POLYNESIAN ORIGINS OF THE MĀORI IN NEW ZEALAND AND THE SUPERNOVA RX J0852.0-4622 / G 266.2-1.2 OR MAHUTONGA

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Abstract

The initial standard narrative of how New Zealand was thought to be settled by a relatively small number of Polynesian people over centuries of gradual adaption grew from the estimates of genealogical reckoning or whakapapa and formative radiocarbon dating chronology.

A new strategic migration model validates a rapid mass translocation from Hawaiiki in the late 13th century and that the incentive for the migration likely was motivated by charismatic authoritarian 'mana' individuals or an unknown 'starburst' event.

Research retrieved into past cosmogenic structures in southern Africa together with known medieval comparitive indigenous knowledge data, reveals evidence that the Great Enclosure structure at Great Zimbabwe was possibly a cosmic reference to a unique astronomical incident with unverifiable sources and mainly non-literate oral narratives that offer inadequate validation.

An uncatalogued supernova remnant RX J0852.0-4622 / G 266.2-1.2 in Vela has now been verified by a Japanese eyewitness account as visible in 1271 and is most likely Mahutonga – the star that disappeared in the oral tradition.

This extraordinary star may have been the primary instigator for extensive translocation south-westwards to New Zealand from Hawaiiki, similar to the formation of Great Zimbabwe that likewise 'followed a star' relating to the nearest, brightest and most recent supernova that disappeared.

Keywords - Hawaiiki, RX J0852.0-4622, G 266.2-1.2, Migration, New Zealand, Nichiren, Mahutonga, Polynesians, Māori, Great Zimbabwe, Indigenous knowledge, History of Astronomy, Te Manu-i-te-ra, Korotangi.

Background

Throughout the past few decades New Zealand was regarded as being occupied gradually by Polynesians who established themselves eventually as the Māori and who left their homeland islands called 'Hawaiiki'.

Various factors together with the introduction of radiocarbon dating led to a variety of ideas of how and when this happened. Archaeology together with oral tradition led to concepts of an initial 'Archaic' settlement followed by a steady recent influx of Polynesian navigators (Barlow 1994; Metge 1976; Duff 1942; 1950; Rivers 1910; Anderson 1991; 2003; 2006; 2014; Walter et al., 2017).

The new 'strategic migration' model provides a different perspective that New Zealand was likely a planned objective for a mass migration from Hawaiiki after a prior initial reconnaissance a few decades earlier (Jacomb et al., 2014; Walter et al., 2017).

This model formulates and scrutinizes the archaeological record, canoe traditions and genetic relationships of the possible known original island populations and how these compare with the earliest settlements and eventual colonization of the Polynesians in New Zealand (Allen & Steadman 1990; Conte & Molle 2014; Emory & Sinoto 1964; Rolett 1998; Sinoto 1979; Sinoto & Kellum 1965; Suggs 1961; Walter 1998; Walter et al. 2017).

The reasons for the sudden and rapid departure from Hawaiiki to embark on the conjectured tremendous enterprise are addressed by oral narratives that relate extraordinary charismatic and unusual 'mana' (authorities) individuals that may have induced the exodus in the early 14th century (Walter et al. 2017) similar to those seen historically in the 19th century Māori leaders Te Rauparaha (Burns 1980; Te Rauparaha & Butler 1980) and Te Kooti (Binney 1995) or as a result of an unknown 'starburst event' (Anderson 2017:224; Orchiston 2017:70)

A similar mass movement is recorded in the oral traditions of the establishment of Great Zimbabwe in southern Africa (Arenstein & Hamese, 2000; Mathivha, 1992; Müller, 2000; Van Warmelo, 1940; Wade, 2009; 2015; Wade et al. 2014), where specific cosmogenic origin narratives describe how various settlements were built by the original population en route to their arrival and establishment of the Great Zimbabwe cultural complex. The general direction was coincidentally south-westwards and speaks of how they followed a star which encouraged them to continue making new settlements until the star disappeared (Mathivha, 1992; Wade 2015).

The Great Enclosure at Great Zimbabwe was established over roughly two hundred years which has various astronomical features embedded in the architecture that together with their descendant legacy of a vast astronomical knowledge indicates that a cosmic reference was formulated when they erected a massive wall and large Conical Tower at the Enclosure that dates to the late 13th century (Vogel 1998; Huffman & Vogel 1991; Wade 2015).

Subsequent astronomical surveys indicate that monoliths on the Main wall may have aligned with a portion of the movement of the Venus synodic period that relates to predictability of conception to birth, that a Platform Area aligned a Small Conical Tower with the vernal and autumnal equinox sunrises and that the Platform Area similarly aligned with the Large Conical Tower and the disappeared star or supernova remnant RX J0852.0-4622 / G 266.2-1.2 known as an 'Ndoro' (Aschenbach 1998; 2017; Aschenbach, Iyudin & Schönfelder et. al., 1999; Wade 2015).

The supernova remnant RX J0852.0-4622 / G 266.2-1.2 in Vela was recently confirmed by a Japanese eyewitness account found to exist in 1271 and is most likely Mahutonga – the star that disappeared in the Māori oral tradition (Aschenbach 2017; Wade 2015; Orchiston 2000, 2002; Harris et al., 2013; Green and Orchiston 2004; Stowell 1911, Best 1955).

This extraordinary bright orb of light may have been the primary instigator for an extensive translocation south-westward to New Zealand from Hawaiiki, similar to the formation of Great Zimbabwe that likewise 'followed a star' that disappeared (Anderson 2017; Walter et al., 2017; Green & Orchiston 2004; Tanabe & Tanabe 1989; Tanabe 2002; Watson 1993; Wade 2015; Wade et al., 2014).

Mahutonga

Mahutonga is known to the Māori as "… a star of the south that remains invisible" (Best, 1955, p. 46).

The location of Mahutonga is thought to be the overall region of the Southern Cross (Orchiston 2000, 2002; Harris et al., 2013; Green and Orchiston 2004; Stowell 1911, Best 1955).

"Mahu is the name of the Magellan Clouds at Tahiti, and Mahutonga is a name for the Southern Cross… Hurae Puketapu tells us that he knows Mahutonga as an atua, a supernormal being, and quotes a saying concerning him that apparently alludes to the c.p. constellation of the Southern Cross. What genuine Māori word originally occupied the place of the abominable term rauna in that sentence we cannot say. The modern Māori uses rauna to denote "round," "to surround," "encircle," "encompass." …. "Regarding Mahutonga; I never heard that he came hither on one of the vessels. There is but one saying concerning him in these parts, namely that he was an atua [spirit god, supernatural being] and a saying is: 'Mahutonga who encircles the world; whose tokens are at Te Mahia.'" (Best 1926:94)

New Zealand was assumed to have been settled by the Māori ca 1000 C.E. but this chronology has changed to the beginning of the 14th century and a tentative date of 1280 C.E. by revised archaeological research (Lowe 2008).

Mahutonga was most likely a supernova that was seen by the Polynesians who arrived at New Zealand as there are no known records of Mahutonga that exist in the communities on the islands that the Polynesians departed from nor any other likely supernova remnant candidates in the overall Crux region, therefore Mahutonga can be dated to their arrival or sometime after (Wade et al., 2014:83-84; Wade 2015: 141,159).

There is no bright star like the polar star in the southern most sky zone and the pointers α and β Centauri to the Southern Cross (Crux), Canopus and the False Cross are the only truly bright stars that make up recognizable configurations in that region. The Māori oral tradition makes no real distinguishing different references between the Southern cross (Crux) and the False Cross (made up by Carina and Vela) and the 'error box' of Māori astronomers may have extended to a wider area when referring to Mahutonga as being in the Southern Cross (Green and Orchiston 2004; Orchiston 2000, 2002).

Best gives various names for the Southern Cross and specific names for the Coal Sack and Crux as all being the same: -

"Kahui o Mahutonga Southern Cross. (Stowell.)
Kahui-ruamahu Southern Cross. (Stowell.)
Te Putea iti a Reti Southern Cross. (Stowell.)
Taki o Autahi Southern Cross. (Stowell.)
Te Whai a Titipa? Southern Cross. (Stowell.)
Mahutonga Star of the South (invisible). (Stowell.)
Mahutonga ? Southern Cross. See under "Kahui."
Manako-uri The Coal-sack. (W.)
Patiki, Te The Coal-sack.
Rua-patiki, Te The Coal-sack.
Rua o Mahu, Te The Coal-sack. (Stowell.)
Whai-a-titipa, Te The Coal-sack. (W.)
Naha The Coal-sack. (W.)

The word mahu appears somewhat often in star-names. One gives Mahutonga as a name for the Southern Cross, which does not seem to have been confirmed.

Stowell seems to give Mahu and Mahutonga as names of a star of the south that remains invisible, and the Kahui o Mahutonga, or Flock of Mahutonga, as a name for the Southern Cross; while the Coal-sack is the Rua or Pit of Mahu—presumably *the place originally occupied by that erratic orb. Tuhoe gave Mahutonga as a star-name, but with no explanation.*

At Horne Island (Futuna) Maafulele is a nubulæ west of the Magellan Clouds, while Maafu-toka is one cast of them. At Tahiti Mahu-ni'a is the upper Magellan Cloud, and Mahu-raro the lower one.

This causes one to wonder if an error has been made in identifying the two Futuna names in the Kauwae runga published by the Polynesian Society Rua-mahutonga is described as "the home of the winds."

The Magellan Clouds are called the Mahu at Tahiti, and Ma'u at the Cook Group, where the word is also employed as a month-name. A saying recorded by Mr. White states that they are the children of Matiti—of whom more anon". (Best 1955: 30 - 38)

Best (1955) drew and shared oral tradition references from Stowell (1911) and Stowell confusingly adds that the Southern Cross is Te Pūtea-iti-ā-Reti (Tamarēreti) which he elsewhere says is the False Cross: -

The constellation of the Southern Cross is known as Te Pūtea-iti-ā-Reti (Tamarēreti), and also as Te Kāhui Rua-Māahu. This "Maahu" is the star of the South which: "has left its place in pursuit of a female. When it secures the female, it will come back again to its true home." The Coal-sack is known as Te Rua ō Māahu, or, the Pātiki. (Stowell 1911:202-203)

Kā ngaro ko Māahu-Tonga - Maahu-Tonga is invisible (the star of the South) … Te Kāhui Rua-Maāhu. Te Rua o Māahu-Tonga - the group (adjoining) Maahu's chamber (the Southern Cross). (Stowell 1911:208-209)

RX J0852.0-4622 is roughly two hand widths (20°) away from the Crux 'error box' zone and any bright object seen in that zone possibly would have been referred to later as having been closest to the only distinctively recognizable stellar configuration which is Crux. It would be too literal to give an exact position to the origin narratives and likewise later oral traditions leave little room of comparisons between the False Cross and the True Cross.

Orchiston and Green could not find any 'recent' supernovae that existed within the last thousand years in the 'error box' zone as RX J0852.0-4622 / G 266.2-1.2 is still uncatalogued (Green and Orchiston 2004; Orchiston 2000, 2002) and classification of the uncatalogued supernova remnant will only be changed by the newly found eyewitness accounts. A transient star outburst of η-Carinae is another possible event of significance that may have been recorded in the oral traditions (Hamacher & Frew 2010).

Te Manu-i-te-ra

Stowell (1911) particularly mentions that there is a difference between Tama nui te ra and Te Manu-i-te-ra and should not be confused; "*Tama nui te ra, illustrious son (of) the day; ruler of the day; sungod; emblem of light, life (not to be confounded with Te Manu-i-te-ra, a comet).*" (Stowell 1911: 118).

Te Manu-i-te-ra is translated by Stowell as being a 'comet'.

"*A comet was known scientifically as a Pu-ihiihi-rere. A Pū-rere-ahu; and au-ahi-roa; (embryonic fire-current); names indicating its cometary character. A comet is also familiarly known as "Te Manu I te Ra," or, the Bird at the Sun. What European* *knows a "double tail," the Maori preferred to describe as wings. Therefore, the reference to "the bird," winged bird. There is reason to believe that Halley's comet is known to the Maori under the proper name of Rongo-mai. That the Maori apprehended some danger from the close presence of a comet is shown by the caution: "Kei werohia kōrua ē nga hihi o Te Manu-i-te-Rā," or, Be careful, lest you two be pierced by the bright points of the bird at the Sun. Children were taught to call a comet Upokoroa, or, Long-head.*" (Stowell 1911:199-200)

The name Te Manu-i-te-ra is given to a cosmic object that emulates a comet but in regard references to Mahutonga is elsewhere referred to as a 'star'. It is seen as the 'progeny' of Tama-nui-te-ra and the Marama-taiahoaho, i.e. the Sun and the Moon and given the name - Bird in the sun or Bird at the Sun.

Best (1955) indicates how the Polynesian navigators used the stars in the direction that was followed in their voyage from Hawaiiki. Interesting to note that he asks when precisely they would have used the star or other body they followed. In many respects of Polynesian exploration migratory birds were also used to direct navigators to unknown islands (Walsh 1905).

Best further states that the prow was kept to the left of Venus and the Sun going south-westwards:

"*A remark that occurs in this story is as follows: Carefully keep the prow of the vessel laid on Venus during the night; during the daytime follow behind Tama-nui-te-ra (the sun)."*

But what puzzles the ignorant person (such as the writer) is at what juncture in the movement of a star or other body on its course did the steersman commence to steer by it. The course would be about south-west on the voyage to New Zealand, and the heavenly bodies have a pernicious habit of rising in the east. At what point were they utilized?

Another account says that the prow of the vessel was kept to the left of the sun or Venus; but unless these bodies were in a certain position the hapless voyagers might still be wandering about the ocean, or haply might have colonized South America. The explanations of Māori deep-sea navigation call for further information.

The sailing-directions laid down by Kupe, who is said to have been the first Polynesian voyager to reach New Zealand, seem to be fairly explicit. They are as follows: "Keep the sun, moon, or Venus just to the right of the bow of the vessel, and steer nearly south-west." This voyage to New Zealand was made in November or December, and Mr. S. P. Smith tell us that the true course from Rarotonga to Auckland is about S. 56 W., or S.W. by W." (Best 1955: 29).

Another reference of the direction to seek a new home presents the concept that the Sun and Moon have a 'little sun' as progeny. Could this be the supernova that would have been seen in 1271 as per Fig 2?

"*We have seen that Tama nui te ra is a personified form of the sun. An old saying was, "When Tama-nui te ra rises, the heavens are light." When the ancestors of the Māori left the homeland of Irihia to seek a new home across the ocean, their leader said—"Me whai tatou i a Tama nui te ra." ("Let us follow the sun"), meaning the rising sun. This name is not applied to the setting sun.*

*When Roiho, one of the celestial beings, announced that the heavenly bodies were about to be placed in position, he said:—"Light is coming in the form of Tama-nui-te-ra and the Marama-taiahoaho (refulgent moon), and the breast of our father will be dotted with the '**little sun**' progeny."*

*When the Takitimu canoe sailed from Eastern Polynesia for the shores of New Zealand, their sailing instructions were, "Carefully keep the bow of the vessel on Kopu (Venus) during the night; in the day time follow behind Tama-nui-te-ra… A few brief allusions to this name are met with in Māori myth, as also in the saying:—"Hoatu! Tenei ano to taua tupuna, a Te Manu i te ra, e tu iho nei." ("Move on! Here is our ancestor, Te Manu i te ra, high in the heavens.") Apparently this name, the **Bird in the sun**, is applied to the sun, but we have gained no explanation of it.'"* (Best 1923:108)

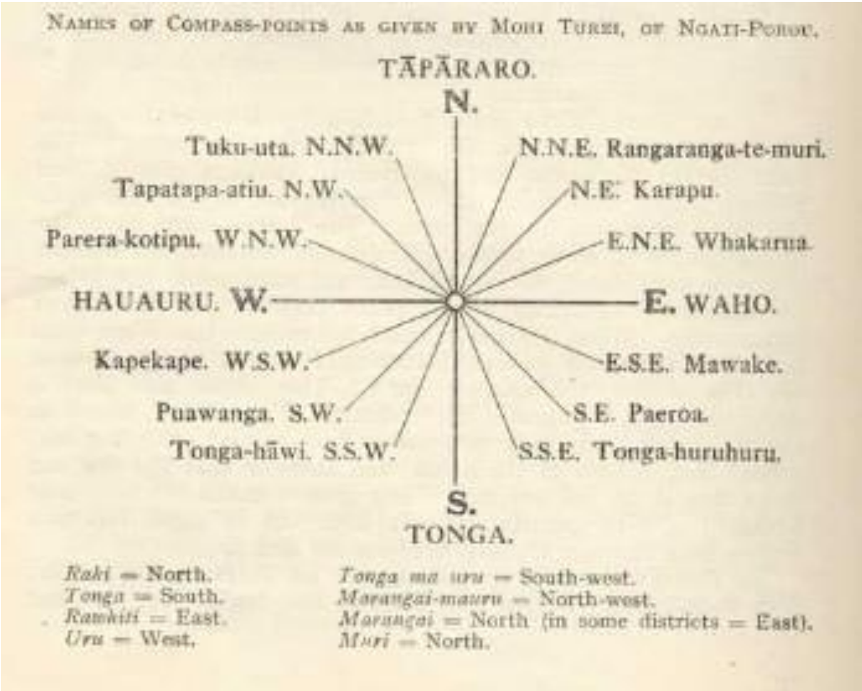

Figure 1 The old Māori voyagers were also compelled to closely study the winds. Few compass-points have specific names; in most cases the wind-names were employed as such Mohi Turei gave names for sixteen points, but Gill published a list of thirty-two points as known at the Cook Isles, each with its proper name (Best 1955: 30).

Computer simulations (Myers & Braganza 2009) indicate that RX J0852.0-4622 would become visible almost at the horizon as the sun set below the sea-horizon from June but optimally from August in 1271. It is below the horizon at sunset from September. Initially it would be seen in the day for a few months.

In August, September and October of 1271 the Moon was seen at sunset on the horizon from the Cook Islands and RX J0852.0-4622 was roughly 55° to the left of the Sun and Moon at sunset (see Fig 2).

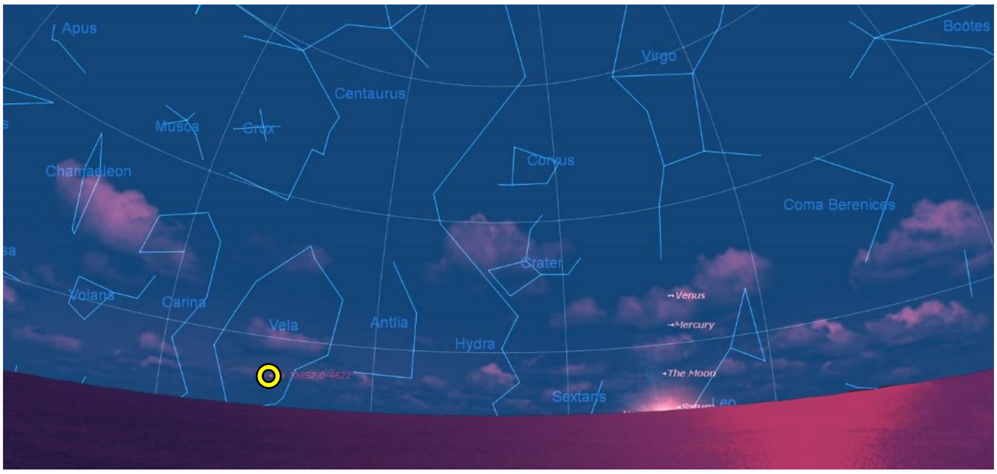

Figure 2 RX J0852.0-4622 or Mahutonga (yellow circle) as was seen from Avarua Cook Islands at sunset on the 7 Aug 1271 18h30. Above the setting sun in this simulation are Mercury, the Moon and Venus. The Legendary Kupe's words were apparently: *"Keep the sun, moon, or Venus just to the right of the bow of the vessel, and steer nearly south-west.'"* (Best 1955: 29) making the ideal direction from Cook Islands as 222°- 225°. (Courtesy Starry Night Pro - Simulation Curriculum version 6.4.3pe EW 1997-2009).

Korotangi

A stone carving of a strange bird that was brought to New Zealand on one of the earliest canoes to arrive from Hawaiiki was lost and when it was rediscovered the Māori recognized it as Korotangi that is considerably revered in their heritage (Wilson & Tregear 1887; MacKay 1973).

Te Manu i te ra (the Bird in the sun) is also known as Mahutonga (a star of the south that remains invisible) and reveals a venerated Māori oral tradition of a bird that disappears which is the offspring of the Sun and the Moon (Tama-nui-te-ra and the Marama-taiahoaho) (Best 1923:108).

The sacred Korotangi legacy epitomizes, in stone, the concept of a supernatural mythical star or 'atua' (supernormal being) that became invisible and alludes to the concept that the Bird in the Sun disappeared after it was brought to New Zealand. It is highly likely that the stone carving was buried intentionally to remain invisible like its celestial counterpart.

The traditional sacrosanct song of Korotangi deals with a mythical bird being that is cherished, lost and deeply mourned - "*Keen is the sorrow, O my bird, for thee!....When, when wilt thou return To me? Where is Korotangi absent?.....Thou wert the guardian of our treasures, and the theme of many conversations on many heights of numerous village homes. Now what remains? We'll ask for thee of Kawatepuarangi.*" (Wilson & Tregear 1887: 500-501).

Figure 3 The Korotangi serpentine bird sculpture unearthed at Kawhia New Zealand in 1878 and claimed as being a lost talisman that had accompanied the migration canoe called Tainui circa 1300A.D. (Wilson & Tregear 1887; MacKay 1973) cf Christine McKay, Dominion Museum monograph, New Zealand, 1978. Photo Credits - Alexander Turnbull Library Pacoll-6585-46 from National Library. Waikato Times. Karla Akuhata 09:50, Aug 08 2011 http://www.stuff.co.nz/waikato-times/life-style/waikato-focus/5398839/Time-for-stone-bird-to-give-back-mana

Great Zimbabwe Cosmic Reference

A distinctly significant alignment is made between the Platform area at the Great Enclosure with the supernova remnant RX J0852.0-4622 and the large conical tower. In computer simulations, the luminous RX J0852.0-4622 would have risen directly over the conical tower in about the mid-13th century and then proceeded in line with the tower, on its vertical journey for most of the late evening and set at dawn, in alignment with another monolith on the western side of the main wall, for a few months in a year (Wade 2015:136).

There exists a geomythology amongst the descendants that the people followed a ‘star’ and established settlements on route in the direction of the setting supernova remnant. The ethnography of the descendants of Great Zimbabwe conceives this ‘star’ as an Ndoro which was regarded as a round and shining object and later reflected as a star or blaze and is found in the rock art and certain artefacts as a dot within concentric circles (Mathivha 1992; Wade et al., 2014; Wade 2015:138-140; Muhlanga 1926; Chigwedere 1996; Frobenius 1923, 1931:166-168; Von Sicard 1951:15-17, 1966):

> *“He (Mhani) was guided by a star which came every evening and showed the direction. They followed the star until the star stood on top of the little hills of Zvishavane. Here the community settled under the Kingship of Mhani…In Zvishavane King Shabi of the Mhani tribe ruled for a long time but all the time the star came in the evening reminding them that Mwari* (God) *was not satisfied with the place where they should settle permanently. One evening they set out and followed the star in a Southern direction until the star reached the mountain where it stood on the mountain…During the evening on the hills the star shone showing that they had not arrived at the place where Mwari the God of heaven had directed them to go… They crossed the river and established a city on the mountain and in the valley. Tovakare Muzimbabwe became the ruler in the settlement. The*

settlement was named Zimbabwe after the founder…The Zungunde suburb with its sub-suburb the Ngavi increased in the popularity and ruled the city of Zimbabwe until a catastrophe happened in the city... The Mhani being the next in the succession of the leadership of the Basena decided to leave the city because the star which was seen when the Basena were settled at Gokomere led them Southwards… all decided to follow the Mhani in a Westerly direction under the guidance of a star… Mberengwa Hadzhi followed the star down south until the star stood on a mountain on which Mberengwa established his village. After the establishment of this village the star never came back since then in Mberengwa…" (Mathivha 1992)

According to the astrophysical data the 'supernova remnant' RX J0852.0-4622 was likely luminous and occurred when the large conical tower and Main Wall of the Great Enclosure were constructed 1320 +/- 30 C.E. Corroborative ice-core data reveal that nitrate peaking appears at depths corresponding to known supernovae with two different abundance spikes dated to be within the range of 1070 ± 10 C.E. and 1320 ± 20 C.E. (Huffman & Vogel 1991; Burgess and Zuber 2000; Watanabe et al.,1997; Motizuki et al., 2009, 2011, 2014; Dreschoff & Laird 2006).

Furthermore, the later related descendants formed a vast socio-political belief system as a result of a super-bolide airburst in 1944 that reinvigorated their ancestral stellar migration theology into one of the largest rapidly growing religious groups that has been established with approximately forty-five million followers in southern Africa as a result (Wade 2009; 2015; Wade et al., 2014).

Great Enclosure

In particular, the structural / stratigraphical and archaeoastronomical alignment analysis of Great Zimbabwe's Great Enclosure proved statistically significant (Wade 2015:24-48). Great Zimbabwe's Great Enclosure was initially built with an inner zone of structures, walling and the small conical tower that preceded the final walling and Large conical tower by almost two hundred years. A specific platform as observation point was used to align the small conical tower with the equinoxes. Stelae placed in the outer wall replaced the celestial positions on the horizon of planetary movements, the sun and the moon and the large conical tower still provides a cosmic reference to the now non-luminous supernova remnant RX J0852.0-4622 also known as Vela Jr. The outer wall and large conical tower were erected circa 1320 +/- 30 C.E. (Huffman & Vogel 1991: 61-70; Wade 2015).

The supernova remnant was discovered by Aschenbach in 1998 (Aschenbach 1998) from the ROSAT All-Sky Survey data and the gamma ray emissions from the decay of ^{44}Ti nuclei using the Imaging Compton Telescope (COMPTEL) (Iyudin et al., 1999) the study of Vela Jr. is complicated by the high background emission created by the larger Vela supernova remnant which masks Vela Jr. To date the distance and the age of the remnant were inconclusive and unknown with estimates of 200 parsecs or 600 light years about 700 yrs ago) (Aschenbach 1998; Irion 1998).

Supernova Remnant RX J0852.0-4622 / G 266.2-1.2

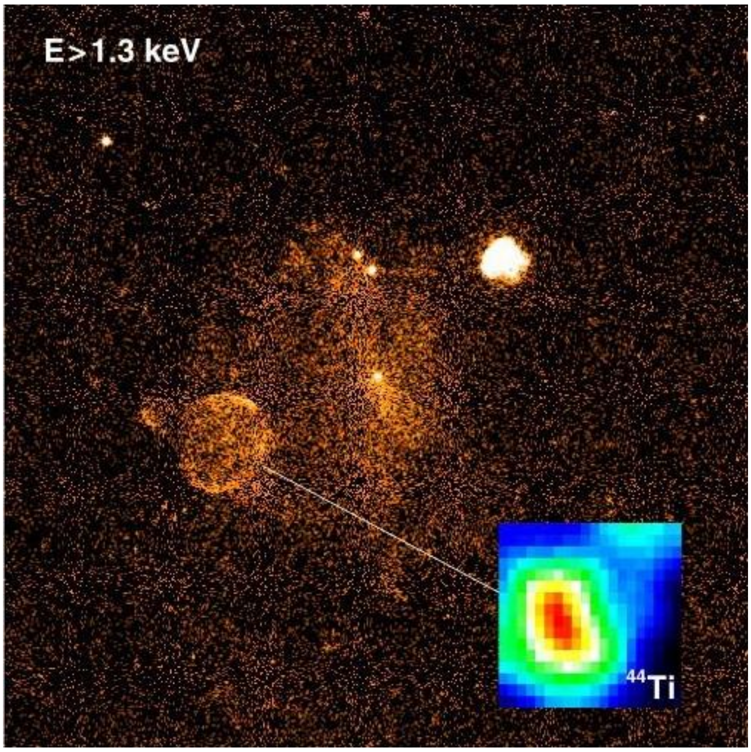

Figure 4 The image shows a ROSAT picture of the Vela supernova remnant in X-rays with energies >1.3 keV. This supernova remnant is visible around the centre of the picture as an extensive emission region. The bright spot on the right side above the centre of the picture is the supernova remnant Puppis-A. The ring-like structure at the bottom left is the recently detected supernova RX J0852.0-4622 (Aschenbach 1998). From the same spot the signature of a gamma-ray line at 1.157 MeV was measured which comes from the radioactive decay of ^{44}Ti (Iyudin et al., 1999). The corresponding skymap is shown at the bottom right (black/blue means low, red maximal gamma-ray line emission). With the obvious assumption that both discoveries refer to the same object an age of about 700 years and a distance of about 200 pc can be derived making this the closest supernova remnant in recent history. Front Cover of the Max Planck Extra-terrestrial Physics Institute - Jahresbericht 1998 / Annual Report 1998. http://www.mpe.mpg.de/JB98/titelseite.html

The remnant RX J0852.0-4622 has been found in front of the larger Vela Supernova Remnant (Iyudin et al.,1999). The gamma rays from the decay of titanium^{44} showed that it must have exploded fairly recently, but there were no historical records of it. The flux of gamma rays and x-rays indicates that the supernova was relatively close to us (approximately 200 parsecs or 600 ly about 700 yrs ago) (Aschenbach 1998; Irion 1998).

To date, the reluctance to catalogue the supernova remnant as an historical event as well as the skepticism amongst astrophysicists is as a result of no eyewitness accounts being found and is epitomized by a reevaluation of the data specifically in the revision of the age of the remnant to an absolute minimum of 2.2 kyr (Allen et al., 2015; Katsuda et al., 2008; Pannuti 2010)

In a literature review critique, Allen et al., presents an argument in attempts to rationalize that the age and distance of RX J0852.0-4622 are incommensurate with the recent revised observations.

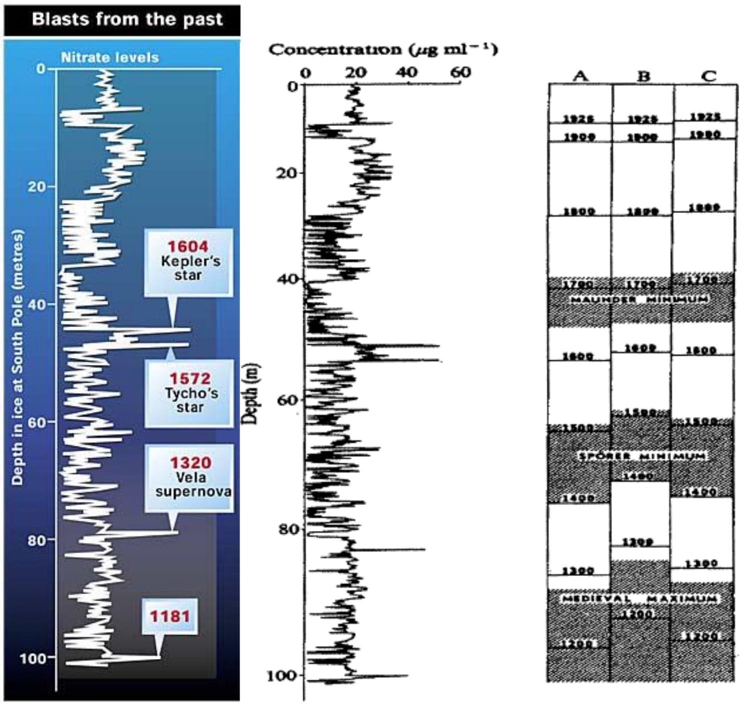

Figure 5 Footprints of the Newly-Discovered Vela Supernova in Antarctic Ice Cores? (Burgess & Zuber 2000:1-6) Nitrate abundance in South Pole ice cores. The two spikes at ~50 m correspond to the dates around 1600, the spikes at ~80 m and ~100 m to 1300 and 1150, respectively. The increases in Nitrate abundance have been associated with Supernovae observed in 1604 (Kepler's supernova), 1572 (Tycho's supernova), and in 1181. The 700-year-old Vela Junior supernova might have caused the fourth spike at ~80 m. (Burgess and Zuber 2000)

Elsewhere they rely on the hydrodynamic analysis which suggests that G266.2−1.2 is between 2.4 and 5.1 kyr old if it is expanding into a uniform ambient medium and a distance of no further than 1.0 kpc (3200 light years) (Allen et. al., 2015).

Aschenbach responds to the various critiques of his discovery of the G266.2−1.2 or Vela Jr. by changing the mathematical models which test the new eyewitness records received as well as subsequent data relating to non-literate sources (Aschenbach 2017; Wade 2015).

He shows that the acceleration of the particles is attributed to their repeated interaction with the supernova remnant shock front and stresses that a gamma-ray line excess above the background signal due to radioactive ^{44}Ti was found, which, because of its short life-time of 90 years led to the conjecture that this SNR would be young, about 700 years, and because of its X-ray extent should be close-by, maybe as close as 200 pc (640 light years) (Iyudin et al., 1999; Aschenbach et al., 1999).

He further suggests that RX 0852.0-4622 (Vela Jr) is a rare type of supernova among the SNR population due to the combination of low ambient density, high birth shock-velocity, a short lifetime of SNR connected cosmic ray electrons and that the remnant could still be 730 years ago with a distance of d=368 pc (i.e. 1177 light years), and that today´s current (expansion rate) velocity would be vs=732 km/s He further points out:

> *“that several findings indicate that very unusual celestial events had happened in the 13th century, which might be attributed to a nearby SN.*
>
> *These are, among others, nitrate precipitation markers in Arctic drilled ice cores (Burgess & Zuber, 2000); sudden increase in atmospheric radiocarbon; the bright star,*

the Zimbabwe star, probably observed from the Great Zimbabwe monument (Wade 2015).

From Japan, there is a report that on September 12, 1271 an object as bright as the full moon suddenly appeared on the sky about 10 degrees above the horizon, which marks the beginning of the rise of Nichiren Buddhism. All findings he argues that are consistent with the occurrence of a SN in 1271." (Aschenbach 2017: 4)

Climate Change and γ-ray flux

SNR RX J0852.0-4622 is regarded as being the nearest, brightest and most recent supernova and is characterized by its high energy and prodigious γ-ray flux that bombarded the Earth ca 1271.

Depending on the type and energy a near Earth supernova between 3000 to 100 light years away will noticeably affect Earth's biosphere. Terrestrial effects of a nearby supernova can affect upper atmospheric conversions of nitrogen into nitrogen oxides that will deplete the ozone layer to expose the surface to harmful cosmic and solar radiation.

One theory suggests that a Type Ia supernova would have to be closer than a thousand parsecs (3300 light-years) to unfavorably affect the Earth. All previous treatments of the effects of cosmic rays from supernova and other high-energy sources have only been approximate but less than 200pc can make exceptional changes in the biosphere. (Thomas et al 2016; Melott & Thomas 2009; 2011; Melott et al., 2004; 2010a; 2010b; 2017; Beech 2011; Dartnell 2011; Atri & Melott 2014; Gehrels et al., 2003).

Generally, a supernova closer than 8pc or 26 light years can destroy half the Earth's ozone layer and cause a mass extinction event but new research shows that significant damage in the form of radiation sufficient to trigger extinction-level ozone depletion could come from a distance of several kpc. (Melott & Thomas 2011; Melott et al., 2017; Wade 2015: 134).

Global effects appear at this time which are regarded as being volcanically caused: The Greenland Vikings eat their dogs in haste to leave Greenland, the Anasazi experience a prodigious drought compared to their usual sparse existence and migrate south-westwards in what is termed the 'Great Drought' ca 1276-1299, the sudden and strange winters throughout Europe cause massive deaths and famine, Mapungubwe in South Africa goes into instant decline and a thick burn layer is found that coincides with the emergence of the Great Zimbabwe flourish ca 1270 - 1290, the Mongols invade China and Japan, the Peruvians flourish into an Inca Civilization and Polynesian navigators occupy New Zealand (Wade 2015: 134).

The ice-core data reveal high levels of nitrogen oxides and nitrate ions rather than sulphate spikes that would corroborate global volcanism for the same time zone. The supernova remnant RX J0852.0-4622 appears to be a near-Earth event which may have affected the biosphere by means of an intense γ-ray flux sufficient to cause atmospheric change.

This may have become the advent of the phenomenon that is termed the 'Little Ice-Age'.

Volcanic outbursts such as Samalas in 1257 juxtapose signals in the palaeo records and deter the evidence at the time. Northern Hemisphere experienced extreme cold summers in 1258 – 1259 and severe famines, however, the volcanic eruption is not seen as the trigger of the famines (Guillet et. al., 2017; Burgess & Zuber; 2000 Stephan Woodborne pers. comm. 1 Sept 2015).

Many cultures throughout the world show rapid changes at this period and an eyewitness account would define the timeline definitively.

There is also a possibility that the Polynesian navigators followed the visible plume of the Kaharoa volcano in New Zealand in 1314:

> *"My own view, partly discussed in the paper you read, is that New Zealand was first discovered as part of a general phase of island exploration that has been on-going for a few thousand years. It was then colonised sometime after 1300 AD.*
>
> *If the voyaging canoes followed anything specific at this stage, it is more likely to have been the plume of volcanic ash that rose from the eruption of the Kaharoa volcano in New Zealand in 1314 and which would have been visible in the Cook Islands"* (pers. comm. Richard Walter Thursday 12th October 2017).

The chronology given by Lowe (2008) outlines the earliest prominent Māori settlements as preceding the Kaharoa 1314 +/- 12 eruptions (i.e. 55 – 31 years after a supernova is seen in Japan). This will imply that the earliest mass migration settlement stratigraphy should exist before the volcanic ash layer was produced by Kaharoa.

Figure 6 The thin white band in the centre of the photograph is ash deposited by the Kaharoa eruption of about 1314, exposed in peat at Waihī Beach, Bay of Plenty. The ash came from Mt Tarawera, and is widely distributed across the eastern and northern North Island. This layer is an important marker for archaeological studies because it approximately corresponds to the beginning of the human occupation of New Zealand. Photograph by David J. Lowe - University of Waikato. https://teara.govt.nz/en/photograph/6826/kaharoa-ash

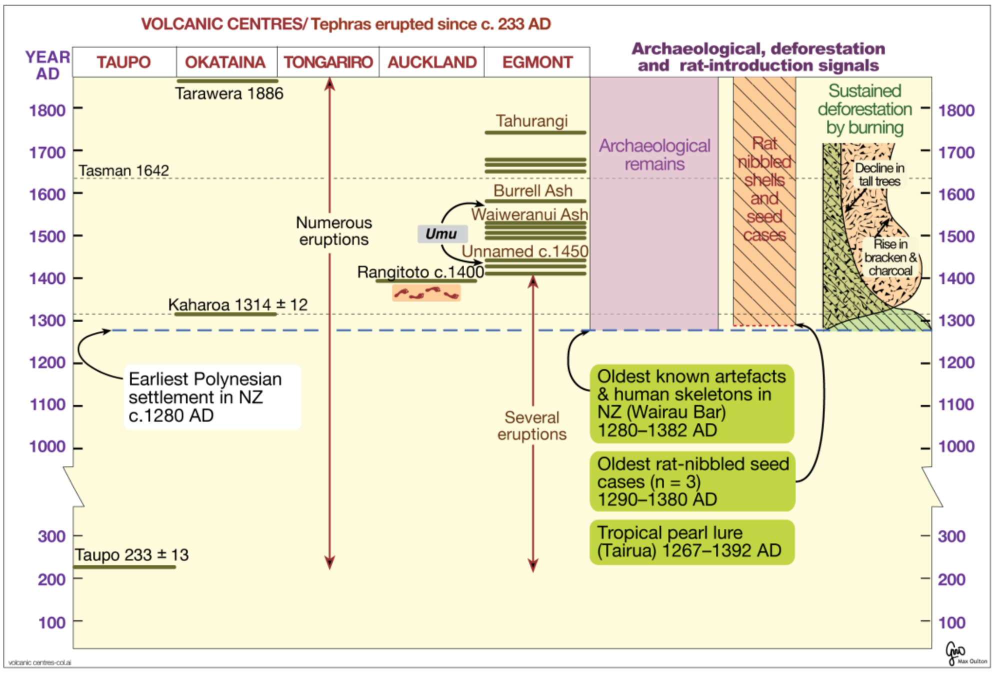

Figure 7 Lowe, D.J. 2008. Polynesian settlement of New Zealand and the impacts of volcanism on early Māori society: an update. In: Lowe, D.J. (editor) Guidebook for Pre-conference North Island Field Trip A1 'Ashes and Issues' (28-30 November, 2008). Australian and New Zealand 4th Joint Soils Conference, Massey University, Palmerston North (1-5 Dec. 2008). New Zealand Society of Soil Science. Pp.142-147. ISBN 978-0-473-14476-0

Japanese Sighting of an Astronomical Phenomenon in Relation to the Supernova RX J0852.0-4622

Aschenbach also verifies the Japanese written record on the 13th September 1271 of a strange orb of light that appeared before dawn and which is depicted as a mandala circular ring surrounding a dot, as well as a viewing altitude and azimuth that coincides exactly with the path taken by RX J0852.0-4622 at the exact times recorded in the texts (Wade et al., 2014; Aschenbach 2016) and thereby announces that RX J0852.0-4622 was seen on the 13th September 1271. The sighting gave rise to the phenomenal Nichiren Buddhist movement in Japan (Aschenbach 2017; Jansen 1995; Neumann 1975; Watson 1993; Tanabe 2002; Tanabe & Tanabe 1989; Wade 2015).

Figure 8 The Execution Ground of Tatsunokuchi in Sagami Province" (on September 13, 1271). At the time of Ushi-Tora, between the time of Ushi (Cow: 2:00 a.m.) and Tora (Tiger: 4:00 a.m.), scarcely when the cuttman threw up his sword over the head, something spherical and strongly shining appeared above Enoshima Island. The soldiers were overwhelmed and ran away, overcome by terror all at once. Nichiren's life is miraculously saved when rays emanating from the sun shatter the sword of his would-be executioner. Illustrated Abridged Biography of Kôsô (Nichiren) by Utagawa Kuniyoshi. Publisher Ise-ya Rihei (Kinjudo) 1835-1836 (Kuniyoshi 1835 – 1836).

A particularly unusual drought in Japan led to a conflict between various religious leaders and those opposing Buddhist monk Nichiren's predictions were further humiliated after severe winds occurred and Nichiren was unlawfully arrested, and was to be beheaded on the 10th September 1271(Wade 2015).

Two days later Nichiren was taken to Tatsunokuchi beach to be beheaded, and where they stopped at the shrine of the god Hachiman to allow Nichiren to address and admonish the deity. On reaching the execution site, just before dawn on 13th September, almost at the moment he was to be beheaded, a luminous sphere appeared in the sky, and the executioners could not continue the beheading of Nichiren (Watson 1993; Wade 2015).

According to the account, "a brilliant orb as bright as the moon" forced Nichiren's executioners to inaction (Tanabe 2002: 357) (Figs. 8 and 10).

Later in exile nearby on an island, he wrote a letter (extract below) to his loyal samurai follower Shijō Kingo in 1271, in the ninth month, on the twenty-first day, only nine days after the Tatsunokuchi Persecution: -

> *"I cannot adequately express my gratitude for your frequent letters. At the time of my persecution on the twelfth, not only did you accompany me to Tatsunokuchi, but also you declared that you would die by my side. This can only be called wondrous…*

I have heard unofficially that by the order of the lord of Kamakura I am to be exiled to Sado Province.

Among the three heavenly sons of light, the god of the moon saved my life at Tatsunokuchi by appearing as a shining object, and the god of the stars descended four or five days ago to greet me. Now only the god of the sun remains, and he is certain to protect me. How reassuring! How encouraging! The "Teacher of the Law" chapter states, "I will dispatch persons magically conjured who will act to guard and protect them." This passage leaves no room for doubt. The "Peaceful Practices" chapter reads, "Swords and staves will not touch him." The "Universal Gateway" chapter states, "The executioner's sword will be broken to bits!" There is nothing false in these sutra passages. The strong and steadfast power of faith is precious indeed.

With my deep respect,
Nichiren

The twenty-first day of the ninth month in the eighth year of Bun'ei (1271)" (Watson 1993; Tanabe 2002: 357; Wade 2015).

The reference to the god of the moon indicates the bright object that appeared in the sky just prior to the Daishonin's scheduled execution, which frightened his executioners to the extent that they aborted their attempt on his life.

It is generally thought that this was a meteor from later written references; however, the only discernible information from the records is that the object first appeared over the area known as Enoshima which is south-east from the beach at Tatsunokuchi. The object traversed the sky and in later versions was seen to enigmatically 'shoot' across the sky to the south-west (Watson 1993: 269; Wade 2015).

The Daishonin, later confined to Homma's residence in Echi, relates that a luminous object fell from the sky and struck the branches of a plum tree before him accompanied by a thunder-like roar and strong winds which may relate to a meteor seen after the first event by Nichiren (Watson 1993: 237; Tanabe & Tanabe 1989).

Nichiren clearly makes a distinction between what he saw on two occasions. That a meteor is a heavenly son of light from the god of the stars and that the shining object he saw on the dawn of his intended beheading, was a son of light from the god of the Moon.

The object was as bright and possibly as large as the moon. The Moon was visible as a 23-day old waning crescent and no mention is made that the object seen was accompanied by tremors, sounds or flashes. The object is seen as a luminous entity that moved across the sky from the southeast over the sea horizon (Wade 2015).

The object is seen and recorded from Tatsunokuchi beach, Ishikawa town located in Nomi District, Ishikawa, Japan at the place of executions near the shrine of the god Hachiman 36°29'35.97"N 136°32'5.83"E on the early morning before dawn of the 13th September 1271. Rising just before dawn south east over the sea at 04h44am) (Fig. 11). The object seen was later to become part of the symbolism of the Nichiren Buddhist movement (Fig. 12) (Courtesy Starry Night Pro - Simulation Curriculum version 6.4.3pe EW 1997-2009; Wade 2015).

Various climatic changes that coincide globally at this time are referenced as the advent of 'The Little Ice-Age' a term that is applied to various changes worldwide at roughly 1300 C.E. and does not necessarily reflect a specific time. There were two phases of the Little Ice Age, the first beginning around 1290 C.E. and continuing until the late 1400s. Japanese texts verify the extraordinary abruptness that took place in regard to the droughts and subsequent rainfall as well as the two attempts made by the Mongols to invade Japan when their two fleets of ships were destroyed by extraordinary 'Divine Winds' ('Kamikaze') in 1274 and 1281 AD (Wade 2015).

Figure 9 The Mongol Invasion of Japan. Kamikaze of 1274 and 1281 – Encyclopaedia Britannica file:///C:/Users/Richard/Documents/2015/Kamikaze%20%E2%80%93%20The%20Divine%20Winds%20that%20Saved%20Japan%20_%20Ancient%20Origins.html Accessed 5 May 2015http://beyondsilkroads.tumblr.com/post/41067907028/the-term-kamikaze-popularized-during-the-second

Figure 10 At the time of Ushi-Tora, between the time of Ushi (Cow: 2:00 a.m.) and Tora (Tiger: 4:00 a.m.), scarcely when the cuttman threw up his sword over the head, something spherical and strongly shining appeared above Eno-shima Island. The soldiers were overwhelmed and ran away, overcome by terror all at once. http://www2s.biglobe.ne.jp/~shibuken/Nichiren/Pages/P35.htm

Figure 11 The object is seen and recorded from Tatsunokuchi beach, Ishikawa town located in Nomi District, Ishikawa, Japan at the place of executions near the shrine of the god Hachiman 36°29'35.97"N 136°32'5.83"E on the early morning before dawn of the 13th September 1271. Rising just before dawn south east over the sea at 04h44am (Courtesy Starry Night Pro - Simulation Curriculum version 6.4.3pe EW 1997-2009).

The object in this Japanese account can be equated perfectly with the placement of supernova RX J0852.0-4622 at that place, date and time. RX J0852.0-4622 rose just before dawn south east over the sea at 04h44am, reaching transit at 08h19am at 15°Altitude and setting at 11h52am (as shown in Fig. 11 for the "object").

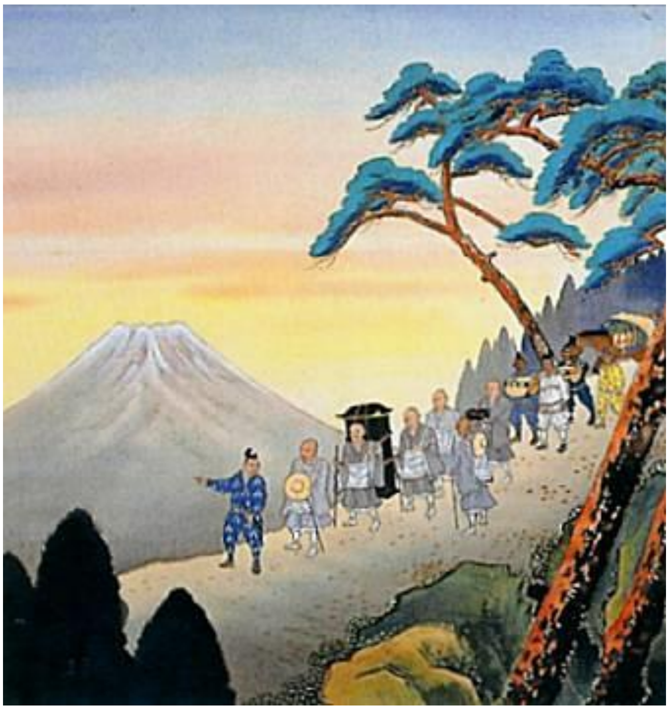

Figure 12 When the Second High Priest Nikko Shonin moved to Taisekiji in 1289, He brought the Dai-Gohonzon, original writings, and remains of Nichiren Daishonin. Biography of Nichiren Daishonin, Nichiren Shoshu Head Temple, Taisekiji, 1981. Of particular interest is the mandala carried by the second person which later became the main emblem or crest of Dai-Gohonzon for the Nichiren Buddhists. http://www.nichirenshoshumyoshinji.org/sermons/intro.php

The Tatsunokuchi Persecution of Nichiren clearly provides a positive conclusion to verifying that a written record may be found in the vast written legacy in Japan, and possibly other sources world-wide. The object is not referred to as a comet and although some have added that it was a meteor, Nichiren differentiates the object as part of the moon deity as opposed to a meteor event that happened a while later and that hit a plum tree where he was walking, which he distinguishes as a tribute from the star deity as opposed to the Moon deity. He mentions that he looks forward to a tribute from the Sun deity (Wade 2015).

Japanese texts verify the extraordinary abruptness that takes place in regard to the droughts and subsequent rainfall as well as the two attempts made by the Mongols to invade Japan resulting in their fleets of ships being destroyed by 'divine winds' or 'kamikaze' in 1274 and 1281 AD (Jansen 1995; Neumann 1975; Wade 2015) (Fig. 9).

Cosmogenic Observations linked to the late 13th century

There is sufficient evidence to suggest that various cultures throughout the predominantly non-literate southern hemisphere societies and elsewhere observed an extraordinary cosmic event that has been recorded by comparative symbols and cosmogenic mythological data all relating to a particular time apart from the Japanese records.

In a worldwide search for evidence of a supernova in the 13th century, Aschenbach reviewed China, Japan and Korea. Arguing that their observatories were typically located at geographical latitude of ~35° where RX J0852.0-4622 would have risen at a low elevation and with a short visibility above the horizon after sunset by up to 11° from middle of December to end of March to reappear 250 days later when the magnitude reduced by 5 or a factor of 100 (Aschenbach 1998b).

Far East records were reduced between the years 1245 – 1264 and 1277 – 1293 when China was ruled by the Mongols and Japan conquered by the first Shogun in 1192. Likewise, Europe and North-Africa affected by four crusades and Egypt by the Mamelukes in 1279 (Aschenbach 1998b).

Altogether it appears that the 13th century was a period of political change from Europe to the Far-East, so that astronomical events were probably not of top priority and were either not recorded or were later destroyed similar to the Aztecs or Incas 250 years later.

Other celestial events which might have been related to a supernova occurred between the 13th and the early 16th century, where the "Historia General" by Sahagun contains a statement made by Moctezuma about the appearance of a bright "flame" in the sky lasting one full year seen night by night, which happened 10 years before the Spaniards came to Mexico in 1519.

Dante Alighieri reported the appearance of a new star in 1290 in his "Vita Nuova" and most important are the traditions that the people of Zimbabwe in the 13th centuries left their homes to settle elsewhere guided by a new star" (Aschenbach 1998b; Wade 2015).

• East African Oral Traditions: Tsisulwe

Amongst the Pare and Hehe people in eastern Africa there exists a concept of a star Tsisulwe that was known to exist as two stars with the same name and which rose in the east and set in the west similar to Venus as a morning and evening star, as well as the path of RX J0852.0-4622.

It was found that within the Pare- and Hehe-speaking peoples of Tanzania that Miss B Millroth preserved a most important oral tradition concerning a strange star, which became part of the legends and oral traditions that emerged from near Mt Kilimanjaro (Millroth 1965: 31; Von Sicard 1966: 51). Millroth (op. cit.) records that 'Tsisulwe' refers to two large stars, an eastern one which shines before dawn and a western one which shines after sunset. Von Sicard (1966: 51) discusses the etymology of the Tsisulwe, that they possibly represent Venus as a morning and evening star and that they might be connected with one of the Hehe peoples' names for God (Wade 2015).

Tsisulwe (a plural name for the two stars concerned in the oral tradition) is indeed similar to Venus in that it shines in the east before dawn and in the west after sunset, in some latitudes, but only after the amount of days it takes in its synodic period to change over from a Morning Star to an Evening Star. But, Tsisulwe is seen as the same star as implied in its naming, which appears in the east and west on the same day; furthermore, it has become invisible. These aspects place some doubt on a Venus interpretation and provide a particular latitude that such a concept was noted. The chronology of this Pare and Hehe oral tradition is vital to confirming whether Tsisulwe is RX J0852.0-4622 but there are no other likely candidates observed to date that would fit the latitude and time of day. This oral tradition thus provides corroborative argument in favour of a definite record of a star that once existed within the past and was unique (Wade 2015).

- **Star of Destiny**

Another oral tradition from East Africa stems from Pâté Island which is located in the Indian Ocean close to the northern coast of Kenya. The island was an early site of Arabic colonization that gained prominence around the 14th century and although archaeology reveals a more recent date (de Vere Allen 1996), the Pâté chronicle records Omani Arab colonization from the 8th century and then again by the Nabahani family in 1204 (Tolmacheva & Dagmar 2005). Oral traditions and an early document refer to a 13th/14th century star, called the 'star of destiny', also called the 'star of the night of the divine decree' (the night when the Prophet ascended to heaven), seen in visions accorded only to holy people (Stigand 1913: 29; Freeman-Grenville 1962: 241 and 266; Wade 2015).

- **A Honduran Mayan Glyph at Copan and the Bolivian – Lakha Manta petroglyphs**

The glyph found by Michanowsky, of a Honduran Mayan Glyph at Copan (Michanowsky 1977; Tierney 1983: 46.) (Fig. 13) and which he fervently attributed to being a rendition of the supernova remnant in Vela thousands of years in the past, proved to him that the Mayans were older than known.

Perhaps the glyph refers to the recent Vela supernova remnant (RX J0852.0-4622) instead, which Michanowsky was unaware of?

This Mayan researcher believed he found that the Mayans could be dated by one of their glyphs to thousands of years older than thought as the glyph describes that a new star is born in the 'False Cross' constellation. The glyph indicates the constellation of Vela that has a 'star' (a sort of plus sign) that is new. It is drawn as a dot with a circle! Michanowsky died before they found that Vela had another supernova or star that may have been visible which is more recent the preceding Vela Supernova thousands of years earlier (Tierney 1983).

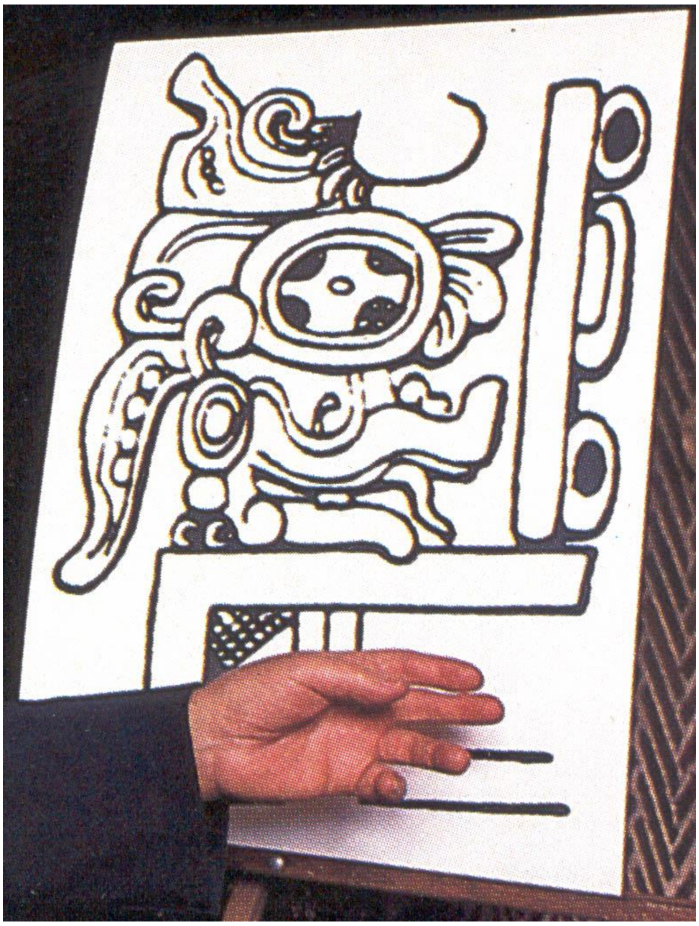

Figure 13 Michanowsky's Honduran Mayan Glyph as found at Copan and dated to 1320+/-30 C.E., "a new star is born in Vela" depicted as a dot in a circle (Tierney 1983: 46).

In 1972 when NASA astronomers John C. Brandt, Stephen P. Maran and Theodore Stecher suggested that the Vela Supernova (Cha et al., 1999; Large et al.,1968) was formed about 11,000-12,300 years ago (about 800 light years away) years ago and that southern hemisphere witnesses may have recorded it in the rock art an archaeologist George Michanowsky gave evidence of his petroglyph find in Bolivia in 1956 of what he perceived was a record of the Vela supernova (Sullivan 1973; Michanowsky 1977; Tierney 1983).

The petroglyph was inscribed on a large flat rock in a remote bush region of Bolivia that indicated four smallish circles and two larger circles that resembled the constellations that make up the False Cross (Vela and Carina). One of the larger circles seemed to emulate the position of Canopus. The second larger circle was positioned where the Vela supernova occurred about 11,000-12,300 years ago. Michanowsky suggested that the petroglyph was evidence of the Vela Supernova recorded by the indigenous Bolivian Indians. No picture is available to date.

The rock was associated to an annual several day festival held by the Bolivian Indians with no knowledge or explanation of its meaning which led Michanowsky to conclude dated to a pre-Columbian past. He maintained that "*the rock carvings are apparently a record of a long-forgotten celestial event: a supernova, or exploding star, a spectacle that would have awed primitive people and perhaps frightened them into paying homage to it by staging an orgiastic celebration*" (Michanowsky 1977).

The Indian dialects, mentioned the site as mutun (very hot stone), which could perhaps refer to some ancient heavenly fire and also refer to the unexceptional night sky area close to the

False Cross as Lakha Manta (The Gateway to Hell), for reasons they were unable to explain. This is the Region of the Chase of the Celestial Ostrich, a bird revered in their Indian mythology, and, that "*the ostrich was driven across the sky by two voracious dogs and finally killed in the constellation Vela*" (Sullivan 1973; Michanowsky 1977; Tierney 1983).

It is highly likely that the petroglyph relates inscriptions by the Bolivian Indians circa 1300 C.E. and that they recorded RX J0852.0-4622.

Other artifacts found in Bolivia by researchers near the south shore of Lake Titicaca may also be cosmic references. The first is a carved pre-Inca stone statue relating to the Tiwanaku period that might ambiguously depict a supernova or transient star in Carina, Vela or Crux believed to possibly be the earlier outburst of η-Carinae circa 1000 C.E. (Teames 2002).

This aspect is supported by the Australian Aboriginal oral traditions found by Hamacher & Frew (2010) who moreover astonishingly validate η-Carinae as being Mahutonga of the Māori but it is not certain if there was an earlier outburst of η-Carinae a thousand years ago. The second are two artifacts with glyphs that may be renditions of an event circa 1000 – 1300 C.E.

Of interest here is that there may be petroglyphs that depict RX J0852.0-4622 which are expected to show two concentric circles with a dot in the centre associated with Vela dating to circa 1271 (Wade 2015: 158).

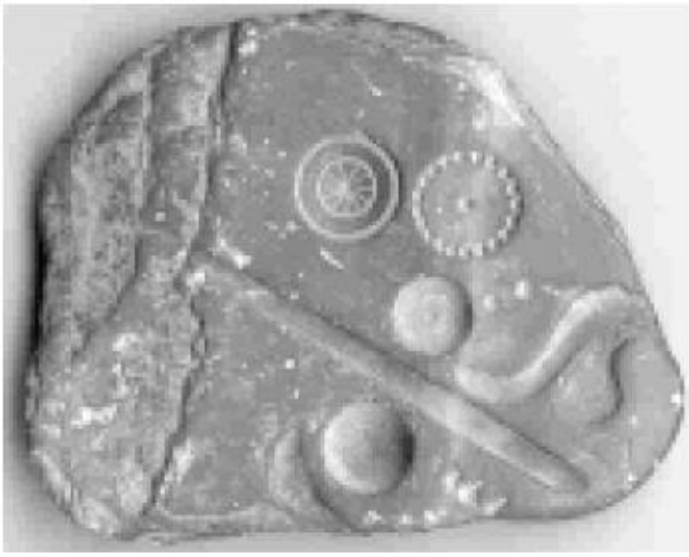

Figure 14 Lake Titicaca circulos stone, 7.5 ´ 17cm, circa 1000 C.E., with possible depiction of η-Carinae outburst**.** Photo courtesy Bernardo Biados (Teames 2002).

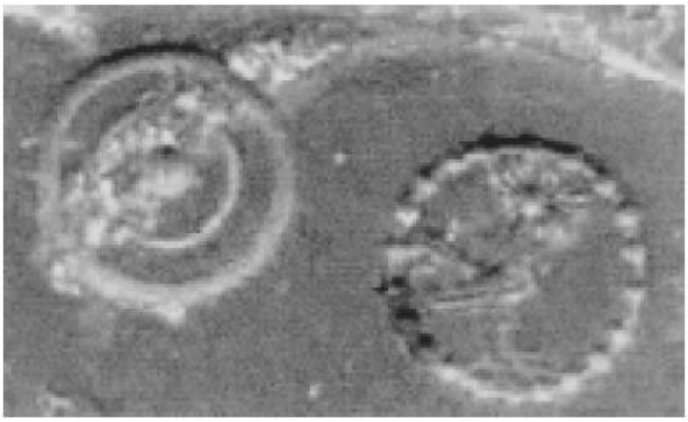

Figure 15 Pajaro Stone, encircled bird with sunburst/starburst above head (right circle) and a circle within a circle (left circle). Circles are 1.5 cm diameter. Lake Titicaca, approximately 1000 C.E. Photo courtesy Bernardo Biados (Teames 2002).

- **The Guam legend of Camel Rock (Gapang) and 'dinagi laolao'**

The origins narrative of Camel Rock known as Gapang (pet of the warrior Pang) near Asan at Guam (Latitude: 13°28'11.43" Longitude: 144°42'16.47"), describes a star with the name 'dinagi laolao' (deceived by the twinkling light) and relates a sudden appearance of a bright star resembling the magnitude of Venus. It speaks of an invasion by a foreign group of star navigators most likely 1200 – 1600 C.E. at the time of the 'Little Climatic Optimum' and settlement expansions and abandonments in the southern Marianas. The oral tradition presents geomythology of Orote, Agana Channel, Camel Rock and Anigua and may be associated with petroglyphs found in the Ritidian Cave at Guam. (Torres 1936; Villaverde 2000a; 2000b; Russel 1998:99:112; Hunter-Anderson & Butler; Bulgrin 2006; Amesbury & Hunter-Anderson 2008: 15; 2013).

The Latte Period associated with stone formations that emerge ca 1000 C.E. provide a clue that 'dinagi laolao' might have been RX J0852.0-4622.

Research into dated petroglyph symbols such as concentric circles would provide supportive evidence Russel 1998; Amesbury & Hunter-Anderson 2008)

> "*Many centuries ago, Guam was inhabited by people with supernatural strength. They were so powerful that the mightiest shark didn't frighten a child of six and was an easy prey to a youth of sixteen. The ancient tribes rivaled one another, but they were brothers against a common enemy.*
>
> *It came to pass that a voyaging fleet of proas were observed on the horizon, their approach was planned through Agana Bay* ('Proas' refers to an inter-island protocol that involves waiting offshore until permission to land is granted by the chief of an intended island) (Brower 1983: 112-113).
>
> *The chiefs of all the tribes immediately held a summit meeting, and they decided to block Hagatna Bay with a huge rock which would seal off the open channel (Boat Basin Channel), which was of easy access to the interlopers. Entrusted with the task was the Aguada Tribe, the mightiest of all clans on the island* (possibly Anigua).
>
> *The chief of the Aguadas dispatched several men to measure the size of rock needed. Soon thereafter, they reported that one of the loose, camel-like rocks at Orote Point would suffice. Because the job could be handled by two youngsters,*

the chief sent for two four-year-old boys and instructed them to fetch the rock and plant it in Agana Bay. The boys left immediately.

Arriving at Orote Point at midnight, the two children picked up a huge rock measuring 120 feet in length, 60 feet in width, and 30 feet in height, and carried it towards Agana Bay.

The two boys were offshore in the vicinity of Asan when they sighted a bright twinkling star. Thinking it was Venus, which usually appears at 4 a.m., they dropped the rock and dashed home (Aguada youths were prohibited from leaving their homes between 10 p.m. and 4 a.m.)

Because the youngsters failed to accomplish their task, the invaders swept into Agana and remained on Guam, eventually intermixing with the ancient race" (Torres, J. 1936) Compiled by Rudolph Villaverde (Villaverde 2000a; 2000b)

Conclusion

Aschenbach confirms the tentative data that provides cosmogenic knowledge of sub-Saharan African indigenous astronomy and the geomythology of Great Zimbabwe as evidence that the uncatalogued supernova remnant RX J0852.0-4622 / G 266.2-1.2 was and still is cosmically referenced in Great Zimbabwe structures.

Furthermore, that the work concludes postulates of the 14th century climatic change as a result of the γ-ray flux from the supernova and a host of migrations and affectations throughout the world at the time of the so-called unrecorded event and how the Great Zimbabwe Great Enclosure functioned as a cosmic reference to a unique event. And in the recent recalculated models estimates that the remnant occurred 730 years ago with a distance of d=368 pc (i.e. 1177 light years), and that today´s current (expansion rate) velocity would be vs=732 km/s.

The abandonment of Mapungubwe for climatic reasons according to present archaeologists, led to the rise of Great Zimbabwe 250km to the north-east. The Zimbabwe culture sequence can now be divided into three periods, each named after important capitals: Mapungubwe (AD 1220 to 1290), Great Zimbabwe (AD 1290 to 1450) and Khami (AD 1450 to 1820) (Huffman 2000; 2009). The C^{14} record of the sudden decline at Mapungubwe ranges 1270 – 1290 (Huffman & Vogel 1991; Vogel 1998; Huffman & Woodborne 2015; Woodborne et al 2015; Stephan Woodborne pers. comm. 1 Sept 2015).

Independent climatic data suggests that this abandonment was related to the initial impact of the Little Ice Age (Lindesay 1988; Lindesay & Vogel 1990; Huffman 1996; Tyson et. al,.2000).

The Great Enclosure at Great Zimbabwe has a large conical tower and a massive 10m high wall that was built almost 200 years after its related structures precisely when Great Zimbabwe flourished and Mapungubwe abruptly declined.

The Large Conical Tower aligns with the supernova remnant as seen from a platform that is also aligned with a smaller conical tower and the annual vernal and autumnal equinox sunrises. The alignment of the Small Conical Tower and the equinox sunrises became obstructed when the massive wall was built.

The reason for aligning Venus with stelae suggests a preference for conception at the vernal equinox with births occurring on the winter solstice which is 274 days and is confirmed by the ethnography and the origins of the ‘domba’ dance.

Most notable are the stelae on the Main Wall at the Great Enclosure that mark Venus from the vantage of the Platform, over the autumnal equinox to the winter solstice. These stelae may time the duration of the last trimester of the human gestation period.

The small conical tower and a stelae are marked by Venus in conjunction with a thin crescent Moon in the early dawn at the start of the stelae being marked by Venus for 93 days during 1 synodic period every 8 years (Scotland 1956; Wade 2009:77; 2015:119-123).

The oral tradition, which mentions some sort of star that guided the Lemba, is mainly prevalent amongst the almost 600 000 people who make up the sections of the South African population in the Mpumalanga and Limpopo Provinces as well as in the southern provinces of Zimbabwe. The Lemba also form part of one of the largest traditional religious groups in southern Africa today – the Zion Christian Church (ZCC), who have a star as their main emblem, in common with the Zimbabwe National Flag.

The vast socio-political belief system emulates the magnificence of the past Great Zimbabwe complex and culture that was reinvigorated by a 20th century meteor event that augmented the cosmogenic ideology of the present population holding to ZCC beliefs south of the Limpopo River. There is thus a fundamental connection between the ancient cosmogenic mythology of the Zimbabwe culture and the rejuvenation of these beliefs related to the 1944 meteor event. Similarly inspired religious growth can be found in the Wise Men who followed a star, the meteorite associated with Mecca in Saudi Arabia, the Buddhist deity made of a Chinga iron meteorite fragment and various examples in Ancient Greece, Rome and America (Buchner et al., 2009; 2012; McBeath & Gheorghe 2005; Farrington 1900; Antoniadi 1939; Mardon et al.,1992)

The idea that the ancestors of the Lemba had instilled astronomical features within the design of the Great Zimbabwe Great Enclosure, amongst other ruins in southern Zimbabwe and northern South Africa, is substantiated in various surveys and a specific cosmic reference of Vela Jr.

Features of the Great Zimbabwe ruined structures were incorporated into the architectural design of the Voortrekker Monument - a prestigious monument inaugurated in 1949 in Pretoria South Africa to commemorate the Voortrekkers who left the Cape Colony between 1835 and 1854. A massive granite mausoleum depicting their clashes specifically with the Zulu at the Battle of Blood River on the 16th December 1838 known previously as the Day of the Vow of the Covenant. The most prominent aspect of Gerhard Moerdijk's monument is the annual mid-noon sun illumination of an Egyptian Benben stone or encrypted cenotaph for the fallen leader and his people.

The monument is a cosmic reference with the most recent truly African cosmogenic solar codification. The original design consisting of a causeway linking two obelisks was rejected for emulating the two conical towers of the Great Enclosure and being too Egyptian (Steenkamp 2008, 2009, 2011; Vermeulen 1999; Kruger & van Heerden 2005; The Star 1936)

The Māori oral tradition geomythology of ‘Mahutonga’ furthermore provides evidence of a similar event during this period. The oral traditions as recorded by Stowell (1911) and later Best (1922) clearly distinguish a star or comet-like object that once existed close to Crux that is generally referred to as a ‘round’ (rauna) mythical star or ‘atua’ (supernormal being) that became invisible.

If Mahutonga is not Vela Jr., then there is an astounding absence of any cosmic references by the Māori and islanders in Australasia to the event recorded by the Japanese in 1271. The Polynesian mass migration and timing all speak of something unusual that occurs and is presented as a concept of being Te Manu i te ra:

> "*Apparently this name, the Bird in the sun, is applied to the sun, but we have gained no explanation of it*" (Best 1923:108).

And equally astounding is the motivation for the mass migration that is associated with a star that disappears in the precise direction and time:

> "*What inspired people from Hawaiiki to migrate to New Zealand is another matter… the body of information circulating in Hawaiiki must have been especially compelling to inspire a mass migration event… Archaeological investigation will probably never tell us about individual motives, ideological drivers or the role of visionary chiefs in the migration and colonisation of New Zealand. But these are precisely the issues that oral tradition addresses and it is now time to take a more nuanced and critical look at these traditions in order to further our understanding of migration, colonisation, and the relationship between early New Zealand and Hawaiiki society*" (Walter et al., 2017:19-26).

The Korotangi stone carving definitively reveals a rich and profound unknown mystery that relates a Polynesian bird cult and a supernova star that charmed and motivated simple canoes to traverse a veritable ocean.

It might therefore be a remarkable coincidence if the Māori are the only people who have a concept of Korotangi, Te Manu-i-te-ra, Tamarēreti and Mahutonga which implies that their narratives were created either as they arrived in New Zealand or after they arrived or both. If Mahutonga is not Vela Jr., then the absence of cosmic references in Australasia circa 1271 is perplexingly illogical.

Michanowsky's Honduran Mayan Glyph as found at Copan dating to 1320+/-30 C.E (Tierney 1983), the NO_3 spikes at ~80 m in the ice cores dating to 1300 C.E.(Burgess & Zuber 2000), the radioactive decay of ^{44}Ti dating to 700 years ago (Iyudin et al., 1999), the C^{14} dating of the arrival in new Zealand ca 1280 C.E. (Lowe 2008) and the 1271 C.E. Japanese eyewitness record (Wade 2015; Aschenbach 2017) indicate a verified time of arrival by people that see an extraordinary stellar phenomenon for approximately two years in a region of the sky known for its arrangement of stars called Southern Cross (Crux) and a very similar arrangement called the False Cross (Vela/Carina) and generally called the star of the south that is invisible - Mahutonga or the Bird in the Sun.

If the concept of Mahutonga existed earlier then evidence should be found in Hawaiiki and the origin narratives, direction and timing of Mahutonga from Hawaiiki convincingly provides a reliable approximation that Mahutonga was the reason, motivation and driver of a rapid and possibly final mass migration to New Zealand guided by the Bird in the Sun – the 'progeny' of the Sun and the Moon.

The profound statistically impossible odds that the orb of light seen by the Japanese from the Tatsunokuchi beach as it rises on the horizon at Enoshima in the south east, precisely at the times indicated in the texts of Ushi-Tora, between the time of Ushi (Cow: 2:00 a.m.) and Tora (Tiger: 4:00 a.m.), is remarkable when compared with a computer simulation of RX J0852.0-4622 rising just before dawn south east over the sea at 04h44am (Wade 2015). The Japanese eyewitness account confirms the various cosmic references and as well as the date and age of the supernova.

Figure 16 Te Waka ō Tamarēreti (constellation of Argo Navus or Vela) showing the present astronomical constellation asterisms in compared to the old depictions and RX J0852.0-4622 or Mahutonga (yellow circle) as seen from Avarua Cook Islands in August to October 1271. White sky. (Courtesy Starry Night Pro - Simulation Curriculum version 6.4.3pe EW 1997-2009).

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