Te Tokelau* contains the word *lau*, which translates to English as "strong." The strongest winds occur in *Te Tokelau*. Taumakans I asked did not know a translation for other wind position names. Kaveia thought that this could be because they were very old names. In any case many of these names were reported in 'wind compasses' reported throughout Polynesia and Indonesia.

TNTM Annual Sunrise and Sunset Positions

There are eight wind positions that traditional Taumakan voyagers use to keep track of at the sunrise and sunset positions during the year. *Te Alunga* is the wind position that the sun rises in at the winter solstice. When the sun rises in *Te Alunga* it sets between *Te Tokelau* and *Te Tokelau Palapu*. Later in the Trade wind Season, when the sun rises in *Te Alunga Tonga*, it sets exactly in *Te Tokelau*. Later yet, when the sun rises in *Te*

Tonga, it sets somewhere between *Te Tokelau Haka Hiu* and *Te Haka Hiu*. Lastly, when the sun rises in *Te Ulu Tonga*, it sets somewhere between *Te Tokelau Haka Hiu* and *Te Haka Hiu*.

The fact that when the sun rises in three out of four sunrise positions, the sun is observed to set in a range of positions, rather than just one position may not seem intuitive. However if one considers that the orbit of the sun is not circular, but elliptical, then it may be that when the sun is closest to the observer its movement along the horizon is more observable than when it is farther away. So maybe *Te Alunga Tonga* sunrise sets exactly in *Te Tokelau* because it is so far away and moving mostly away or toward the sun around the pointy end of the orbit, then we cannot observe its change of position along the horizon. Whereas when the sun rises in *Te Alunga* and sets between (and including) *Te Tokelau* and *Te Tokelau Palapu*, or when the sun rises in *Te Tonga*, or *Te Ulu Tonga*, and sets anywhere between (and including) *Te Tokelau Hakahiu* and *Te Hakahiu*, it is because we can actually see the change in position along the horizon when the earth is nearer to the sun in its orbit. In any case, the naked eye observations are correct.

TNTM Seasons, Solstices, and Equinoxes

According to *TNTM*, the tradewind season begins at the winter solstice and ends at the spring equinox. The cyclone season begins at the summer solstice and ends at the autumn equinox. The Gregorian calendar, that is commonly used by European-derived cultures today, is not useful when interpreting *TNTM* correlations. This is because the particular dates when the sun is overhead is different at different latitudes. So the actual month for making a particular voyage, or the length of a particular voyaging season, or gardening season, varies too. But the

solstices and the equinoxes never change. Thus these comprise the calendric structure of *TNTM seasons*.

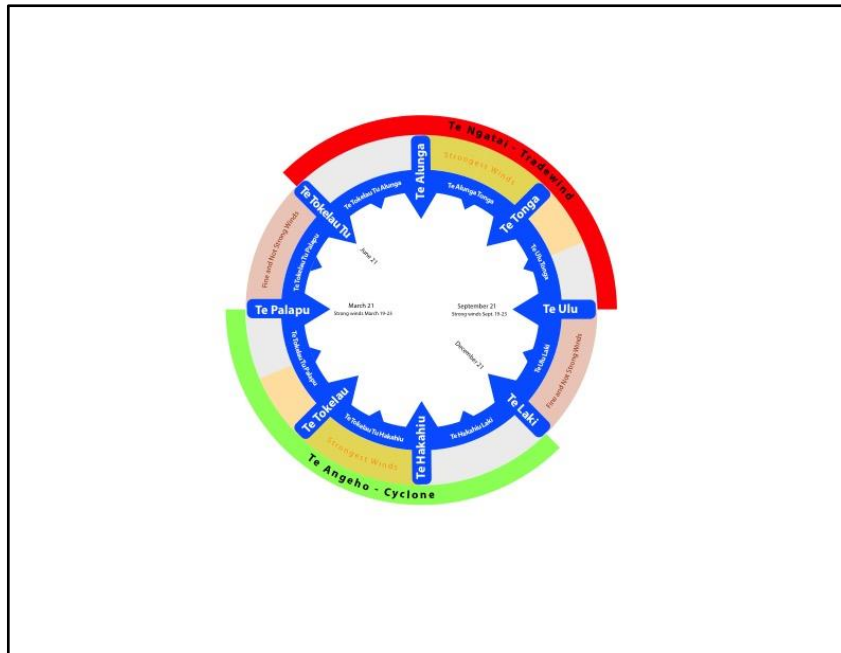


Fig. 6: *TNTM Diagram Seasons, Solstices and Equinoxes.*

The tradewinds start when the wind sits briefly in *Te Tokelau Tu*, and then moves clockwise to sit firmly in *Te Alunga* (Fig. 6). *Te Alunga* is regarded as the base position for the Trade wind Season. Any wind position from *Te Alunga*, *Te Tonga*, *Te Ulu*, and *Te Laki* are trade wind positions. During the period of time from the Winter Solstice to the Spring Equinox, the eye of the wind will shift gradually from *Te Alunga* to *Te Tonga*, *Te Ulu*, or even to *Te Laki*, and then shift back again to *Te Alunga*. But as the Trade wind Season progresses, the wind will sit for prolonged periods in *Te Tonga*. Toward the end of the season, the wind starts to sit in *Te Ulu*, and then moves into *Te Laki* before coming back to *Te Tonga* or *Te Ulu*.

During the cyclone season, from the summer solstice to the autumn wquinox, the wind sits between *Te Hakahiu Laki* and *Te Palapu*. As weather fronts move through, the wind position moves clockwise from position to position, returning to *Te Hakahiu Laki* early in the season, and

then only returning to *Te Tokelau*, then only to *Te Palapu*, and finally moves into *Te Tokelau Tu* when the tradewind season is beginning again.

Taumako Model of Wind Patterns, and Human Modifications

The ancient model of seasonal and inter-seasonal wind shifts is that there is a person who, like Lata, stands in the middle of all the wind positions (Fig. 7). This person, according to Taumakans, is like anyone who has an interactive relationship with the elements, like wind. That is, anyone can modify the positions of the wind, as Lata did, and Lata's descendants, do today.

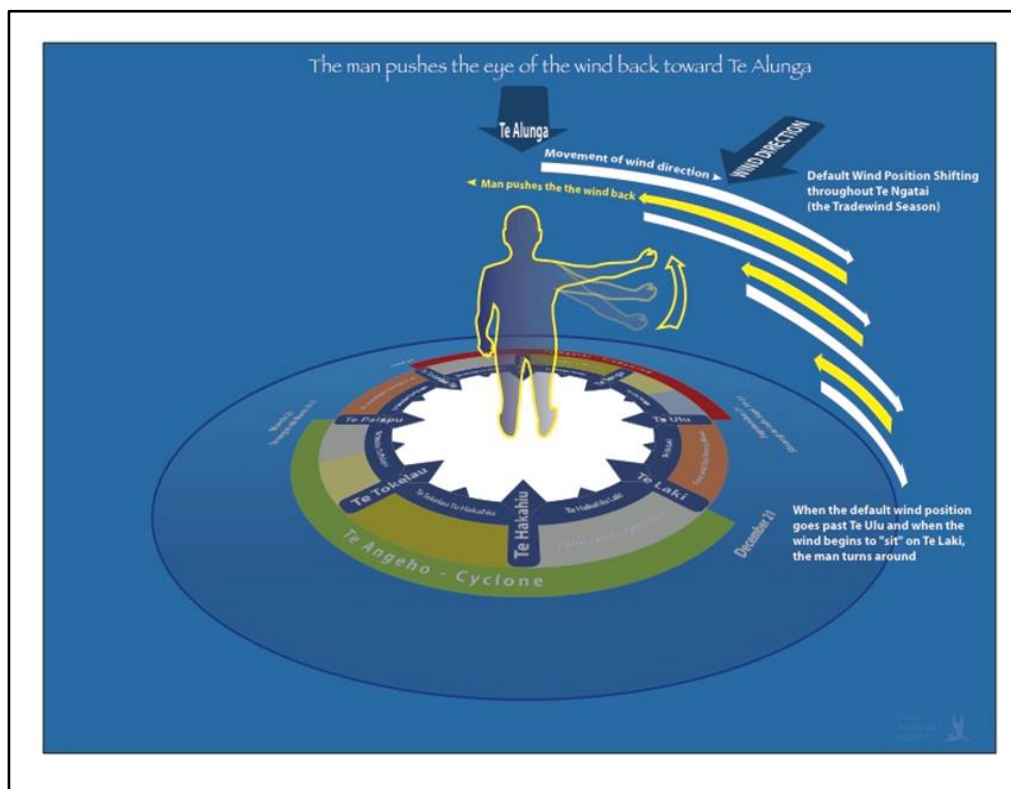


Fig. 7: TNTM Diagram Lata Pushing the Wind Back.

When the wind sits down in the primary positions of the Trade wind or the cyclone season (i.e. *Te Alunga* for the tradewind and *Te Hakahiu* for the cyclone) then the person waits for the wind to move clockwise to other positions. Each time it does this, the person pushes the wind back

(counterclockwise) to *Te Alunga* or *Te Hakahiu* (depending on the season).

But as the season progresses the Lata-like person in the middle (which is identified as a “man” in the diagram, but is not necessarily gendered) is not able to push the wind all the way back to the starting position of each season. So, for a long time the person can only push the eye of the wind back to *Te Tonga* (for the trade wind season), or back to *Te Tokelau* (for the cyclone season). Eventually, when it is getting close to the next equinox or solstice, the person will be unable to push the wind back to *Te Tonga* or *Te Tokelau*...or even back to *Te Ulu* or *Te Palapu*. So then, the wind will eventually move past *Te Hakahiu* and out of the tradewind season positions, or past *Te Palapu*, and out of the cyclone season positions. Then the man (probably Lata) will have to turn 180 degrees around and begin to push the wind back to the base position of the next season. So the person who pushes the wind back turns his/her own body clockwise twice a year to keep modifying the wind positions and the seasons. This person is spiritually skilled in relationship to weather, and has the ability to modify, but not completely control weather patterns.

This model recognizes that some people have useful relationships with weather. This model is also very like the meteorological model of the way systems moving through a location during seasons. As the location of highs and lows shift with time during a season the wind rose positions experienced at any location in the southern hemisphere tend to shift in just the way the Taumako model describes.

***TNTM* Voyaging Routes between Islands**

Sailing vessels need to have the wind come from favorable directions and not be too stormy to sail to other islands. Taumako voyagers choose wind

positions that are most reliable and that come from the side of, or from behind, the vessel (Fig. 8).

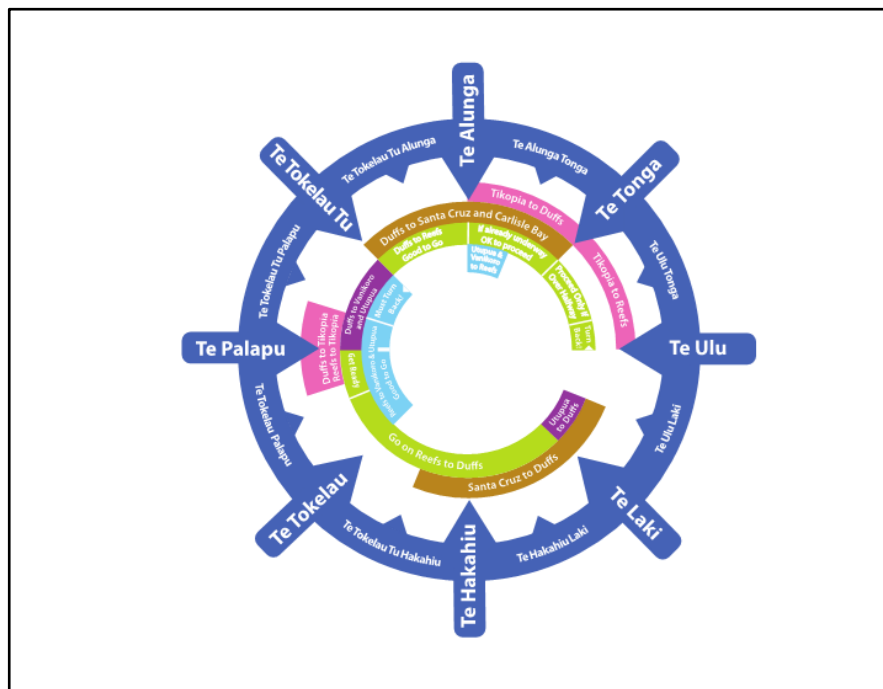


Fig. 8: TNTM Diagram Inter-Island Routes.

Routes between islands are linked with wind positions needed for those routes. TNTM way finders set off on a given route only when the wind sits (*noho*) in the right position for that voyage. For example, to voyage from Taumako to Tikopia or Vanikoro, the wind must come from *Te Palapu*, and it must come sometimes in November. No other wind position is reliable for that route. But for voyaging from Taumako (Duffs) to Reefs, any wind position from *Te Alunga* through *Te Tonga* is good, and these occur during the trade wind season.

Rises and Sets of Asterisms Useful for Navigation

The rises and sets of asterisms (stars, star groups, dark cloud shapes, or other celestial bodies) occur in certain wind positions (Fig. 9). When various asterisms are in these wind positions they are useful for navigation. Each of the named asterisms is the lead asterism in a star path

comprised of other un-named asterisms that rise and set in the same wind positions. Each of them also has an opposite partner asterism. When one of the partners rises higher above the horizon the other is falling closer to the horizon, or is below it. But some asterisms are used for way finding during some of the months when they are not seen above the horizon at all...such as Hetu Mdavo (the Pleiades).

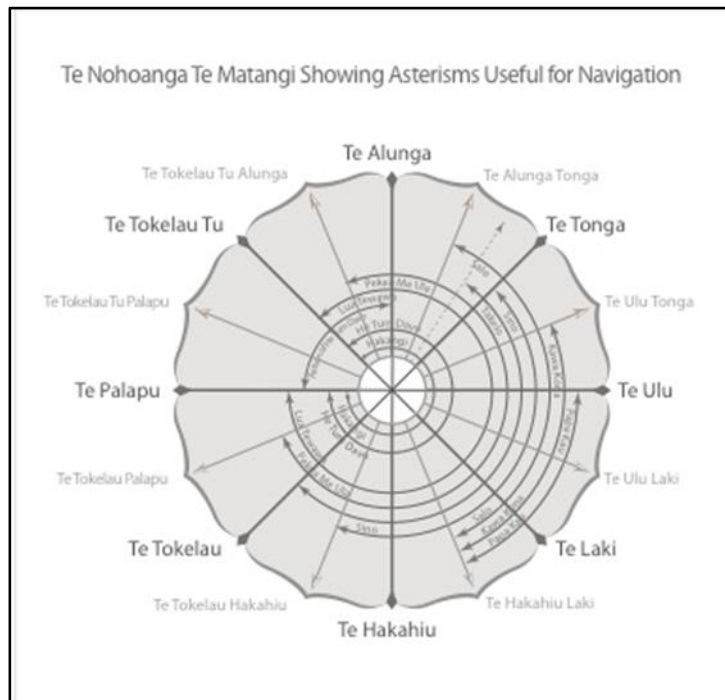


Fig. 9 (left): TNTM Rises and Sets of Asterisms Useful for Wayfinding.

The opposite partners Takelo (Orions belt on far right) is going to set, while Salo Lavo (top 7 stars of Scorpio on far left) has just risen (Fig. 10). In this diagram there are note about the weather that occurs when some of

these asterisms rise or set, such as the rises or sets with specific wind positions and weather.

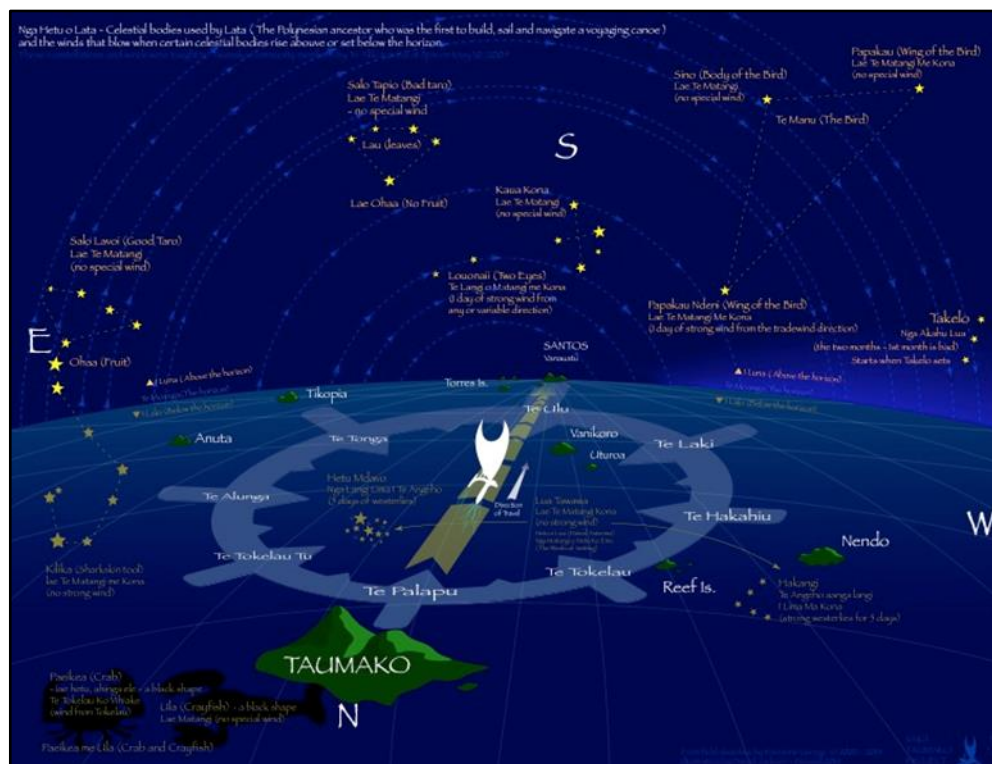


Fig. 10: TNTM Asterisms/TNTM Miles-High View Diagram.

Conclusion

Interrelationships have been briefly presented here that are part of a body of knowledge of Taumaka voyagers. These relationships are between wind positions and weather, rises and sets of asterisms, (including the sun, the stars and star groups, and the solstices and equinoxes), seasons, and specific routes between islands. There is specificity, complexity, and layering of natural patterns, and there are spiritual relationships between the voyagers and the elements. These are correlated and calibrated in the mental model of Lata's *TNTM* wayfinding system (Fig. 11).

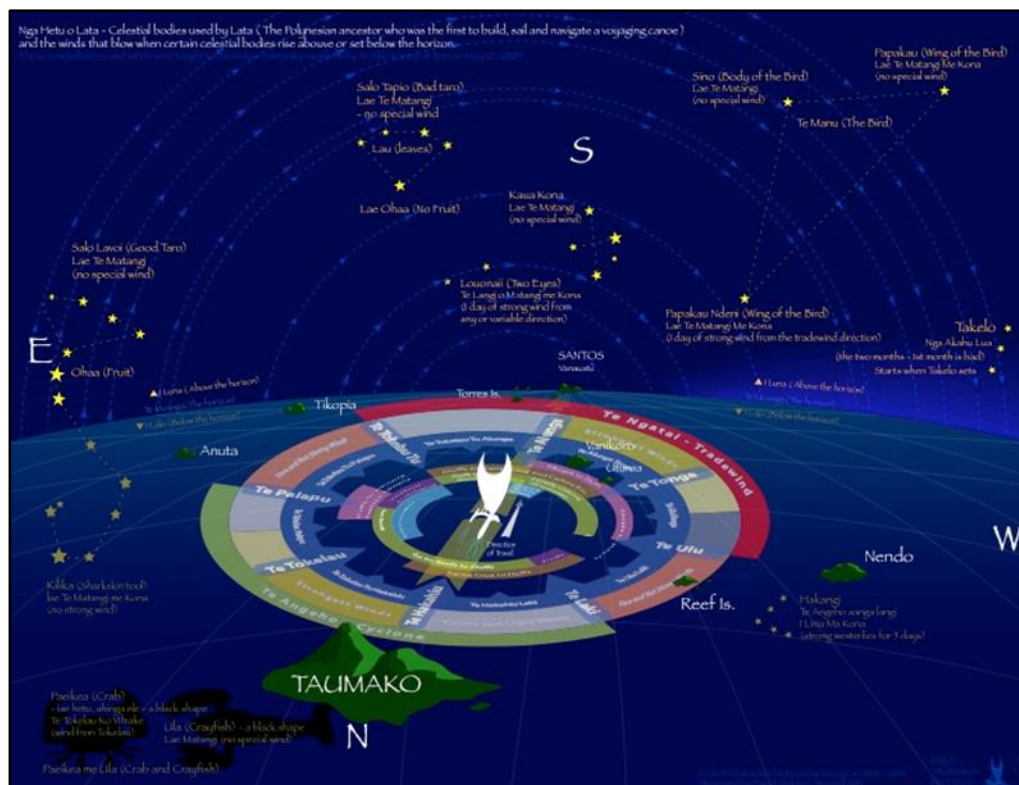


Fig. 11: TNTM Diagram Combination of Diagrams 3-10.

There are many more types of phenomena included in *TNTM* voyaging knowledge, including swell patterns, *Te Lapa* (George, 2012), signs by animals, plants, and atmospheric phenomena, as well as complex protocols involving respectful spiritual behaviors.

As scientists seek to further define the causes and effects of climate changes, the systematic knowledge of ancient voyaging cultures has value as baseline data about natural patterns and events, including relationships between spiritual knowledge and natural phenomena.

References

- Dow, K. Ebi, K. Kunkel, K. Mearns. K, Mearns. Melillo, J. 2012.
<http://nca2014.globalchange.gov/report/response-strategies/research->

Genz, J. H. 2016. Resolving Ambivalence In Marshallese Navigation: Relearning, Reinterpreting, and Reviving the “Stick Chart” Wave Models. *Structure and Dynamics*, 9(1) University of Hawai’i at Hilo.
<http://escholarship.org/uc/item/43h1d0d7>

George, M. 1999. July. “The Return of Lata” *Sailing New Zealand* Vol. 38.

George, M. 2012. “Polynesian Navigation and *Te Lapa* – “The Flashing” Time and Mind: *The Journal of Archaeology, Consciousness and Culture*. Vol 5 Issue 2. pp. 135-174

Leach, F. and Davidson, 2014. J. *Archaeology on Taumako: A Polynesian Outlier in the Eastern Solomon Islands*. Archaeology Laboratory, Museum of New Zealand, Te Papa, Tongarewa

Lewis, D. H. 1996 (1972). *We, the Navigators: The Ancient Art of Pacific Landfinding in the Pacific*, Honolulu, HI: University of Hawaii Press

Alexander, C. Bynum, N. Johnson, E. King, U. Mustonen, T. Neofotis, P. Oettle, N. Rosenzweig, C. Sakakibara, C. Vyacheslav, S. Vicarelli, M. Waterhouse, J. Weeks. 2011. “Linking Indigenous and Scientific Knowledge of Climate Change” *BioScience* (2011) 61 (6): 477-484.
<https://doi.org/10.1525/bio.2011.61.6.10>

Biography:

Marianne “Mimi” George, Ph.D, a remote-ocean sailor and cultural anthropologist, who supports revival of ancient voyaging practices that enable sustainable and peaceful interactions. George researched spiritual power and female imagery in the ritual cycle of an Austronesian people in New Ireland, Papua New Guinea, the experience of a small, mixed gender, group, in prolonged isolation, wintering-over a sailboat in Antarctic sea-ice to do science, the spiritual connections of sea-hunters and herders across Bering Straits, and the efforts of SE Solomon Islands Polynesian elders and their students to build and navigate using only ancient materials, designs, and methods, and re-establish voyaging networks to share and maintain resources.

