

Stingray in the sky

Astronomy in Tasmanian Aboriginal Culture and Heritage

Michelle Kathryn Holly Kendall Gantevoort

A thesis submitted to the Nura Gili Indigenous Programs Unit
at the University of New South Wales
in partial fulfilment of the requirements
for the Honours degree of
Bachelor of Arts
October 2015

Word Count: 24,667

Originality Statement

I hereby declare that this submission is my own work and, to the best of my knowledge, it contains no material previously published or written by another person, nor material which to a substantial extent has been accepted for the award of any other degree or diploma at UNSW or any other educational institution, except where due acknowledgment is made in the thesis. Any contribution made to the research by others, with whom I have worked at UNSW or elsewhere, is explicitly acknowledged in the thesis. I also declare that the intellectual content of this thesis is the product of my own work, even though I may have received assistance from others on style, presentation and linguistic expression.

Signed:

Date:

Abstract

Aboriginal peoples of Tasmania lived in isolation with the environment for thousands of years, the canopy of stars a central presence on the daily and spiritual lives of Tasmania. With the arrival of European settlers, the (astronomical) cultures of Tasmanian Aboriginal people were interrupted and dispersed. Fragments can be found scattered in the ethnographic record throughout the nineteenth century. This thesis uses historical textual analysis to draw these fragments from the record and organize into a database. The interrogation of this data through linguistics, comparative research and Stellarium reveal a complexity of sky knowledge evident between the nine language groups of Tasmania. It was found that stars, the Milky Way, Orion, dark nebula, the sun and moon, as well as transient phenomenon (aurora and eclipse), held cultural, spiritual and practical meaning within Tasmanian Aboriginal cultures. This thesis shows a reconstruction that moves beyond a monolithic view of Aboriginal Astronomy in Tasmania, commonly portrayed in previous research. The results also show difference in traditions is evident across Tasmania, laying the ground work for further rigorous investigation into the nuances of Tasmanian Aboriginal astronomies.

Acknowledgements

I would like to acknowledge the Bedegal people who are the Traditional Custodians of the land where University of New South Wales is situated. I would also like to pay my respects to the Elders both past and present

Acknowledgements

Thank you Nura Gili, my supervisors, friends and family.

Special shout out to Daphne, my mother's mother.

Bringing the sass since 1927

Note to Aboriginal and Torres Strait Islander readers this thesis contains the names of people that have passed away.

List of Illustrations

Figure	Page
1. Map of Tasmania showing regional Aboriginal territories	16
2. Map of Tasmania showing locations of astronomical data recorded.....	33
3. The Coalsack nebulae and Southern Cross.	39
4. Betelgeuse sitting south and Sirius sitting east of Orion.....	46
5. Partial Lunar Eclipse appeared on 23 August 1831.....	51
6. Robinson's sketch of the orientation of the three stars.....	62
7. The three stars of Orion's belt (Mintaka, Alnilam, and Alnitak) rising at dawn	63
8. Sirius, Adhara and Wezen (Group 3) in line with Robinson's description and sketch of the three seasonal stars.	67
9. Australian Indigenous Astronomy Facebook Page	76

Tables	Page
1. Star names recorded from Robinson's Journals, April – July 1831.....	37
2. Vocabulary for time of Day	57
3. Names given to the three stars shown to Robinson, 30 June 1934.....	60
4. Possible groupings of three stars as recorded by Robinson (A)	65
Possible groupings of three stars as recorded by Robinson (B).	66
5. Summary of the main findings of this thesis sorted by astronomical categories.	72

Astronomy Terms

Astronomy Term	Abbreviation	Meaning
Visual Magnitude	Vmag	
Azimuth	Az	See figure i
Hipparcos catalogue	HIP	Star catalogue from astrometric satellite <i>Hipparcos</i>
Right ascension and declination	RA /Dec	
Julian Epoch	J2000.0	January 1, 2000 at 12:00 TT
Terrestrial Time	TT	Astronomical time standard for observations made from Earth's surface

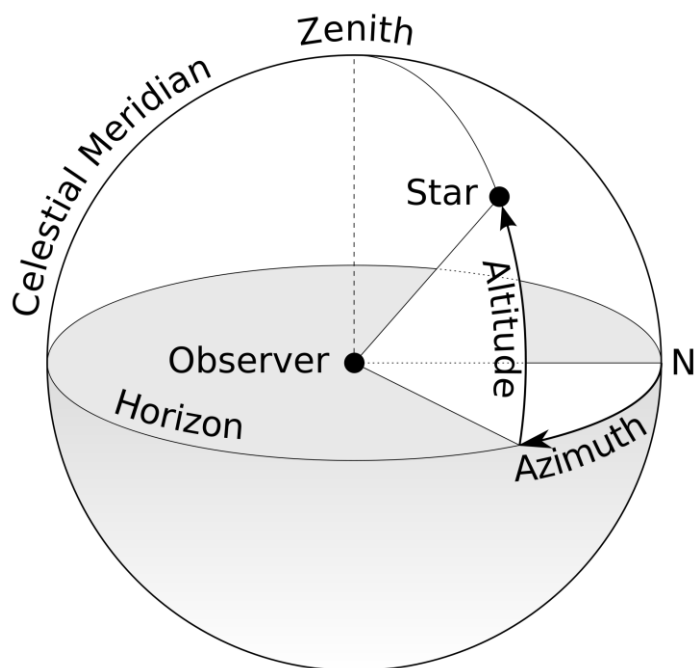


Figure i: Azimuth diagram. Source Wikipedia

Table of Contents

Abstract	3
Acknowledgements	4
List of Illustrations	7
Astronomy Terms	8
Table of Contents	9
Chapter 1: Introduction	10
Chapter 2: Background	13
2.1 Tasmanian Aboriginal History	14
2.2 Cultural Astronomy	18
2.3 Australian Aboriginal Astronomy	20
2.4 Tasmanian Aboriginal Astronomy	21
Chapter 3: Methodology	23
3.1 Historical Textual Analysis	24
3.2 Comparative Research	26
3.3 The Database	27
3.5 Stellarium	29
Chapter 4: Knowledge Reconstruction	31
4.1 Dreamings and Astronomy	31
4.1.1 Stingray in the Sky	32
4.1.2 Moinee and Droemerdeene	43
4.3 Aurora, Eclipses, and Cultural Beliefs	49
4.3.1 Lunar Eclipse	49
4.3.2 Aurora	53
4.3 Time	56
4.3.1 Navigation and Songline	57
4.3.2 Seasonal Time	60
Chapter 5: Discussion and Conclusion	70
5.1 Summary of Astronomical Objects and Phenomena Described	71
5.2 Further Investigation and Education	74
Appendix	78
Bibliography	79

Chapter 1: Introduction

"How wonderful in a world of flux and unpredictability, the travels of the stars also tell an earth story." - Deborah Rose Bird (2006)

Tasmanian Aboriginal people lived with the stars for thousands of years. Uninterrupted until European contact, the strength of their knowledge of the environment is undeniable. The endurance of astronomical knowledge alone is clear; it appears fragmented within nineteenth century literature, despite decades of cultural destruction on the colonial frontier in Tasmania. This research looks to these fragments to reconstruct Aboriginal knowledge to understand the way astronomy was used in Tasmanian Aboriginal life.

Australian Aboriginal culture is one of the longest continuing cultures in the world (Rasmussen et al. 2011) and astronomy is the oldest of the natural sciences (Moore, 1983). The astronomical knowledge imbedded within Australian Aboriginal traditions, although practiced by Aboriginal people for generations, has only recently been acknowledged in mainstream Australia. Stigma has overshadowed Aboriginal culture since the age of the enlightenment. Traditions likened to fairytales and extinction myths dominated the national discourse, especially in Tasmania (Ryan, 2012).

Research into the connection between astronomy and Australian Aboriginal cultures has increased in the past decade, led by researchers such as Ray Norris, Duane Hamacher, Robert Fuller, Dianne Johnson, Roslyn Haynes, Hugh Cairns, Bill Yidumduma Harney, Serena Fredrick, and Ghillar Michael Anderson. The outcome of this research reveals a network of Aboriginal astronomical Knowledges that weave through country and explain the formation and usage of the natural world. The appearance and positions of stars indicate seasonal change, breeding cycles, food availability, and inform law and social structure. The dark spaces between stars can be read in the same way (Hamacher and Norris, 2011; Johnson, 1998; Cairns and Harney, 2003). Songs are used to map the skyscape and landscape, noting geographical markers into place and navigating the terrain to natural resources (Cairns and Harney, 2003:9). Dreamings contain eyewitness accounts of meteorite impacts, passing comets, eclipses, and aurorae that fill in the blanks of Australia's natural history (Hamacher, 2012).

The astronomical knowledge of Tasmanian Aboriginal groups is included within the historical record. However, there is a lack of focused examination of the ethnographic

record. The discussion, so far, has been largely a monolithic representation of Tasmania's Aboriginal astronomies and does not reflect the regional difference in astronomical knowledges across the island.

This paper aims to contribute to the current field of cultural astronomy through a rigorous examination of nineteenth century historical records of Tasmanian Aboriginal cultures. This investigation will attempt to answer the following questions:

- Can historical data inform the way Tasmanian Aboriginal peoples developed astronomy?
- Is Aboriginal astronomy represented differently in Tasmania than mainland Australia?
- Are there distinct traditions between the language groups within Tasmania?
- Do Aboriginal Dreamings give explanations for the formation and dynamics of the skyline and landscape?
- How did Tasmanian Aboriginal peoples perceive irregular sky phenomena, such as aurorae and eclipses?
- Was astronomy applied in the everyday life of Aboriginal Tasmanians?

To answer these questions, I draw upon Indigenous Knowledge systems and Western science to uncover the astronomical traditions of Tasmanian Aboriginal peoples' night sky. The significance of my research is best described by Martin Nakata (2007: 56):

"[W]e need to privilege both in the appropriate context for appropriate purpose."

The analysis does not try to prove or disprove Indigenous methodologies or preference Western Science over Indigenous Knowledge. This thesis uses both approaches to construct a rigorous interpretation of the historical texts. Both epistemologies are necessary to negotiate each possible line of inquiry, building a detailed description of Tasmanian Aboriginal astronomy as recorded during the nineteenth century.

In the first chapter, I will address the interdisciplinary nature of the research. This will establish the context and raise awareness of existing debates within the scope of four topics that have bearing on the research question: (1) *Tasmanian Aboriginal History*, (2) *Cultural Astronomy*, (3) *Australian Aboriginal Astronomy*, and (4) *Tasmanian Aboriginal Astronomy*. A review of literature is structured to gradually narrow the scope from a broader understanding of relevant fields, to then position the research within existing works specific to Tasmanian Aboriginal astronomy.

The second chapter dissects the methods used to analyse data drawn from nineteenth century literature. These methods are then implemented to develop a representation of Tasmanian Aboriginal astronomy as recorded in the nineteenth century. The methodology is divided into five action categories; (1) *Historical Textual Analysis*, (2) *Comparative studies*, (3) *Linguistics*, (4) *The Database*, and (5) *Stellarium*.

The third chapter utilizes the methodologies of Chapter 2 to reconstruct Tasmanian astronomical knowledge. It addresses four main areas: (1) *Dreamings and Astronomy*, (2) *Aurora*, (3) *Eclipses*, and (4) *Time*.

The final chapter summarises my findings and conclusions and discusses the importance of further research and community engagement.

Chapter 2: Background

When investigating the histories of Tasmania, a researcher can identify two epistemologies in play: Indigenous knowledge systems and Western knowledge systems. The latter looks at Tasmania's history in a linear and sequential order of time and development. A popular empirical understanding of Tasmania's history is the island, now separated from the mainland, was once part of Australia's Great Dividing range, connected and populated by a land bridge thousands of years ago (Lourandos, 1997).

The Tasmanian Aboriginal people tell a different history of Tasmania, and like their Western counterpart, it varies from group to group. The Tasmanian understanding of histories is different from Western understandings of histories, as the former is not constrained to the past. "The Dreaming" is an English phrase used to group the complexity, connectivity, and timelessness of Aboriginal belief systems (Nicholls, 2014). In Tasmania, one of the Aboriginal words for The Dreaming is "poywootta" or "long time ago" (Baird, 2008). The concept of the Dreaming was explored by Australian anthropologist W.E. H Stanner in his 1953 essay *The Dreaming*, where he coined the term 'everywhen'. According to Stanner (2010: 58):

"One cannot 'fix' The Dreaming in time: it was, and is, everywhen. The Dreaming has an unchallengeable sacred authority"

Stanner muses over the translation given to him of Aboriginal belief to the English word 'Dreaming', exploring the idea that the act of Dreaming is reality and symbol, a word that is both literal and abstract enough to ribbon understanding between two knowledge systems.

One Dreaming told by the Neunone people of Bruny Island in Tasmania describes Trowenna (the Aboriginal word for Tasmania) as sitting through ages of darkness and light. The sea rose and Punywin (the sun), and his wife Venna (the moon) moved across the sky, creating life. Punywin would help Venna by reflecting his light on her to encourage her to walk across the sky. Together they had two sons, Moniee (the great south star) and Dromerdene, placed halfway between Venna and Moniee, Dromerdene can still be seen today as the star Canopus, or Alpha Carinae (Thompson and Tasmanian Aboriginal Community, 2011).

Two histories of Tasmania, one scientific and one cultural, appear to sit in juxtaposing epistemologies, with the former positivist and the latter interpretivist. The past has treated these two lines as completely separate interpretations of history, but this is changing. There has been a methodological shift in approaching Aboriginal past in an effort to bridge this divide. Modern researchers, such as Lyndall Ryan, Duane Hamacher, Leslie Head, and Julie Gough, are redefining the way researchers look at Aboriginal past by building an interdisciplinary picture, calling upon symbolic evidence unrestricted by time, with old and new methodologies and evidence from geography, archaeology, anthropology, and the sciences (such as astronomy).

Modern research by Hamacher (2012) and Head (1993), whose studies of astronomy and geography traditionally lay within the realm of positivist epistemologies, approach The Dreaming with realist epistemologies to bridge the separation between scientific and cultural understandings of Indigenous environment. Using Aboriginal and non-Aboriginal sources, Hamacher and Head use the antiquity of the Dreaming as an infinite and timeless fusion of past and present cultural information. Reflecting a dynamic understanding of nature gives impetus to the idea that the Dreaming is a phenomenon produced by the realities of the world, thereby becoming a line of evidence that engages and incorporates the physical landscape through songlines, art, ceremony, and dance.

2.1 Tasmanian Aboriginal History

On 1 January 1856, a grand regatta was held in celebration of the official naming of the southern 'heart-island', *Tasmania*. Boys were named *Tasman* and girls were named *Tasma* (Heeres, 1985: 41). It symbolized a new year, a new name, and a fresh start. Before this day, Tasmania was known as "Van Diemen's Land", a name given by Abel Tasman in honour of Anthony van Diemen, a Dutch colonial governor (ibid : 27). During a period of 214 years, the name was weighed down by the effects of a penal colony and a resistant Indigenous population. The 'free people' resented the name Van Diemen's Land and what it represented, preferring the unofficial name *Tasmania*, which they used more commonly in the 25 years leading up to the name-change (ibid : 41). The Tasmanian Aboriginal people knew it as 'my country' (Plomley, 1976: 192). Today, the name *Trowunna*, and variations of this, is commonly used as the name of the island. This comes from Bruny Island and wider Tasmania, where it is explained by Tasman Langford to mean 'heart-shaped homeland' (Langford and Peck, 2015).

The origin of the people of the heart-shaped homeland has been of continued interest and debate (Ryan, 2012; Johnson and McFarlane, 2015). The far southern isolation of Tasmania and its people had never been seen or experienced anywhere else in the world, spurring debates of origin including: migration from New Caledonia, Indonesia, Africa or South America by sea or temporary land bridges (Johnson and McFarlane, 2015: 16). Due to the distinct appearance of Tasmanian Aboriginal people from mainland Aboriginal people and the wild waters of the Bass Strait, migration from Australia was often dismissed as implausible (ibid : 15). Further discoveries from archeology and linguistics revealed possible migration via a land bridge between Wilson's Promontory in Victoria and North East Tasmania before waters rose about 14,000 years before present (BP)(Breen and Roughley, 2015). Archaeological evidence dates Aboriginal occupation of Tasmania to at least 35,000 years BP and within this time evidence supports occupation of Caves in Prime Seal Island, Badger Island and Hunter Island around 27,000 years BP (ibid).

Ochre mines were established 20,000 BP, years before rising sea levels caused coastal camps to be abandoned. Over the last 10,000 years, controlled burning was practiced and bark canoes were made for seasonal visits to the islands. Around 3,000 years BP, most of the island was occupied (ibid). By 1,000 years BP, regular burning took place and sub-tidal resources, such as cray fish, were a large portion of the peoples' diet (ibid). Archeological and ethnographic evidence indicate that Aboriginal people of Tasmania lived in an estimated nine clan territories, in up to 70 smaller groups within these regions (Johnson and McFarlane, 2015: 16) speaking in an estimated nine to thirteen dialects at the time of contact (ibid). It was the common burning of land practiced by Aboriginal people that caught the eye of Captain Tobias Furneaux in March 1773, and again by two French ships in 1803 (Cameron, 2011: 37). Smoke from the fires inspired Furneaux to name the coast 'Bay of Fires' (ibid).

Before the arrival of Europeans, it is believed Aboriginal Tasmanians lived across roughly nine territories (Johnson and McFarlane, 2015:36): North East, Ben Lomond, North Midlands, Oyster Bay, South East, Big River, North, North West and South West (Figure 1.1). Within each of these nations existed smaller groups tied through marriage, kinship, and language, led by a respected male (ibid). Conflict could arise between the neighboring clans due to disputes about access to economic, food, and social resources. Nonetheless, there are accounts in the ethnographic record of large peaceful gatherings of hundreds of people for cultural reasons or to practice hunting (Lloyd, 1872: 52). During these hunts,

men used spears made of tea-tree or dogwood, which were thrown with admired accuracy. A wooden club named a 'Waddy' was also used for hunting, along with various forms of ingenious traps (Johnson and McFarlane, 2015: 40). Game consisting of grey kangaroo, wallaby, wombat, and birds were prepared and cooked on an open fire (the majority of food being roasted in this manner). Women bore much of the remaining labor, as well as hunting smaller fare. Women of the inland prided themselves on their ability to climb trees for possum, and those on the coast prided themselves on their superior swimming, diving, and imitation skills as they collected crayfish and hunted seals (Plomley, 2008).

Tribal Map of Tasmania with accompanying Names and Divisions

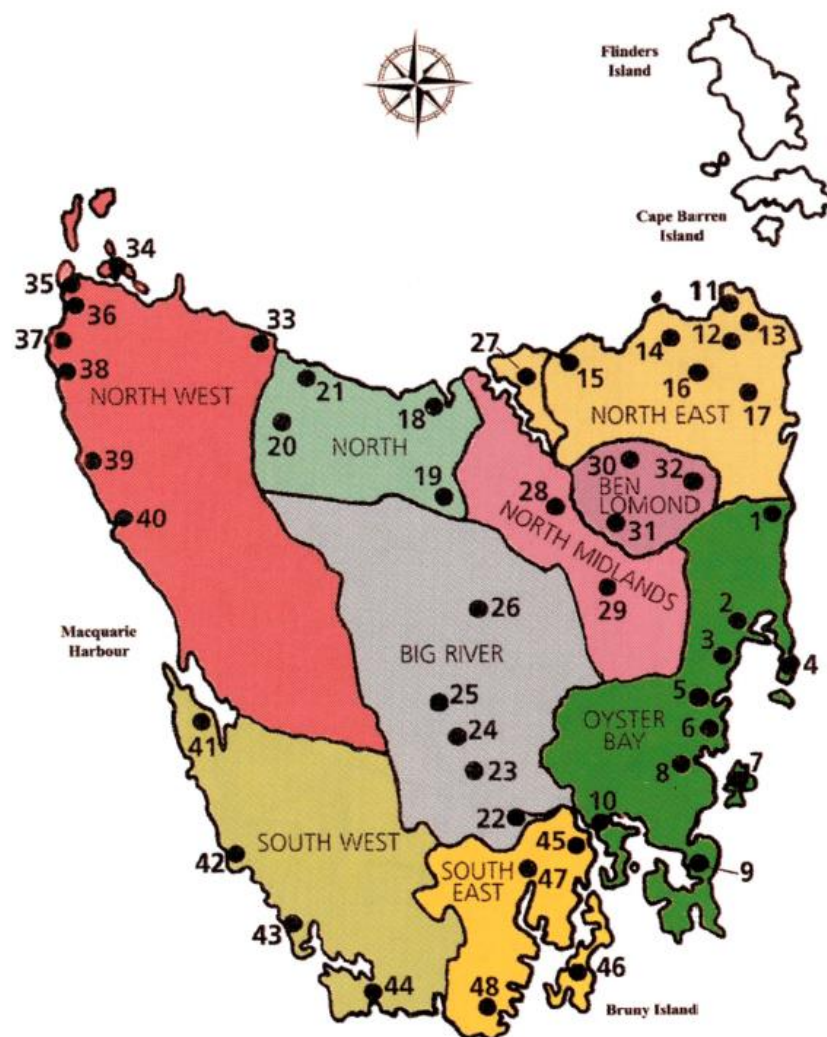


Figure 1: Map of Tasmania showing regional Aboriginal territories. Source: Johnson and McFarlane (2015: 185).¹

¹ This was originally found in Jones (1974: 237).

Cosmology of the Tasmanian Aboriginal people was often noted through a lens of Christianity, with the recorder more interested in imposing their own faith than learning about Aboriginal perspectives. Despite this, Aboriginal people of Tasmania probably kept certain aspects of their culture secret, only providing information that was considered “public”.

The sky, land, and people are intricately linked with each other, having traditions specific to each group’s region. Ancestral spirits dwell in the sky and sometimes fall to the earth, creating geological markers. An example is the Dreaming of the star-god Moihernee (Plomley, 2008:405). Moihernee and his brother Droemerdeem fought in the sky resulting in Moihernee falling down to the ground at Coxes Bight where he cut through the land and made rivers (ibid: 406). In another Dreaming, two stars use the Milky Way as their road and brought fire to the country men (ibid: 433). The importance of fire is reflected in dance. Tyrellore women from the islands of the Bass Strait perform such a dance as homage to the fire spirits (Plomley, 2008: 334). Good and evil are represented within the ancestral spirits, Wraeggowraper being the most named and dreaded, and the Furneaux islands is identified as the spiritual home for the dead for those living on the North East (Cameron, 2011: 28). The location of the ceremony was not divulged or inquired by George Augustus Robinson, though the petroglyphs and stone arrangements that dot the landscape are sites of potential culture significance today. Curiously, only a few were happened upon by Robinson and not specifically shown to him. Rather, it seems the Aboriginal people intended for them to remain secret (ibid: 23).

In the three decades leading up to Robinson's *Friendly Mission*, Aboriginal Tasmanians navigated between sealers, bush rangers, and military through relationships that ranged from subjugation and brutal violence, to courtly trades, family cohesion, and even tactical sabotage and warfare (Johnson and McFarlane, 2015: 107). As the non-Indigenous population grew from 2,000 in 1817 to 12,643 in 1824, a booming pastoral enterprise forced Aboriginal people off their traditional lands. Progress was threatened on both the settlers and Indigenous people, resulting in the Black War. This saw violent frontier attacks, which lead to martial law in 1828. This allowed the legal shooting of Aboriginal people, followed by the formation of the 'Black Line' and Robinson's 'Friendly Mission' in 1830 (ibid: 142). The 'Black Line' focused on rounding up the remaining people of the

Oyster Bay and Big River nations by driving them to the Tasman Peninsula where they could be captured. This was unsuccessful and a Plan-B (known as 'the conciliation') was launched, led by Robinson (ibid: 154).

The protection and relocation offered by the government through Robinson in return for the peaceful surrender of Aboriginal homelands was a forsaken deal. Their new home on Gun Carriage, then followed by Flinders Island (Wybalenna), was essentially a prison. Controlled conditions gradually forced all Aboriginal people to be reliant on government rations. Many suffered and died as a result of illness spreading rapidly through the settlement (Reynolds, 2004: 183). Wybalenna closed in 1847 and forty-seven of the Tasmanian Aboriginal survivors 'from no less than 10 tribes' were transported to Oyster Cove Station (Gough, 2014: 33).

The new accommodations, consisting of an ex-convict government settlement that was abandoned earlier due to failure to meet health requirements, were no better. The new location would see further deaths and the transfer of Aboriginal children to boarding houses. By 1855, only five males and eleven females remained. A year later, Van Diemen's Land changed its name to Tasmania. The actions taken by the government may have ended the Black War, but a new form of political resistance was emerging on Cape Barren Island. The Aboriginal Islander community, led by Lucy Beedon, began campaigning for a school, land rights and compensation for the disposition of Aboriginal people from Tasmania. This resulted in a school teacher being assigned to Badger Island in 1872 after Beedon had already established a tent school. Beedon was then awarded a life time lease of Badger Island for £24 a year (Breen, 2015).

2.2 Cultural Astronomy

Scholars in the field of cultural astronomy collaboratively define the essence of cultural astronomy as being:

"[T]he mechanisms by which people come to understand astronomical phenomena. It analyzes their systems of conceptualization and representation and correlates social connections, social processes and sets of ideas about social life," (Ruggles, 2011: 15).

This definition is a product of 30 years of discussion in methodology from within this field and continues to evolve (ibid). There has yet to be a defined theoretical framework

designated specifically to the field of cultural astronomy, instead adopting the theoretical frameworks and methodologies of the disciplines from which the researchers conduct their work.

Earlier deconstructions of cultural astronomy, described by Anthony Aveni under the term *archaeoastronomy*, were a meeting ground for three established disciplines: astroarchaeology, history of astronomy, and ethnoastronomy (Aveni, 2003). These disciplines were classified, then grouped by overall methodology into Old World (Green) and New World (Brown) approaches to archaeoastronomy.

The Old World (Green) approach was based on positivist epistemologies, relying primarily on the archeological record and the statistical accuracy of astronomical alignments in buildings and megaliths as proof astronomical activity in past cultures, an approach Aveni and Stephen McCluskey found problematic. McCluskey (2011) criticizes modern astronomers as being ethnocentric: sorting out ancient astronomers in their own image. The New World (Brown) approach is based in interpretivist epistemologies, obtaining sources from post-colonial ethnographers, coupled with the archeological record. This gives a more direct insight into the cultural perceptions of astronomical phenomena (Hamacher, 2012).

The “colour coding” of the disciplines comes from the first major conference on archaeoastronomy, held at Oxford University in 1983. The proceedings were published in two volumes: *Archaeoastronomy in the Old World*, edited by D.C. Heggie and published with a green cover, and *Archaeoastronomy in the New World*, edited by Anthony Aveni and published with a brown cover. The division between Old World (Green) and New World (Brown) methodologies in archaeoastronomy is now outdated, along with the term itself. Cultural astronomy as a whole utilises all available methods and approaches to understanding astronomy in culture.

A poststructuralist approach to cultural astronomy was more commonly practiced, combining the Green and Brown methodologies. However, a new divide between Western and Indigenous approaches to the field emerged. Archaeoastronomer Clive Ruggles (2010) acknowledges the differences in attitudes: Western knowledge perceives the cosmos as an objective reality, placing rationalistic logic as a passive observer while observing that Indigenous perceptions tend not to place a separation between the world and themselves, rather a consciousness of submersion into the natural world in which they are actively

involved. It is these fundamental differences in universal perception that Ruggles argues need to be acknowledged and addressed with mutual respect between Western and Indigenous scholars.

Finally, a move to have cultural astronomy firmly placed within social theory helped to dissolve this concept of the divide. Stanislaw Iwaniszewski's (2011) paper, *The Sky as a Social Field*, argues against a single interpretation of the sky. This application of social theory sees the sky as being embedded in peoples' habits and ego as they negotiate their field or society in relation to the sky (ibid). Cultural astronomy has moved towards anthropological methodologies to aid in the understanding of Indigenous frameworks of astronomy. Ruggles (2010) argues that basing the cultural astronomy hypotheses within social theory has been instrumental in bridging the gap between the traditional opposing frameworks. This aides in a universal understanding of astronomy and stresses the importance of practicing rigor when evaluating the evidence.

2.3 Australian Aboriginal Astronomy

Hamacher (2012: 41) describes Aboriginal Astronomy as cultural astronomy as applied to Aboriginal cultures. This definition aims to go beyond a limited description of stories of the sky and labeling of astronomical objects. It aims to understand the practical applications and understandings of celestial objects and phenomena through a social, historical, and scientific lens, connecting the relationships between life, sky, human origin, and natural events. Australian Aboriginal astronomy is interdisciplinary, drawing from archaeoastronomy, ethnoastronomy, and geomythology. It is through The Dreaming where Hamacher (2012) recommends the search for astronomical knowledge must begin. Access to oral traditions can be difficult, as much of the knowledge is restricted by gender or initiation. Other problems arise, depending on the type of knowledge being transferred from person to person in anthropological studies, such as cultural bias, language barriers, and colonisation, particularly in terms interpreting nineteenth century documentation of Dreamings.

Researchers of Australian Aboriginal astronomy have discussed inconsistencies in historical and ethnographic records. Hamacher, Phillip Clarke, Serena Fredrick, John Goldsmith, and Ray Norris have all described the difficulties in obtaining a complete and accurate record of oral traditions, especially near major metropolitan areas where colonisation was rapid. Records mostly consist of anecdotal observation from explorers,

settlers, and colonial officials whom were generally ignorant of Aboriginal languages and traditions.

Current work emphasises a collaborative approach between researchers and Aboriginal communities. An example of this collaboration is Bill Yidumduma Harney, a Wardaman Elder, and Dr Hugh Cairns together published the book *Dark Sparklers* (Cairns and Harney, 2003). *Dark Sparklers* is a "full account of his [Harney] spiritual and intellectual world" (ibid: xi). The book combines Indigenous knowledge and Western knowledge, working towards an outcome that is investigative and respectful and reengaging knowledge back into the community and wider Australia.

2.4 Tasmanian Aboriginal Astronomy

Compared to mainland Aboriginal cultures, little research into the astronomical traditions of Aboriginal Tasmanians has been undertaken. Despite this, information has been referenced throughout the recorded history of Tasmania. Early writers, such as G.A. Robinson, Henry Ling Roth, James Backhouse Walker, Joseph Milligan, and James Bonwick, noted features of Aboriginal astronomy, usually within a broader discussion of religion and spirituality. Bonwick (1870) conducts a brief comparative study called *The Astronomy of Natives* where he discusses possible aspects of Tasmanian Aboriginal astronomy relating to the sun, moon, Orion, and the Pleiades. He draws together connections across Tasmania, mainland Australia, and other indigenous hunter/gather cultures.

Robinson's journals document his interactions with Aboriginal society from 1829 to 1834. Within his journals are references to Dreamings and astronomical observations. He praised the guides on occasion for their accurate knowledge of the stars (Plomley, 2008). Some modern scholars have been critical of these selected histories, claiming they are romanticised and portray Tasmanian Aboriginal people as "dancing" towards extinction (Gough, 2000: 100). Julie Gough (ibid) argues this is an unacceptable recording of Aboriginal culture, which does not account for the adaptability and strong hold traditions maintained through the dramatic change of colonisation.

Other modern writers of Tasmanian Aboriginal History who reference Tasmanian Aboriginal astronomical knowledge include Henry Reynolds, Patsy Cameron, Ida West, Ian McFarlane and Emma Wilson. Wilson (1999) wrote a book dedicated to Astronomy in Tasmanian Aboriginal culture from the point of view of her Grandmother. Within her

booklet *Astronomy and Other Seasons*, Wilson chooses not to credit the authors in the academic style, instead leaving a list of sources available. She explains (ibid:86):

"I have chosen not place the sources into a formal academic structure of reference solely because this book is not intended to give credit of any sort to those who wrote the information down about my ancestors."

This refusal can be understood as an effort to reclaim traditional information from colonial powers and structures. Yet the absence of referencing makes it difficult to place traditions in history and use it as a comparative text for research.

Chapter 3: Methodology

This study of the astronomical traditions of Aboriginal Tasmanians is placed under the academic field of cultural astronomy.

The methodology positions my study within epistemologies that reflect the unification of Indigenous and Western Knowledge systems. My research navigates the area between the quantifiable (data) and qualitative (cultural traditions), creating a space for developing an interpretive hypothesis. This post-positivist scientific method is not reductive or nihilist. It is constructive in understanding how both knowledge systems construct a reality that contributes to a greater understanding of the world. An interpretive hypothesis is not a framework aimed directly to incorporate Indigenous knowledge systems; empirical science is subjected to the same interpretation within its physical evidence. What it does is situate relevance and rigor to achieve a universal understanding when uniting multiple lines of evidence. These lines of evidence move beyond the discipline of science, to history, anthropology, archeology and Indigenous studies, arriving at a comprehensive conclusion. (Whitley, 2006; Ruggles, 2011).

The issues that rise when applying a post-positivist methodology to research into Aboriginal astronomy is the conclusion will always be empirical. Knowledge that fails to meet this benchmark risks slipping into the realm of pseudo-science. This potentially places science in opposition to the scope of 'the Western' and is counterproductive to us reaching a greater understanding of astronomy. While important to acknowledge the difference in knowledge production and privilege each in some contexts and understand where it is limited in others, we should also see that knowledge is interchangeable and the histories of knowledge production are interwoven in both Indigenous and Western epistemologies. Arun Agrawal (1995:422) suggests:

"In the face of evidence that suggests contact, variation, transformation, exchange, communication, and learning over the last several centuries, it is difficult to adhere to a view of Indigenous and Western forms of knowledge being untouched by each other."

Using Agrawal's views, an investigation into the astronomical traditions of Tasmanian Aboriginal people employs Western and Indigenous methodologies interchangeably. An interpretive hypothesis was developed to understand the physical astronomical

environment, an approach dictated by the texts and the nature in which Tasmanian Aboriginal Dreamings, culture, and traditions have been imbedded within nineteenth century literature. Empirical texts were examined for oral traditions, embedded with scientific information. The Dreaming was examined through Indigenous methodologies as the embodiment of culture and tradition, guiding further understanding of celestial movements. The idea of theory being dictated by data is one developed by Strauss and Corbin (1998) using the term *grounded theory*. They (ibid: 13) explain that:

“Analysis is the interplay between researchers and data. It is both science and art. It is science in the sense of maintaining a certain degree of rigor and by grounding analysis in the data. Creativity manifests itself in the ability of researchers to aptly name categories, ask stimulating questions, make comparisons, and extract an innovative, integrated, realistic scheme from masses of unorganized raw data.”

Grounded theory was applied when interpreting and analysing the texts. Data found within the literature dictated the outcome of the theory. This approach permitted flexibility within research design, opening creative engagement with textual analysis, including written journals, sketches, and oral traditions. This analysis is an interrogation of the data through both Western and Indigenous lines of enquiry.

To investigate the data through only one telescope would be like looking through a telescope in the middle of the city: only the brightest and most obvious objects are visible, while the infinity of the night sky is missed. Multiple lines of enquiry gives an indication of whether the results connected to the sky were grounded in traditions that have social or practical implications on Tasmanian Aboriginal lives, conceptualised in Indigenous and Western scientific methodologies. By using historical textual analysis, I was able to filter through categories of data, including vocabularies and Dreamings related to astronomical objects to develop a database. This database was used for basic linguistic and comparative analysis, aided by the use of astronomical software packages.

3.1 Historical Textual Analysis

A textual analysis of nineteenth century literature was used to collate the recordings of Aboriginal astronomy written by explorers, anthropologists, and missionaries. Fragmented accounts of oral traditions were recorded sporadically in newspapers,

journals, books, and papers written with a clear superiority that often reduced richness of the culture to brevities before being quickly dismissed.

My primary source is *Friendly Mission*, the journals of G.A. Robinson (Plomley, 2008), which contain references to traditional Tasmanian astronomical knowledge. Additional sources include Henry Ling Roth's *The Aboriginals of Tasmania* (1890), Joseph Milligan's contributions to *The Royal Society of Tasmania* (1886), and Robinson's Flinders Island journals, *Weep In Silence*, edited by N.J.B. Plomley (1987). Previous attempts to undertake a textual analysis (specifically to astronomical knowledge), through historical documentation revealed numerous complications. This includes misidentifications, transcription errors, and conflated terminology (e.g. stars and constellations, comets and meteors; Goldsmith, 2014). Additionally, star groupings and “constellations” described by Aboriginal people are forced into the prescribed structure of Classical astronomy (Fredrick, 2008).

Throughout the literary analysis, I pursued histories produced by Tasmanian Aboriginal people. This method of reading is described by Penny Van Toorn (2011: 6) as ‘tactical histories.’ Van Toorn argues that the voices found within earlier writings have a political or economic agenda, cased within an institutionalized document. Van Toorn argues that oral tradition can be heard through the formalized writings; addressing multiple recipients, speaking for communities and Indigenous principles of exchange... all indicators of orally based paradigms (ibid). Examining the literature in this way facilitated an inclusive analysis of the speakers’ and recorders’ backgrounds.

When knowledge was recorded, the speaker was identified (or at least the group or clan they belonged to), ensuring the knowledge remains securely tied to the source. This benefits future research, as the details of *who* said it is just as important as *what* they said. This can also be said of *where* and *when* the knowledge was recorded. Robinson's journals are dated. As Robinson moved across Tasmania’s landscape, geographical markers were noted, as well as changes in weather across a period of five years. This sample of documented history, along with indicators of time, place, people, and conditions, are invaluable in reconstructing astronomical traditions.

In companion essays to *Friendly Mission*, Wendy Aitkin (2008) and Sharon Dennis (2008), representing a 'community voice', criticise the journals. Both discuss problems with using Robinson as an authoritative line of history. Aitkin highlights the destruction of Robinson's

later journals from Wybalenna, as an example of history being censored. Aitkin also argues that Brian Plomley's editing further filtered and obscured the record. Dennis identifies the common adoption of *Friendly Missions* as the only true recording of Tasmanian Aboriginal people is problematic for the Aboriginal community. With *Friendly Mission* used as a benchmark for all research regarding the history of Tasmanian Aboriginal people, any oral history that contradicts this is often disregarded as fabrication (Aitkin, 2008; Dennis, 2008).

These sentiments have been repeated for decades, especially in relation to Robinson's later journals, which reflect his time at the Flinders Island settlement (Wybalenna). Plomely (1976: 293) writes in his book *Weep in Silence*:

"Many parts of the official record are either wildly exaggerated or simply untrue, and that holds for Robinson's own statements as well as those of others. It must be borne in mind that all those at settlement sought to justify themselves for their actions, but that few of them behaved honestly, instead seeking monetary or professional gain at all cost."

Nearly a decade later, Aboriginal elder Ida West in her 1987 book *Pride against Prejudice* asks the question (West, 1987: 99):

"It doesn't matter what George Augustus Robinson puts on paper, or what they find of Robinson's. How do we know that this is the truth?"

This question, nearly three decades on, has still yet to be answered and it is unlikely that it will ever be answered completely. What we can do is meticulously analysis the literature that explores all avenues of astronomical connections to culture. This approach is not final, and this analysis does leave questions and loose ends - ready to be tied through further research.

3.2 Comparative Research

Comparative inquiry into Aboriginal astronomy in mainland Australia benefited this research. Like language and customs, the ways in which astronomy is used between groups is different, and this should be clearly understood when doing any comparative analysis. Tasmania's history is unique and the Aboriginal people developed traditions that

are exclusive to this locale. Yet trading routes, songlines, and Dreaming tracks connected Aboriginal people all across Australia (Norris and Harney, 2014). But it was the disruption to Aboriginal cultures during colonisation that led to the loss or fragmentation of traditional astronomical knowledges.

Researching mainland Aboriginal traditions can provide insight into some of Robinson's cryptic observations. On 28 August 1832, Robinson wrote:

"Dick saw a cockatoo and called it Black Joe: he is a sad talker."

Robinson had sent Joe to communicate with the sealers sixteen days earlier (ibid: 674). Dick, or *Roonathadanna*, could be referring to the symbolic meaning of the cockatoo as an omen of death. In a TED talk (2010), Mary Victor O'Reeri of the Nyul Nyul homelands in the northwest Kimberly region of Western Australia says:

"My old people say to me, they tell me that one cockatoo symbolizes death, two signifies hope and joy, three is for disappointment, five if for surprise."

Mary Victor O'Reeri explains the symbolic significance of one cockatoo. Knowing this, the entry made by Robinson describing Roonathadanna as a 'sad talker' takes on a weighted meaning. Comparative research encourages mindful engagement with the journals, which can reveal a subtext of Aboriginal knowledge. Comparative analysis is used to strengthen argument, and position Tasmanian Aboriginal astronomy among the wider discourse of Aboriginal astronomy in Australia. Utilising a comparative element in the research has helped fill gaps in analysis, as well as inform and justify lines of enquiry.

3.3 The Database

Astronomical information from both primary and secondary literary sources were compiled into a database that categorized findings into subject, vocabulary, region, environment, date, story, and source. The database follows categories made by researchers in the field of Australian Aboriginal astronomy, including Dianne Johnson (1998), Robert Fuller (2014), and Serena Fredrick (2008). This database differs from those of Johnson, Fuller, and Fredrick, as ethnographic data was not included. I included more categories than Fredrick or Fuller to broaden the scope of commonalities that could

be found between, and within, the texts. This allowed for a qualitative comparison of stories and vocabularies based on the region from which it comes.

The database initially included all available literature on Tasmanian Aboriginal astronomy. However, the scope began to narrow as I refined the research question and focused on writings of the nineteenth century. The database, allowed sorting of information and has been immensely useful in mapping out the data and informing lines of enquiry. The database has been used to quantify the information, measuring frequency of stories accounted for in a particular region or across many regions. Results of these findings will be presented in the next chapter (Knowledge Reconstruction).

3.4 Linguistics Analysis

The importance of linguistic analysis to this research became apparent during the textual analysis and data collecting. The variations evident within the 44 known word lists recorded, often opportunistically between 1777 and 1847, are linguistically different, indicating there were up to 12 dialects spoken within Tasmania (Bower, 2012: 4590). These have since been grouped or netted into five clusters

1. Oyster Bay
2. Southern/Bruny Island
3. Northeastern
4. Western
5. Northern

These were grouped using a Bayesian clustering algorithm that identifies source and amalgamation of words and groups them (ibid). The idea that Tasmanian Aboriginal language was monolithic is disparaged. Of the 3,412 words tested, only 24 words are found in all branches. Most of these being introduced (e.g. *cattle*) and cultural and mythological terms that Bower argues are most likely borrowed (ibid).

The analysis of Tasmanian Aboriginal languages confirms the breadth and division of language in Tasmania. Identifying the source of the record helps understand why variations occur, which aides in navigating through cultural connections to sky. The Aboriginal words transcribed by Robinson represent his own understanding of vowel and

consonants through his understanding of language. Further, this was influenced by English language dialects. Robinson, being a laborer, would have spoken like a lower middle class Londoner (Plomley, 1987: 5). The same word would then have variations of spelling between the recorder, whether French or British, and in the case of Robinson, between occasions of recording. Due to the variation of spelling in the source material the spelling of Aboriginal names in this thesis will replicate the spelling of what is being referenced.

The representation of Aboriginal words recorded needs to be considered. Is the recording true to what the speaker intended? English biologist and Quaker, Earnest Westlakes, created a vocabulary during his visit to Tasmania in October 1908. In Westlakes' vocabulary, the word 'kangaroo' is given for the phrase 'I don't know' (Plomley, 1976: 65). Interestingly there was discussion about the confusion of 'kangaroo' and 'I don't know' in Captain James Cook's vocabulary list (ibid). This confusion is also noted by Claire Bown, who remarked that the word for 'nose' in some Tasmanian Aboriginal languages is actually the word for 'I' (Egan and Bown, 2015). It is possible the recorder pointed to their nose, and the speaker thought they were pointing to themselves (ibid).

Plomley's (1976) book, *A word-list of the Tasmanian Aboriginal Languages*, was a vital aid in analysing historical texts. This resource is a culmination of 26 years work by Plomley across archives, both national and international. Plomley omitted many words given for stars that are associated with mythology, instead directing the reader back to Robinson's Journals (ibid: 409). Due to this editing process, I found it necessary to look to the original vocabularies of Milligan, Robinson, Roth, and Backhouse Walker.

3.5 Stellarium

Stellarium (www.stellarium.org) is a free, open-source planetarium software package. It simulates a realistic sky as seen from any point on the Earth at any time, within several thousand years in the past or future, displaying the exact positions of celestial bodies, taking into account the movements of stars due to precession, nutation, proper motion, and considers atmospheric and seeing effects.

When coupled with the data in the journals of Robinson, the information transforms from a once hypothetical space of analysis into a physical blackboard where ideas can be visualised. Stellarium serves to clarify and examine the data collected from historical texts.

When the data is removed from a loaded historical context, it allows breathing space for new insights and concepts to form.

The key functions in Stellarium assisting in this analysis are; observability, transforming manual calculations into an immediate display, specific to each astronomical body. Clearly presenting heliacal and acronycal rise and set times and rise and set times for the day and periods of absence below the horizon. 58 navigational stars are marked for quick reference. The archaeolines feature maps the declination pathways of the sun and moon as it swings between its major and minor standstills. Angle measurement tools, historical supernovae tracker, constellation art, lines and labels have all assisted and reduced the time taken to identify stars from the historical record (Stellarium, 0.13.3).

Stellarium opens up a new territory of engagement with the journals that was previously unavailable, or at least required hundreds of hours of manual calculations. It creates a connection to the past by transforming a flat reading of nineteenth century texts into one that is dynamic and interactive.

Patsy Cameron's (2009) supplement, *Meeting at Bark Hut*, approaches analysing the journals in a similar vein. *Carne Neemerranner* or 'telling ground' research methodology is used to reinvestigate an extract from Robinson's journals. Modern bodies are placed in historical location to experience a journey faced by Aboriginal ancestors in a simulated reenactment (Cameron, 2009). Although Stellarium is an augmented recreation of the past, a similar methodology can be employed. The researcher is transported back in time and looks to the same sky as those who lived hundreds of years ago. This approach can be subject to parallels in criticism in Cameron's 'Telling Ground' research: emotional dramatization and the inability to construct a historical moment without projecting present values onto the past. The latter is more relevant to this study. Using Stellarium to test the accuracy of Robinson's and other authors' records, we can obtain a more precise, clear, and rigorous reconstruction of Tasmanian Aboriginal astronomies.

Chapter 4: Knowledge Reconstruction

The database contains a total of 73 astronomical items. 22 recordings are contemporary accounts of Tasmanian Aboriginal astronomy. 51 were from nineteenth century literature, and 42 are from Robinson's journals. Of the 51 accounts of astronomy in the earlier literature, 42 could be linked to a physical location in Tasmania. These locations are pinned on the map in Figure 2. The coastal areas of Tasmania, especially down the east coast, have a higher frequency of astronomical traditions recorded. The number of stories recorded in each region are as follows: Bruny Island (13), Cape Portland and Swan Island (7), Big River (1), Ben Lomond (1), North West Tasmania (8), Oyster Bay (5), Port Sorell (1), and North East Tasmania (5), see Figure 2.

The astronomical traditions recorded included 14 mentions of stars, constellations, and celestial objects (e.g. Milky Way and Orion). This includes five stories about the moon, one about the sun, three mentions of two planets (Mars and Jupiter), and eight mentions of ancestral spirits connected to the stars.

Data will now be analysed by qualitative methods to understand how astronomical knowledge was used in Tasmanian Aboriginal cultures.

4.1 Dreamings and Astronomy

The term Dreaming is an echo of the vast epistemology it represents (Fletcher, 2003). The Dreaming is time, knowledge, ontology, ancestors, law, language, place, tradition, home, and heart. The Dreaming takes on different meaning between Aboriginal groups and is the collected knowledge of that group. Hamacher (2012) says it is here that the search of scientific knowledge must begin.

In this chapter, two Dreamings recorded in the nineteenth century from the east coast of Tasmania are investigated. Understanding the concept of the Dreaming and the potential information contained in these oral traditions sets the research toward informed examination. The two Dreamings are analysed through language, comparative studies, and explored using Stellarium to better understand the significance of astronomy in

Tasmanian Aboriginal traditions. Both Dreamings look into aspects of creation, one fire the other man. This chapter is divided into two subsections; the first part will look at the creation of fire in *Stingray in the sky* and the second *Moinee and Droemerdeene* (my titles), tell of the creation of man.

4.1.1 Stingray in the Sky

In nineteenth century Tasmania, some names of stars were recorded along with the Dreamings attached to them. Mannalargenna, a leader of the northeast Aboriginal people of Tasmania, named the two men who created fire and lived in the sky world. Mars was their foot and the Milky Way their road. Others also spoke of the two stars that brought fire to their countrymen and identified a stingray from the dark nebula in the Milky Way.

The original traditions are now fragmented, as colonisation and disease surged through Tasmania, displacing and killing many Aboriginal people. As a result, Tasmanian Aboriginal astronomical traditions are scattered throughout the historical records and archives. Mannalargenna's account of the two stars that made fire were repeated and recorded in Robinson's journals (Plomley, 2008: 432 & 436). Years later, Joseph Milligan (1890) recorded the *Legend of The Origin of Fire*, a Dreaming from an unknown Oyster Bay Aboriginal person. Unlike Robinson's writings, which were disjointed and unrelated, Milligan's record is more detailed and appears to be more complete. I aim to build upon Mannalargenna's description of the two stars by working back from Milligan's fuller record and filling in the gaps. Tracking accounts from recorded Dreamings and analysing the skies of the 1830's through Stellarium.

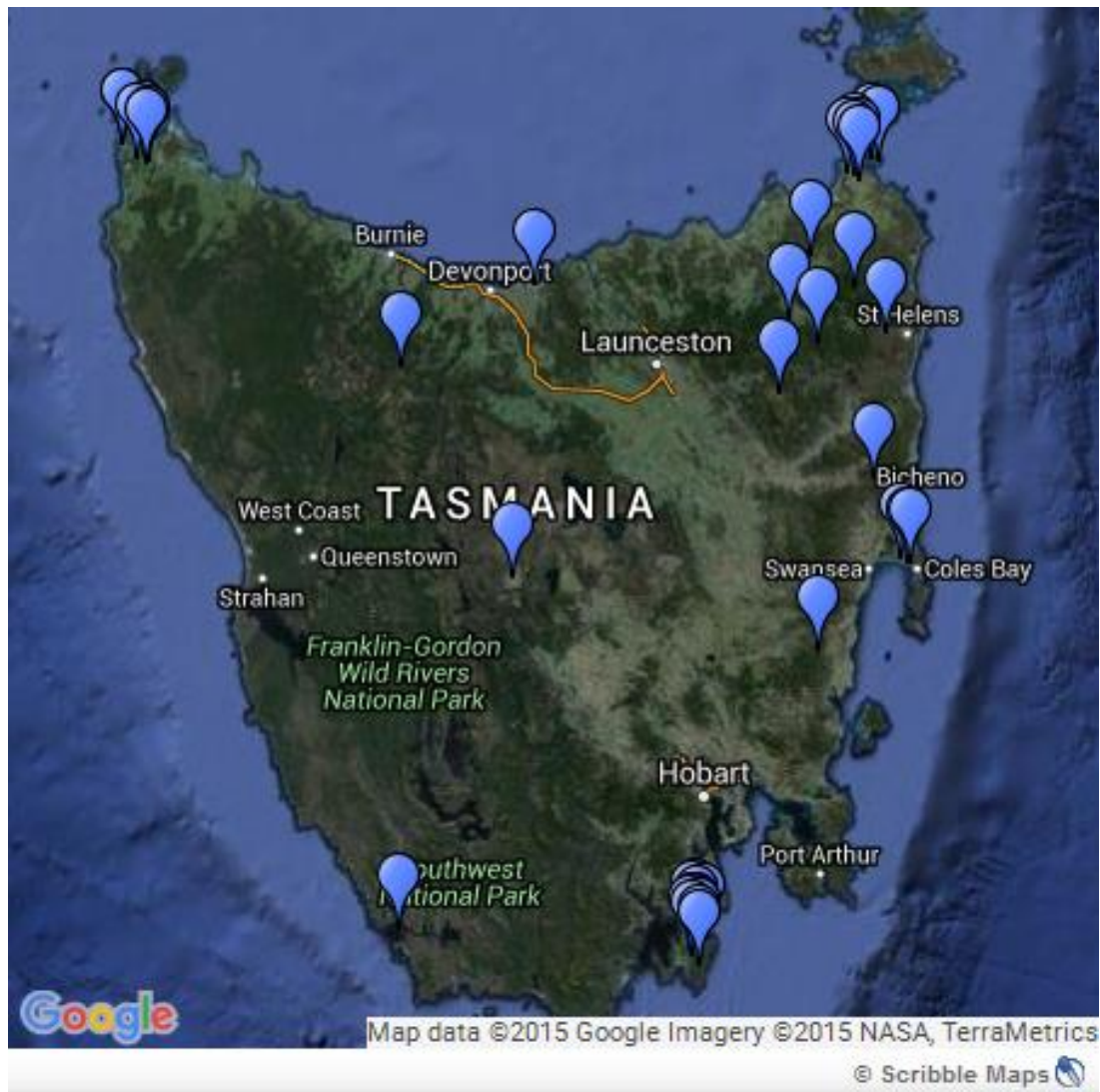


Figure 2: Map of Tasmania showing where astronomical data was recorded.

Joseph Milligan's recording of a *Legend of the origin of Fire and the Apotheosis of two heroes, by the Aborigines of Tasmania, as related by a Native of the Oyster Bay Tribe*² was recorded sometime around 1831 during Milligan's 30-year stay in Tasmania. Most relevant to this study is Milligan's time while appointed as superintendent and doctor to the Aboriginal people held on Flinders Island (Florek, 2013). Milligan's appointment commenced in 1843, nearly a decade after Robinson's expedition. It is here that I draw on Milligan's vocabulary as an extension to Robinson's journals. This provides new insights, and perhaps complement the interpretation of Robinson's entries relating to stars and the Aboriginal names of those stars.

² See Appendix for full version.

During the month of August 1831, G.A. Robinson, the government appointed protector of Aboriginal people, journeyed with his party through the Mount Cameron ranges of North East Tasmania. During this expedition, Robinson was accompanied by Mannalargenna (UTAS, 2015; Plomley, 2008; Ryan, 2012). Robinson wrote of his obligation to the 'colony at large' to record places and their Aboriginal names, as he predicted the Aboriginal people would soon be 'defunct' (Plomley, 2008: 430).

The period of conscious recording by Robinson is reflected in his journals over three days. The first day, on Sunday, 14 August 1831, Robinson (being a man of God) focused the conversation on his Aboriginal companion's religion. Robinson records Mannalargenna's words on the creation of man and fire. The Sunday recording reveals that the Cape Portland people believe fire was first made by PORM.PEN.NER. This name will be mentioned twice more in relation to fire but will be spelt differently each time, as it was recorded: PARDEDAR (ibid: 872) and PARPEDDER (ibid: 577). Woorrady, one of Robinson's guides from the South East Nation of Tasmania, attributes PARPEDDER as being the one who gave fire to the Bruny Island people.

On 16 August 1831, Mannalargenna gave the name of two stars: (1) PUM.PER.ME.HOWL.LE and (2) PINE.TER.RIN.NER. He repeats them the next day as the two spiritual ancestors who created man and fire. It seems the traditions of Oyster Bay and Cape Portland people are aligned (ibid: 436). However, the traditions of the people of Brune/Bruny Island differ slightly. They do not attribute the same actions of creation to the two stars in the Milky Way (ibid: 432). Yet consensus is achieved on 15 August 1831 when Robinson recorded:

"The Brune natives said that the two stars in the Milky Way are two men, and Mars is his foot and the Milky Way his road. The Cape Portland natives confirmed this, that Mars was the foot. Our Conversation this night was brief."

Investigating this shared tradition further, we turn to Stellarium. Moving into this virtual space allows a unique opportunity to investigate how the written history is reflected in the night sky.

Over the period of 14-16 August 1831, Mars set soon after the sun, making it very difficult to see in the evening twilight (and was within 2 degrees of Saturn). Antares (Alpha

Scorpii), a red supergiant, is visible high in the sky (azimuth of 80 degrees) and is bright red, similar to Mars³. The declination of Antares means that when it sets, it is just beneath the Milky Way, appearing at the “foot” of the Milky Way.

Robinson discussed these stars in the period between April and July 1831. Examining the sky on these dates using Stellarium shows that through the month of May, Mars moved through the Western constellation of Gemini and was clearly visible in the sky after sunset. The two stars mentioned in the journals could be the Gemini twins Castor (Alpha Geminorum) and Pollux (Beta Geminorum), which are also the brightest stars in Gemini. During the month of May, just after nightfall, Mars is positioned northwest on the horizon, at the feet of the Gemini twins. With Castor and Pollux at the head, they use the Milky Way as their road, just before disappearing below the horizon at sunset, as described by Mannalargenna.

Milligan, in a footnote to his record of the *Legend of the Origin of Fire*, also identifies Castor and Pollux as the two stars representing the two men who create fire. This is a common association made in traditions across the world relating to men and fire. In Classical astronomy, Castor and Pollux are two men who appear to sailors as St Elmo's fire, and seen as a good omen to sailors out at sea (Dixon-Kennedy, 1998: 116). The motif of fire in association with Castor and Pollux continues in Victoria. In Boorong traditions (Stanbridge, 1857: 140), Castor and Pollux represent two young male hunters that pursue a kangaroo and kill him at the commencement of the “great heat” (summer). A mirage is seen as the smoke of the fire, by which they roast him. When their smoke is gone, autumn begins. It is worth noting that these two stars are high in the dawn sky in mid-November, during the start of summer. This may contribute to their association with the “great heat”, which generally runs from November to March ⁴.

Elements of the first part of the *Legend of the Origin of Fire* are reflected in the August 1831 journals of Robinson. Mannalargenna identifies the two stars as giving fire to his countrymen. I argue the two accounts are connected, as a member of the Oyster Bay tribe

³ Antares is the heart of the scorpion (and brightest star in Scorpius), whose means “rival of Ares”, the Greek god of War. He was considered a rival of Mars, the Roman god of war, as both are bright red and come very close to each other in the sky on occasion, as the ecliptic passes close to the star.

⁴ Swan Hill, Victoria climate (WeatherZone). URL: www.weatherzone.com.au/climate/station.jsp?lt=site&lc=77094

gave this account to Milligan. It is understood that Milligan's role as a doctor on Flinders Island (post-Robinson expedition) would have resulted in Milligan forming relationships with the same Aboriginal people who were with Robinson during his mission. Mannalargenna died in 1835 on Flinders Island, nine years before Milligan's employment in 1843. During Milligan's stay he was appointed superintendent of the Flinders Island settlement until 1846, when he left - returning to his duties in 1847. On his return, Milligan supervised the move from Flinders Island to the Oyster Cover camp and continued this role until 1855 (Florek, 2013).

Sometime between 1843 and 1855, Milligan recorded *Legend of the Origin of Fire and the apotheosis of two heroes, by the Aborigines of Tasmania, as related by a native of the Oyster Bay Tribe*. Milligan does not specify the gender of the narrator of this Dreaming. Still, a census was performed by Robinson in 1836 renaming Aboriginal people with English names (Plomley, 1987: 878). It is probable this list contains the name of the person who told this Dreaming. It is important to note among this role-call is Manalargenna's daughter, Wapperty, Big River man Calamarowenye (King Tippo), Robinson's guides who travelled with Manalargenna; Truganini and Bullrer, all who originating from the Oyster Bay region (Gough, 2014: 33). Any of the aforementioned people could have told this story to Milligan. It is highly likely that the same story was described to Robinson a decade before, during his mission through Tasmania.

The second part of this Dreaming helps to clarify the vocabulary table (Table 1). This includes jottings from the end pages of Robinson's journals, covering the period from April to July 1831. The table also explains the story behind the "stingaree" in the sky, recorded by Robinson on 13 March 1834 (ibid: 895).

At 11:00pm on 13 March 1834, Robinson (ibid: 895) recorded the following on a clear and starry night. With his mind heavy with the weight of his mission, I argue Robinson did not give this conversation his full attention.

"They call the black spot in the Milky Way or Orion's Belt a stingaree and say the blackfellows are spearing it. The Natives of the South call it LAR.DER, which is their name for this fish, and the natives on the east call it LAR.NER, which is their name for this fish. They spoke of the subject of stars with great zest."

The south and east Tasmanian Aboriginal words LAR.DER and LAR.NER are translated to *stingaree* in Robinson's account. Robinson uses the same word LAR.DER in 1831 to identify the "dark area" in the Milky Way (Table 1). LAR.NER is also used in relation to Mars and LAW.WAY LAR.NER translating to 'Milky Way or road Stingaree.'

This word appears to be associated with Mars in Robinson's notes. LAR.NER may have been incorrectly linked with Mars, or this word may take on other meanings. Another version of this word for fish is 'Lerunna', recorded by Milligan (1890: 28) as "Flat Fish or Flounder."

Robinson identifies the "black spot" as being in the Milky Way or Orion's Belt. This is probably the Coalsack nebula, a dark absorption nebula that can be seen clearly with the naked eye and appears as a dark hole against the backdrop of the otherwise bright Milky Way (Figure 3).

Table 1: Notes regarding star named found at the end of Robinson's journals, April–July 1831.

Object	Oyster Bay	Brune/ Bruny Island	Cape Portland
Mars		LAW.WAY LAR.NER	LAW.WAY DEVER.ER
Star (1)	PUCK.AR.NE.PEN .NER	PY.LE.BAY	PUM.PER.ME.HOWL.LE
Star (2)	LORE.NE.PEN.NE R (wife)	LAW.WAY	PINE.TER.RIN.ER
Black Milky Way		LAR.DER	PY.ER.DREEM.ME TONE.NER.MUCK.KEL.LEN.N ER
White Milky Way		LAW.WAY.TEEN.NE	PUL.LEN.NER

The Coalsack nebula borders the Western constellations of Centaurus, Musca, and Crux (the Southern Cross), not Orion (which is 90 degrees on the other side of the sky). On 13 March 1834, Orion is sitting prominently on the western horizon at 11:00 pm. Robinson was on the west coast of Tasmania in the Arthur River region, so we can imagine his view to the west and of Orion would be unobstructed. Orion (or rather, the asterism of his belt)

is commonly associated with men and hunting in many Aboriginal cultures (Norris and Hamacher, 2011; Johnson, 1998), as well as in Classical astronomy, a coincidental association recognised by Robinson. Nonetheless, the constellation of Orion sits near the Milky Way, but not within it. Thus, it does not contain any large or obvious dark nebula visible to the naked eye.

Robinson writes in that day's entry:

"we made a small fire and laid down in the open air covered with a blanket."

On that night, the Coalsack nebula was high in the southeastern sky at sunset, moving higher in the sky as the night progressed. From his supine position, he would have had a clear view of the nebula's dark shape high above. Orion would have appeared high in the northwestern sky that night (at about the same altitude as the Coalsack), gradually sinking towards the horizon as the night carried on (being near the horizon by 11:00 pm).

Robinson's entry regarding the Coalsack nebula states that the stingray is being speared by the men. I suggest the spears are the pointers to the Southern Cross (Alpha and Beta Centauri), as the points to the crux will be identified as the two fire creators and their wives. In North West Victoria the dark space (Coalsack) is an emu named *Tchingal*, in the Wergaia language. The eastern stars of the Southern Cross (Alpha and Beta Crux) are the pointy ends of the spears of two warriors who speared the emu through the neck and rump (Stanbridge, 1857: 139).

The table made from Robinson's notes between April and July 1831 identifies a particular star as being female (Table 1). The Oyster Bay word LORE.NE.PEN.NER is given with the translation of 'wife' next to it (ibid: 497). The 1890, Oyster Bay account of the *Legend of the Origin of Fire* identifies the women as Lowanna; a common word for women in Milligan's own collected vocabulary (Milligan, 1890: 51). The presence of a female-star in Robinson's notes supports the idea that a version of *Legend of the Origin of Fire* could have been related to Robinson during his mission, with the names of the stars representing the names of the ancestral protagonists who feature in this Dreaming.

In the journal entry that accompanies the above notes written on 27 June 1831, Robinson writes:

“Busy writing. In conversation with the natives respecting the stars. These people, like the ancients, have described constellations in the heavens as resembling men and women, men fighting, animals, and limbs of men; together with names for the stars. The Aborigines pointed them out.”



Figure 3: The Coalsack nebulae and Southern Cross. Image: Wikipedia Commons.

Unfortunately, like many of Robinson's entries, details are condensed and rarely elaborated upon. The excerpt provides a summary of features of Aboriginal interpretations of the stars, many identifiable within Milligan's 1890 *Legend of the Origin of the Fire*.

This Dreaming, shared by a member of the Oyster Bay group, can be unpacked beyond that of labels and language. Dreamings are passed on for (potentially) tens of thousands of years. These oral traditions are encoded with information significant to the survival and navigation of the physical and social landscape. Reading the canopy of stars above as form of traditional text informs practice on land, evident in *Legend of the Origin of Fire*. On the surface this Dreaming explains how fire came to the countrymen of Tasmania. Digging deeper, there is evidence of this story containing information on seasonal indicators, fishing customs, burial and healing practices, as well as fire attainment.

Tasmanian Aboriginal women living on coastal environments, like Oyster Bay on the east coast of Tasmania, spent many hours in the water. Acting as the prime hunters of shellfish on the coast and being taught from a young age, they were excellent divers and could dive considerable depths on a single breath (Plomley, 2008: 66-88; Johnson and McFarlane, 2015: 39). Due to the large portion of their lives spent in the sea, the Dreaming and the night sky were used to inform cultural practices regarding how to navigate the oceanic environment safely.

The two women diving for crayfish were 'sulky' due to their unfaithful husbands. Consequently, they were speared by the stingray and died. The detail and language used is significant. The same wording was used in an earlier recording of a separate incident in Robinson's journals. On 4 November 1830, Robinson (Plomley, 2008: 302) describes the women returning from diving for crayfish off Swan Island, where they were chased by a shark:

"The women went to dive for crawfish. Soon returned and said they had been chased by a large shark. Said that the women was sulky and that made the sharks come. LYGDUGEE said that a NEED.WON.MEE woman was eaten by the sharks."

Legend of the Origin of Fire also describes the women as being 'sulky' when they were speared and killed by an ocean animal, this time a stingray. Looking to other coastal Pacific communities, there are similar warnings taught via oral tradition. Marine life is believed to be ancestral spirits who will punish those who trespass or break sacred law. The Fijian shark god, Dakuwaqa, and Tahitian shark god, Vivi-te-Fua-ehu, are two examples of feared and respected deities who enforce and protect traditional law (D'Arcy, 2006: 42-43).

Stingrays are also significant in mainland Aboriginal traditions. Gawangalkmirri, the mangrove whipray, is sacred to the Gumatj clan of the Yolngu of North East Arnhem Land. The stingray is seen as a reflection of human society as they are social and carry spears, only to be used in self-defense (McDavitt, 2005: 4). In this Dreaming, it is not explained why the women were punished for their 'sulky' behavior. The above comparisons allow us to see possible reasons as to why this warning is made.

After the stingray had speared the two women, the two star men arrive and see what the stingray has done, and fights the sting ray (Milligan, 1890: 13):

"The two black men fought the sting-ray; they slew him with their spears; they killed him."

The spearing of the stingray by the men in the story, again, reflects culture practiced on the ground. George Thomas Lloyd, in his book *Thirty Three Years in Tasmanian and Victoria* (1872), recorded a personal observation from an Aboriginal hunting trip. The hunting trip occurred the morning after a significant corroboree was held with a number of groups in the area during a full moon. 'The great fish hunt' was attended by men, women, and children of the assembled tribes, 'numbering upwards of 300'. Wading out into a half circle, a human line was formed to enclose the stingray within the half circle, banging the water with their sticks. The men then entered the water to spear the stingrays (Lloyd, 1872: 52). Connecting the Dreaming to a constellation could have informed the time and location of this mass corroboree. The positioning of the four ancestors in the sky as the Southern Cross (Crux) could be read by many of the Tasmanian groups, signaling the time for this significant Corroboree.

The final section of this Dreaming (Milligan, 1890:13) explains the revival of the two women who were speared by the stingray:

"The two black men made a fire, a fire of wood. On either side they laid a woman, the fire was between: the women were dead! The black men sought some ants, some blue ants (puggany eptiettd): they placed them on the bosoms (parugga poingta) of the women. Severely, intensely were they bitten. The women revived, they lived once more."

Deconstruction of this paragraph reveals insights into the natural world. Firstly, healing practices can be identified. A fire was built between the two women. The importance of fire within Aboriginal culture and its relationship with rejuvenation and healing is evident on human as well as geological bodies. On the Wellesley islands in the Gulf of Carpentaria, the sky is synonymous with healing. Astronomical phenomenon such as a meteors act as a sign signaling the end of a healing process (Johnson, 1998: 118). In the case of *Malgri*, a disease specific to, and found only on, the Wellesley Islands, is first treated by lighting a fire next to the patient, encouraging the patient to sweat. Similarly, this has been recorded in Tasmanian Aboriginal cultures. Bonwick (1870) describes the patient drinking lots of

cold water then lying by the fire to encourage perspiration, a detail reflected in *Legend of the Origin of Fire*.

The “blue ant” referred to in the above passage can be identified as *Diamma bicolor*, a member of the flower wasp family found on southeast mainland Australia and Tasmania⁵. Despite the female having an ant-like appearance and being labeled a Blue Ant, she is actually a wasp. If the female is disturbed, her stinger can cause burning pain and swelling, similar to the description given in the Dreaming. Early recordings ascribe large ants or *Diamma bicolor*'s eggs as being a delicacy among Tasmanian Aboriginal people (Noetling, 1910: 281). As this Dreaming describes the resurrection of the two women, the blue ant may have aided healing, or had a role in traditional medicine. Additionally, Blue ants are active in mid to late summer, playing an important role in pollinating native plants, a possible timing component indicating seasonal change within the Dreaming (ibid). Unravelling this information, we are given small and informative insights into ways oral traditions were used to educate each generation on the environment.

A near identical story of *Legend of the Origin of Fire* appears in the 2013 publication of the Cotton family papers. A controversial account of Tasmanian history, this publication is a result of information recorded from an Aboriginal source by Joseph Cotton, a Quaker. The original documents were lost in a fire in 1959. Descendent William Jackson Cotton then rewrote the stories from memory and published it as *Touch the Morning* (1979). The most recent reconstruction of this is the *Cotton Papers*, compiled by William Cotton's daughter, Jane Cooper, and published without consultation from the Aboriginal community (Johnson and McFarlane, 2015: 14). This story is titled *Cross of Fire* and was related to Francis and Joseph Cotton by Timler, an east coast Aboriginal elder.

Cross of Fire mirrors the story line of *Origin of Fire* in nearly every way. Where *Cross of Fire* diverges is at the Christian imagery it provokes - the two warriors make fire via a staff from atop a mountain, reminiscent of Moses' staff used as the rod of God. *Cross of Fire* also locates the story's mountain, Meledna Lopatin (Mountain of Fire), to a physical geographical place: Mt Amos in eastern Tasmania (ibid: 62). The two men who bring fire, Una and Bura, are found in the vocabularies of Braim and Jorgen-Jorgenson, La Billardiere,

⁵ Museum Victoria (2015). *Diamma bicolor*: Blue Ant. Atlas of Living Australia. URL: bie.ala.org.au/species/urn:lsid:biodiversity.org.au:afd.taxon:8a3d3734-87ed-47a6-9ace-4b7300f69ac0

and Peron in Roth (1890: xii). 'Una' or 'Une' is translated to 'fire' by all of the above. The two words joined, 'Une Bura', is translated by Peron to 'lightning'. 'Bura' alone is translated by Peron to 'thunder' (ibid: xiv).

Different to the names given to the two stars in Robinson's recordings, Una and Bura are names that give a literal and direct translation to their intended meaning: fire, lightning, and thunder. Similar to the *Legend of the Origin of Fire*, this story ends with the two men and the two women returning to the sky. Furthermore, *Cross of Fire* identifies the four ancestors (now stars) as the Southern Cross, or the traditional name *Urapane Lopatin* (Cross of Fire).

Additionally, the stingray joins them in the sky. This is the first of the accounts that places the stingray in the night sky. Conversely, *Cross of Fire* does not identify the Coalsack nebula or any dark patches in the sky (ibid: 71). *Cross of Fire* as a source has its obvious embellishments and European influences, but its inclusion is important for this analysis. *Cross of Fire* provides another version of this Dreaming, highlighting the perseverance of oral tradition in all forms and appropriations.

The detailed account of the *Legend of the Origin of Fire* helped fill gaps left by Robinson in his journals. Connections have been made between the two warrior men who created fire and the two brightest stars in Gemini: Castor and Pollux. The stingray in the sky has been identified as the Coalsack nebula using vocabulary and the four points of the Southern Cross become the four ancestral protagonist's home in the sky. These connections were made possible through analysis of two nineteenth century texts, providing data for subsequent enquiry through linguistics, comparative analysis, and visual mapping via Stellarium.

4.1.2 Moinee and Droemerdeene

Woorrady, a clansman of the Nuenone people from Bruny Island, told a Dreaming in July 1831 to Robinson and his party. The Dreaming was given in 'very full detail' in response to a question asked by Robinson, who again was curious of their religion asking, 'How and where the first black man come from?' (ibid: 405). The Dreaming told was assured to Robinson by all the Tasmanian Aboriginal people present that it is believed by the whole Aboriginal population on the island. The telling of the Dreaming was treated with

'profound silence and attention' by all who was present, demonstrating the importance of sharing the ancestral history. Robinson's recording is at best confusing, jumping through ideas and time, most likely finding it hard to keep up with Woorady and unfamiliar knowledge systems.

Woorady speaks of two sky spirits, Moinee and Droemerdeenne, whom together create the first man. Moinee first created man with a tail like a kangaroo and no knee joints, making it impossible for him to sit or lay down. Seeing Parlevar (the name given to the first man) struggle, Droemerdeenne cut off his tail, then used grease to rub over the wound and gave him knee joints (ibid: 406). The use and significance of grease in this Dreaming reflects the importance of grease used in traditional Tasmanian Aboriginal cultures. Grease was smeared on the body to create a layer of warmth and act as waterproofing against the extreme conditions. Grease was mixed with ochre then painted on the body for ceremony, and hair as part of a daily ritual (Cameron, 2011: ix).

Droemerdeenne is identified by Woorreddy as the "bright star in the south," who "comes out of the sea" (Plomley 2008: 406). Plomley identifies this star as Canopus (Alpha Carinae), a yellow-white supergiant and the second brightest star in the night sky (Nemiroff and Bonnell, 2015). Droemerdeene was identified as Canopus in other accounts of this same Dreaming. In Francis Cotton's 1830 recording of Toogee elder Timler's Dreaming titled, *The Beginning Island* (McKay, 2001), or *The Beginning* (Cotton, 2013), Dromemerdeene is the second son of Parnuen (the Sun) and Vena (the Moon). Their first son was Moinee, who sits as the 'Great South Star'. Dromemerdeene was placed in the sky between Moinee and Parnuen.

Canopus is a circumpolar star as seen from Tasmania, meaning it never drops below the horizon. Circumpolar stars do not technically rise, still during the months of September, October and November of the year, Canopus can appear to 'come out of the sea' as it 'rises' from just above the south horizon, and moves high in the southern sky [10, October 1831]. Common connections between Droemerdeene and Canopus are logical as Canopus' prominence and consistent presence above the horizon share attributes with revered ancestral deities. Parnuen and Vena (the sun and moon) are a constant watchful presence as they rise and set over the lives of Tasmania.

About a month later, on 1 August 1831, Droemerdeene's brothers are identified as two stars sitting south and east of Orion's belt:

"Tonight the Brune [Bruny Island] natives pointed out two stars to the southward, laying eastward of Orion's belt, which they said was Dromerdeenne and his brother, i.e. Beegerer and Pimerner. They were brilliant stars and appear to move towards the observer, rising as it were in the southern horizon and setting in the north."

Plomley identifies these two stars as Betelgeuse (Alpha Orionis) and Sirius (Alpha Canis Majoris). Plomley suggests the text may be 'corrupt' and actually meant 'Dromerdeene's brother's, Beegerer and Pimerner'. Instead of 'Dromerdeenne and his brother' (ibid: 500). Droemerdeene has already been identified as Canopus.

All of the stars suggested sit to the south or east of Orion's Belt and are prominent in the night sky (Figure 4). The asterism Orion contains a prominent line of three stars known as Orion's Belt. The belt includes, Mintaka a second magnitude star and two first class magnitude stars; Alnilam and Alnitak. Betelgeuse is a red supergiant and the second brightest star in the Orion constellation⁶. Sirius is the brightest star in the sky, with magnitude of -1.46, sitting east of Orion (Nemiroff and Bonnell, 2015).

⁶ Betelgeuse is a variable star and sometimes appears brighter than Rigel, despite often being fainter than Rigel.



Figure 4: Shows Betelgeuse sitting South and Sirius sitting East of Orion. Source: Stellarium.

Orion's Belt, and consequently Betelgeuse and Sirius, do not rise above the horizon until three in the morning on 1 August 1831. Rising above of the eastern horizon and moving from a southeasterly direction, Betelgeuse sits 'southward' and Sirius sits 'eastward' to Orion's Belt. Betelgeuse and Sirius move in a northerly direction before they set at sunrise at approx. 5:37. The general descriptions of the stars' directional movements match Plomley's suggestions.

In the Dreaming, Droemerdeene and Moinee fight in the sky. As a result, Moinee falls to Earth (ibid: 409):

"They say that Moinee was hurled from heaven and dwelt on the earth, and died and was turned into a stone and is at Coxes Bight, which was his own country. The natives say that there is a large stone standing up which is Moinee and that he was a native and turned to stone. Also say that Laller a small ant first made the natives."

This entry is of particular interest, as it identifies a star and its disappearance and giving a physical location. Hamacher (2012) explored the astronomical content of oral traditions using a similar origin Dreaming story from Tasmania. He proposed that Moinee, 'The Great

South Star' mentioned in both Dreamings, could be referencing a nova or supernova (ibid: 95). 'The Great South Star' may also represent a star that was prominent near the south celestial pole thousands of years ago, but no longer does so due to axial precession. Hamacher identifies Achernar (Alpha Eridani) as an example of this: 6,000 years ago, Achernar appeared within 8 degrees of the south celestial pole (ibid). The close locality of a star to the south celestial pole would make it appear to move very slowly over a small area.

Over human history, twelve to thirteen supernovae and a few novae have been visible to the naked eye (Hamacher, 2014). Hamacher and Frew (2010) identified an unknown star in Boorong oral traditions of western Victoria as a “supernova impostor”.

Collowgullouric War is a female crow and unidentified 'large red star', and wife of *War*, identified as the star Canopus. The recording of the star without Western identification was unique, as the other stars were identified by William Stanbridge using a star chart. Hamacher and Frew identify the 'large red star' as an eruptive blue variable star. This event, which occurred during the period of time Robinson was in Tasmania, is commonly called the "Great Eruption of Eta Carinae" (Ibid). During the 1840's the star Eta Carinae's magnitude greatly increased, appearing as the second brightest star in the night sky, after Sirius. By 1858, Eta Carinae had returned to its pre-outburst magnitude, then faded rapidly below naked eye visibility (ibid: 228).

The identification of Collowgullouric War as Eta Carinae during its outburst could explain Moinee, the Great South Star. From the early recording by Robinson to retellings of the story (McKay, 2001; Cotton, 2013; Wilson, 1999), each character has been able to be identified with its star equivalent, except for 'The Great south star.' This supports the idea that Moinee was a stellar variation, novae, or supernovae phenomenon that is yet to be identified, but there are no known supernovae or novae candidates at southerly declinations that date to within the last few hundred years. This leaves the stellar identity of Moinee a mystery.

Wooreddy's Dreaming associates Moinee to a physical place, Cox's Bight in southwest Tasmania. At the time of recording this tradition, Moinee's petrified form was described as being “a large stone standing up” (Plomley, 2008: 409). There is little information about the exact location of this site, or whether it was used as a sacred site. Today this area is heritage listed. While there are no specific Aboriginal sacred sites listed, it is believed this

is due to the dense vegetation and poor visibility of the area, not that there are none (Parks.tas.gov.au, 2015). If Moinee fell to the Earth (in either a literal or symbolic sense), it may explain why it is no longer visible in the sky.

The Dreaming describes Moinee as falling to Earth and turning to stone. Across Australia, many oral traditions record objects falling to the Earth (Hamacher and Norris, 2009, 2010). Research conducted by Hamacher and Goldsmith (2013), discovered that some of these traditions are linked to impact sites, including Henbury, Liverpool, and Wolfe Creek. Henbury is one of the youngest impact sites in Australia, and Aboriginal oral traditions tell of its formation (ibid). The only known alleged impact crater in Tasmania is Darwin Crater, located 3 km east of Mount Darwin and northwest of Cox's Bight. Darwin crater is the potential source of Darwin glass, believed to have formed $816,000 \pm 7,000$ years BP (Haines, 2005) – far before humans evolved or travelled to Australia.

Moinee is said to have made the rivers and islands - attributes also given to Laller, a small ant. The interchangeability of the two creator spirits may indicate they are one and the same: a totemic relationship similar to some practiced in mainland traditions (Witzel, 2013: 11). Moihnee was shortly followed by his wife, who went into the sea, and his children who came down as rain and fell into his wife's womb. The geomythology⁷ of Moinee, or Parledee (a term used for God), is referenced again on 24 January 1834:

"[O]n crossing the Bluff Mountain saw numerous concavities in the ground resembling a basin, some of them deep. These the natives said were made by Parledee, God"

During Moinee's time on Earth he fought with a bad spirit, the Wraegeowrappe (Plomley, 2008: 406). Upon hearing this part Robinson notes the similarities between this story and 'Milton, where Lucifer is hurled down from the heavens' (ibid: 406)... a reference to a 17th century English poet John Milton's 1667 narrative poem, *Paradise Lost*, about the origin of Satan and the rise and fall of man. This observation reiterates Robinson's strong affiliation with God. It also reiterates the parallels between beliefs and how similar ideas of the universe evolve independently of each other.

⁷ Geomythology is the impact of geological events on history and legend Vitaliano, D. (1968). Geomythology. The Impact of Geologic Events on History and Legend with Special Reference to Atlantis. *Journal of the Folklore Institute*, 5(1), 5.

It is evident that astronomy played a significant role in Aboriginal beliefs in nineteenth century Tasmania and before colonisation. Mannalargenna and Wooreddey told Dreamings that explained the creation of man and fire, oral traditions synonymous with traditional life. A network of knowledge has been unpacked from these spoken words communicating custom for generations.

The use of language within text informed identification of the stingray as the Coalsack nebula. Comparative research strengthened the identification of the two fire spirits as the stars Castor and Pollux. Woorraady's Dreaming of the creation of *parlevar*, potentially contains information of markers in the physical landscape or astronomical phenomenon. Following these interdisciplinary pathways covers more ground, and ultimately converges at a point of greater understanding of a shared history of Tasmania.

4.3 Aurora, Eclipses, and Cultural Beliefs

4.3.1 Lunar Eclipse

Luminary bodies, such as the sun and moon, are recognised in oral tradition as powerful entities, symbolising creation, growth, death, and rebirth. The ancestral power embodied within these shapes appears on the bodies of some Aboriginal people as cicatrices in the form of a crescent or circle. This chapter looks at how the moon and transient phenomenon is represented in Tasmanian Aboriginal culture.

An eyewitness account of a partial lunar eclipse is recorded in Robinson's journal on 24 August 1831. Two days earlier, Manalargenna, Kickerterpoller, and three women left to make contact with other people in the area. They were away from Robinson's party for five days. During their absence, the guides with Robinson noticed the Earth's shadow cross the moon. They took this as an ominous sign that harm had come to Kickerterpoller. Trugannini and Woorraady saw the same lunar eclipse from Waterhouse point and read it as a bad sign that Robinson had been speared (Cameron, 2015).

"And what appeared to confirm them in this opinion was the shadow of the earth on the face of the moon, that luminary not having yet arrived in full. This they said was

Black Tom: that the natives had killed him and he had gone up into the moon."
(Robinson August 24, 1831).

In Patsy Cameron's (2011) *Telling Places in Country*, the project team (with help from a local astronomer) was able to confirm this eclipse on 24 August 1831. The eclipse calculating program developed by Fred Espenak and Jean Meeus⁸ reveals a partial lunar eclipse was in fact visible on 23 August 1831 at 10:00 pm (Figure 5), the night before Robinson wrote the entry in his journal. The partial lunar eclipse at its maximum coverage from this location was visible high in the night sky off the North East of Tasmania and would have been clearly visible. This is one of many examples across Australia of astronomical phenomenon being adapted into Aboriginal oral tradition. The observations made by Truganni, Woorrady, and Robinson's guides, provide an eyewitness account of historical astronomical events, along with insights into the cultural interpretation of the eclipse.

The moon's waxing and waning is reflected in Australian Aboriginal oral traditions, representing ideas about death, change and fertility. Yolngu traditions in Arnhem Land describe the moon as a man named Ngalindi, who is fat and lazy (becoming a full moon). Ngalindi demanded his wives and sons feed him and when his sons refused, he killed them. Ngalindi's wives retaliated with their axes and started to chop bits off him (waning moon). He tried to escape but died soon after (new moon). Ngalindi remained dead for three days, then rose again becoming increasingly fatter and rounder once again (waxing moon), and the cycle continued. Similar stories are told across the mainland, with each death symbolic of a lesson to be learned (Norris, 2009: 9). A story told by the people of Bruny Island to Robinson explains how the moon-woman, Vetea, got her dark patches (Robinson, 1831: 412):

"The Brune natives affirm that the moon (VETEA) came from England and that's she stopped at the RORE.DAIR.RE.ME.LOW, that is, the country at Oyster Bay, that the kangaroo and mutton fish asked the moon to stop there, that the moon was LOONER, woman, that she was roasting mutton-fish when the sun (PARNUEN) came and swept her away, and she tumbling into the fire was hurt on her side and then rolled into the

⁸ Eclipse.gsfc.nasa.gov, (2015). NASA Eclipse Web Site. URL: <http://eclipse.gsfc.nasa.gov/eclipse.html>

sea, and afterwards went up into the sky (WARRANGERLY) and stopped there with her husband the sun. They say the rainbow is the sun's children. Told me if I looked I would see it black where she had been burnt."

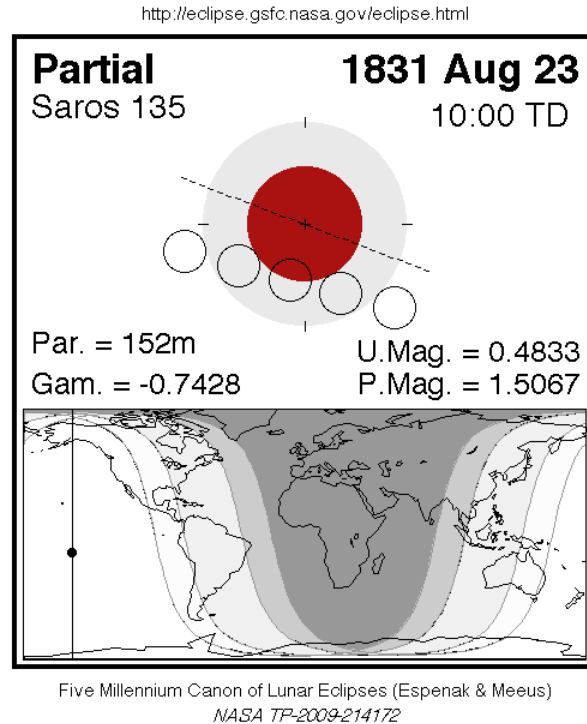


Figure 5: Partial Lunar Eclipse appeared on 23 August 1831 and witnessed by Trugannni and Woorrady. Image: NASA

The Adnyamatana of the Flinders Ranges in South Australia have a Dreaming in a similar vein. Vira, the moon-man falls off his stick ladder while trying to punish his nephew for stealing his food (Johnson, 1998: 201). On impact he burst open, leaving marks on his belly. The parallels are interesting between the two Dreamings, from the names, to the injuries suffered during preparation of food.

These Dreamings emulate a constant theme of disruption and restoration that is common in Dreamings related to the moon. The moon as a symbolic cycle of pain and healing that I argue is reflected on the bodies of Tasmanian Aboriginal people. Scarring was first thought to be unique to each group, distinguishing between nations. Yet often when there is mention of cicatrices, Robinson offers up astronomical motif in partnership, indicating meaning beyond the cosmetic (Johnson and McFarlane, 2015: 35). Sightings of moon or crescent shaped markings on bodies appear, but are not limited to the east coast of Tasmania. Lieutenant Le Paz, a member of French explorer Marc-Joseph Marion

Dufresne's expedition in 1772, noticed when they made landing on the east coast of Tasmania, 'several little scars or black marks in a crescent shape' on the chest of a young man (Duyker, 1955: 33). On 1 November 1830, Robinson observes most of the people from the eastern groups, 'had the form of the moon cut on their flesh' (Plomley, 2008: 297). In a note written on the end pages of his journal Robinson carries on this thought and writes (ibid: 613):

"[T]he aboriginal females on the islands have round circles cut in their flesh in imitation of the sun or the moon. I have seen a woman with four of them on her body; others I have seen with two or three. They are very fond of them, are generally placed on each side of the backbone and about the hips... The cicatrices of the sun and moon is intended to remove inflammation and having the power of those luminaries they imagine it will have the same influence on the part infected."

Similar circular images are reproduced in rock carving, drawings, huts, stone arrangements (Bonwick, 1870: 192), and on bodies, often beholding more than one meaning. In a journal entry, Robinson writes of Van Diemen's Land company surveyor, Mr Hellyer seeing a circular charcoal drawing and believing it was a representation of the sun. Robinson corrects him in his journal stating, "Those circles are emblematical devises of men and women" (ibid: 575). In the notes to this entry Plomley addresses the conflicting meanings without mentioning the possibility of the circle being a polysemous symbol. The moon was previously identified as a woman named Vetea, indicating a circle can mean both woman and moon. The multi-layered meanings of man, woman, moon, and sun are interchangeable and complex. The power of each is not confined to a singularity, but rather an Indigenous view of wellbeing, traversing body, environment and spirit, in an ebb and flow of meaning and balance.

Robinson identifies women specifically in the above passage, their cicatrices localised around the hips and on either side of the backbone. These areas on a woman's body are affected by strain during childbirth and menstruation. The moon is often linked to mensuration and fertility: the waxing and waning of the moon representing the cyclic flow of menstruation (Berndt and Berndt, 1993). The moon is recorded as both male and female across Aboriginal communities in Australia (usually male), and is often related to fertility, no matter the gender. The moon man in some traditions, if looked at directly can impregnate young women (Hamacher, 2011) or oppositely render the onlooker barren (Johnson, 1998).

The Yaraldi of South Australia describe the moon as a woman who is very sexually active. During the crescent phase, she is thin. She then gets pregnant and becomes bigger as the moon waxes, until she is full term. The moon gives birth, and then wanes until she disappears (Berndt and Berndt, 1993). The placement of these cicatrices could be used as to a healing agent in response to back pain, as well as curing issues around fertility. Women were assigned much of the labour, from hunting crayfish, seals, climbing trees for possum, mining ochre, and on Robinson's journeys carrying the bulk of the load while travelling. This freed the men to hunt larger game and act as guards for the group (Johnson and McFarlane, 2015; Plomley, 2008). Bloodletting was also a method of relieving inflammation, as recorded by Bonwick (1870). Truganini performed this on her husband to cure his swollen thigh, curing him in nine days (ibid: 89).

4.3.2 Aurora

Solar wind accelerating through Earth's magnetic field interacts with Earth's atmosphere, ionizing particles that create aurorae. Tasmania, along with Antarctica and the southern margins of Australia and New Zealand, sit within the southern auroral ring, defining an area of auroral activity (Hamacher, 2013). The visibility of aurorae outside this zone is rare, but happens during periods of high solar activity. The Aurora Borealis in the northern hemisphere is directly above inhabitable land, exhibiting a greater range of colours. Comparatively in the southern hemisphere occupied land such as Tasmania sits on the edge of this zone. The Aurora Australis viewed from Australia tend to be seen lower on the horizon and at a higher altitude. Presenting a reddish display of colour more frequently and in low light conditions can appear white to the naked eye (Ibid).

Cultural traditions of aurora in parts of the northern hemisphere are in areas of high aurora activity and tend to be associated with positive omens (Hamacher, 2013). Compared to places where aurorae are less common, traditions err towards caution and act as warning (ibid). This rational is supported by Aboriginal traditions in Australia's south. The positioning of Australia on the edge of this auroral zone finds the appearance of aurora rarer and often associates it with blood, fire and death because of its (often) reddish appearance. Traditions of the Gunai on coastal Victoria believed the aurora to be bush fires in the spirit world and served as warning of impending catastrophe. The Dieri people of South Australia saw this as a large fire in the spirit world, made by an evil spirit.

Ngurunderi, also of South Australia perceived the aurora as campfires of spirits living in the land of the dead (Berndt 1940:181).

Recordings of aurorae traditions in Tasmanian Aboriginal cultures are sparse and sometimes quite vague, appearing briefly in literature in the mid-nineteenth century. One example is a mention in *The Queenslander*, a newspaper from Brisbane, in an article looking into the drought happening at the time of publication 1877.

"There was a splendid Aurora in 1847, grand in its-effects At Hobart Town; and an interim one September 4, 1851, at the same place where the vividly shooting streamers of violet, red and other colors, where somewhat marred by the bright moonlight. The Aborigines of Tasmania compared the crackling noise of the curruscation to the snapping of their fingers."

The action of Aboriginal peoples snapping their fingers to describe a noise reported when seeing aurora is a significant observation. Despite reports of sound associated with aurora, it was not believed aurora could produce these sounds, as it was too far away (Aalto University, 2012). In 2012 researchers from Finland released findings that gave a direct link to the noise and aurora. This comes 135 years after the above newspaper article, demonstrating how early observations of the natural world can push science to come up with an explanation.

In Robinson's journals, aurorae are not specifically referenced until 1837. At this time his *Friendly Mission* had been completed and many of the Aboriginal people were detained on Flinders Island. On 19 October 1837, Robinson notes that:

"Last night the southern lights were extremely visible; the natives call it - (1) PURNENYER (2) NO.HOI.NER King George, (1) GEN.NER (2) NUM.MER.GEN Nomey Western native."

One of the Aboriginal names of aurora australis given to Robinson by King George is NO.HOI.NER. This is spelt slightly different to the Cape Portland name given to 'electric spark', or NOI.HEE.NER in an entry six years earlier. In another effort to strip the traditional identity and assimilate the Aboriginal people of Tasmania, Robinson renamed the occupants of Flinders Island and gave them imperial names. King George's real name is Rolepa and he was leader of the Ben Lomond group who are thought to be linked in trade

agreements with the Cape Portland region. It is possible that they share language and it is possible the two words mean the same thing, with respect to random light phenomena (Ryan, 2012:32).

The earlier use of the Cape Portland word NOI.HEE.NER was made on 12 August 1831 and parallels the sentiments of mainland Aboriginal Australia's feelings of apprehension.

"The natives last night saw an electric spark in the atmosphere, at which they appeared frightened, and one of them told them not to mention it as they would all be sick if they did - the native of Cape Portland call in NOI.HEE.NER and the Port Sorell natives call it NAR.NO.BUN.NER."

Robinson describes an "electric spark in the atmosphere" as the source of uneasiness among the Aboriginal people with physical repercussions, 'they would all be sick' if this topic was to be repeated (ibid). It is unlikely that the electric spark was referencing aurora as aurorae do not appear as a single spark. It is most likely lightening or a meteor.

Similar words with slightly different spelling variations are applied to all forms of light, including lightening, electric sparks, and aurora. With the same word applied to all light-like phenomena in the atmosphere, it is probable the cultural significance and meaning is shared as well. Some of the words recorded for the southern lights resemble words used for lightning and thunder. NOW.HUM.MER is a word used by Aboriginal people from West Point and Cape Grim in Tasmania's North West and is the name of an evil spirit (Plomley, 2008: 650).

People from Bruny Island are also recorded as believing thunder and lightning is an evil spirit (ibid: 321). In Plomley's consolidated word list, NOI.HEEN.NER is the name given by various language groups, as God, good spirit, sun, moon, thunder, and lightning. These words may first appear to be different yet they all share attributes of ancestral deities. The sun and moon are viewed as ancestors. Robinson being a religious man would have easily translated these meanings of thunder and lightning to God or spirits all, which are predominantly taught to be respected and feared.

4.3 Time

The evolving environment was used as a natural clock and was important for food economics, calendar development, and social structure. Aboriginal people organised their world, in part, based on the cycles and behavior of fauna and flora, weather and seasonal change, phases of the moon, and movement of the sun and stars.

Consolidated vocabularies of the language groups of Tasmania reflect words used to indicate time of the day (e.g. sunrise, midday, sunset, twilight), astronomical presence (e.g. starlight, moonlight), and seasons (Milligan, 1890; Plomley, 1976). There are words for times of day (Table 2), and the relationship between each day, yet no words for time itself: an observation made by W.E.H Stanner in his 1953 essay *The Dreaming*. The abstract concept of time is a Western construct, as is the way categories of time are packaged into disconnected histories, sitting outside the individual. Linguistic difference is one of many forks on the ontological road. Aboriginal knowledge systems move to a rhythm that does not match time's found then forgotten beat. In this chapter, time will be addressed through three sections. The first section, *Navigation and Songline*, presents evidence of a Aboriginal songline that applies solar navigation knowledge. The second section, *Seasonal Time*, works to identify seasonal and timekeeping stars. Finally the third section *Time and the moon* demonstrate how the moon was used to manage time.

Table 2: Vocabulary table of Aboriginal words indicating time of day. Source (Plomley, 1976)

	Bruny Island /Southern Tasmania	Oyster Bay	Northern Tasmania	Western Tasmania
Twilight	nunto neenah	teggrymony keetana narra long - boorack		
Early morning at twilight	nunawenapoyla	tuggamarannye		
Sunrise	panubre roeelapoerack	mue.nat.te.me.lar	war.ka.la we.tin.ne.ger	
Sunrise		puggalena parrack boorack		
Midday	toina wunna	tooggy malangta		
Midday	wer			
Sunset	punubra tongoieerah	wietytongmena		
Sunset		par.to.pe.lar		
Moonlight	weetapoona	wiggetapoona		weenapooleah
Starlight	oarattih	teahbertyacrackna		

4.3.1 Navigation and Songline

Tasmanian Aboriginal peoples' acute awareness of the natural world is evident in the literature. The moon and stars inform seasonal and daily time, and evidence shows navigation through the landscape was aided by song, sun, and shadow. In Roth's (1968[1890]: 146) short chapter, *Astronomy*, he makes a fleeting comment on the understanding of time and astronomy of Aboriginal people:

"It would seem from a statement of La Billardiere's (II. p. 61) that the Tasmanians had some idea of regulating time by the apparent motion of the sun. He says some savages gave him to understand that in two days time they should be very near the ships. To inform La Billardiere that they should make the journey in two days, they pointed out with their hands the diurnal motion of the sun, and expressed the number two by as many of their fingers. This is the only reference to any knowledge of the movement of the heavenly bodies."

Roth gives references to an exchange made between the Aboriginal people of Tasmania and French naturalist Jacques Julien Houtou de La Billardiere. Diurnal motion is the daily east to west movement of the sun.

Roth then incorrectly states that this is the only reference of the knowledge of the heavenly bodies. On 13 March 1834, Robinson himself writes:

"They [Aboriginal Tasmanians] are quite at home on the subject, that is, they have names for the stars and constellations and are aware that they revolve."

This record demonstrates 'knowledge of the movement of heavenly bodies'. More examples are found in the literature. On 25 December 1830, Robinson praises the 'considerable knowledge' of Tasmanian Aboriginal people so much, that they had 'attained to such celebrity'. As a result Robinson and 'white men' in general would consult them on the subject and be pleased at the information as it 'seldom found them to err' (ibid: 334).

"Thus they are able to know when to build their huts, to go to the coast to fish, travel, etc. They also judge by the stars and have names by which they distinguish them."

Knowledge of celestial movements is applied to practical purposes within their daily lives. Astronomical knowledge is embedded through Aboriginal traditions, but not always as obvious as a direct comment. The below extract found in Robinson's manuscripts (Plomley, 1976: 51) describes a song, possibly used for navigation and travel:

"Native song of the northwest, north coast and the interior - they repeat the words (tone.ner, sun) and point the way the sun is travelling in her course, and point to where they are stopping for the sun to be there."

The traditional word *ton.ner* is repeated in this song along with a gesture towards the direction the sun is travelling. Like many Tasmanian Aboriginal words, *ton.ner* has multiple meanings. *Ton.ner* is also used for the English word "West" (ibid: 205) and is part of the Aboriginal word for the Black Milky way; *ton.ner.muck.kel.len.ner* (ibid: 408). The description of the actions that accompany the repetition of *ton.ner*, indicates this song was sung to help with timing and navigation on their journey; serving as an insight into a Tasmanian songline.

Songlines are common on mainland Aboriginal Australia, also known as 'Dreaming tracks' or 'strings' as they connect country, Dreaming, people, ceremony and art (Harney and Norris, 2014). Songlines have been found to function as navigational tools and oral mapping. The song acts as a mnemonic of the landscape (ibid, Fuller et al. 2014). Aboriginal knowledge of the Tasmanian landscape is well documented. This is apparent through the guides who aided Robinson on his mission. The compass Robinson used to lead his party through Tasmania was rendered impracticable. Parts of the country covered in rugged terrain could only be navigated through the ground knowledge of the Aboriginal guides. Thomas Dove (in Roth 1899: 165) remarks on this astute recognition of country:

"Their geographic knowledge of the country in which they [Tasmanian Aboriginal people] live is remarkably accurate and minute. The relative bearings and distances of its more prominent headlands, bays, mountains, lakes, and rivers are distinctly impressed on their minds. When at any time a chart of Tasmania is presented to them, only to embody the picture of form and dimensions which their own fancy had enabled them to sketch."

Dove likens the Tasmanian Aboriginal knowledge of the land to that of a photographic memory. Combined with knowledge of the sun's movements during the day and year, and the above songline can be interpreted as an application of solar navigation.

Solar navigation is a skill that requires a thorough understanding of the sun's locality throughout the year. From Hobart, Tasmania, the sun rises within the azimuth range of 57 degrees (winter solstice on 21 June) to 123 degrees (summer solstice on 21 December). The sun sets within the azimuth range of 237 degrees (summer solstice) to 303 degrees (winter solstice). On the vernal (spring) equinox (21 September) and autumnal equinox (21 March), the sun rises due East (90 degrees) and sets due West (270 degrees). The azimuthal range between the northern tip (Burnie) and southern tip (Hobart) of the island is 1 degree.

We know Aboriginal people on the mainland noted the positions of the rising and setting sun throughout the year and its position in the sky (Norris et al., 2013). I argue that this songline describing 'the way the sun is travelling' and indicating 'where they are stopping' in relation to the sun, demonstrates a form of celestial navigation.

4.3.2 Seasonal Time

Seasonal stars are used to indicate patterns of weather, food gathering and hunting. Mallee people of Victoria knew the wood ant would have larvae available as a food source, when Arcturus (Alpha Bootis) sat north at the evening (August and September) (Stanbridge, 1857:138). Arcturus was known as the ancestor Marpeankurk, who first found the larvae. After death, Marpeankurk became Arcturus so she could always tell the people when the larvae were coming into season (Johnson, 1998: 41). In Kurna traditions of the Adelaide Plains of South Australia, autumn is indicated by the appearance of a star, which the local Aboriginal people call *Parna* (Teichelmann and Schürmann, 1840:37). The appearance of this star also signifies the start of the annual autumn rains, indicating to Kurna people to prepare shelter (Hamacher 2012:79).

Fragments have been left in the literature of Tasmania, echoing similar sentiments to those in Victoria and South Australia.

Three unidentified stars relating to seasonal change are mentioned twice in Robinson's journals: on 20 June 1832 and 30 June 1834. In both instances, the three stars are used to track time seasonally, daily, and in the 1832 account the dark phases of the moon are used in conjunction with stars to indicate specific, shorter intervals of time. The identities of these stars are unknown. Using linguistics, comparative studies, and Stellarium, I attempt to identify the three stars in question.

The stars are shown to Robinson on 30 June 1834. Names were allocated to the stars by members of Bruny Island, Oyster Bay, Northern, and Western groups of Tasmania (Table 3).

Table 3: Names given to the three stars shown to Robinson on 30 June 1834

Origin	Aboriginal Word	Possible meaning
Bruny Island	PUR	White Edible Berry
Oyster Bay	PARNG.GER.LIN.NER	Wife (eastern)
Northern	NOE.GO	West Point (place)
Western	LONE.ER.TEN	Wife

The Bruny Island word PUR is similar to PUR.RAR, a Bruny word given to white edible berries (Plomley, 1976: 340). This association indicates that the star would appear white, ruling out any red stars. The Western group's word LONE.ER.TEN has connections with LOON.ER, or "wife" across many language groups in Tasmania (ibid: 471). The Northern word NOE.GO is quite close to Nongor, the Aboriginal name for West Point in the North of Tasmania. PARNG.GER.LIN.NER from Oyster Bay may be related to the word for "wife" given by some eastern groups: *par.nune.ning.er* (ibid: 321).

It is challenging to speculate on the meaning of these words; at this point more research into the linguistics must be done. The benefit of this preliminary work is to introduce possibilities outside of direct correlation. The names of the stars in Tasmanian Aboriginal astronomy are more than just labels, as seen with the Mallee people of Victoria. I argue, the Aboriginal names recorded would reflect the ripening of the native white berry, seasonal travel, and/or kinship ties. It is important to the analysis of the literature that these elements are acknowledged as avenues for further investigation.

The entry made by Robinson describing the three stars is also one of the most detailed accounts of astronomy in *Friendly Missions*. Robinson describes stellar positions, magnitude, and their use as a seasonal indicator on 30 June 1834:

"Am, calm and clear, fine weather, sun hot. The natives showed me the three stars which they say is a sign that the fine weather is coming and when those stars are vertical the fine weather is come. They appeared in the heavens to the eastward. No. 1 was large and is called the mother, No. 2 the husband is of lesser magnitude and No. 3 the offspring is hardly visible. They are called by the Brune natives PUR, by the western natives LONE.ER.TEN, by the northern natives NOE.GO, and by the natives of Oyster Bay PARNG.ER.LIN.NER."

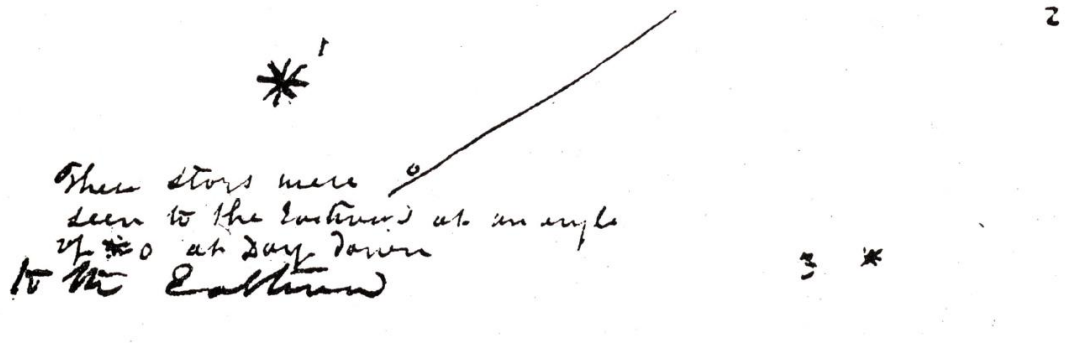


Figure 6: The sketch Robinson made showing the orientation of the three stars described on 30 June 1834.

Key information provided from this journal entry can be divided into the following groups, which aide in identifying the stars:

- **Time and Date:** The recording was made on 30 June 1834, after Robinson had been showed the three stars that appear at 'day dawn' (as written on the sketch in Figure 1.5).
- **Direction:** Robinson clearly writes that the stars appear 'eastward' (azimuth between 0 and 180 degrees)
- **Brightness:** Robinson described the stars as being of different magnitudes: a large (bright) star (presumably first magnitude), a lesser bright star (presumably a second or third magnitude star), and a hardly visible star (presumably fifth or fainter magnitude).
- **Orientation:** The orientation of the three stars is an illegible number. Plomley interpreted this number to be 30, presumably from looking at the sketch drawn by Robinson in Figure 6. Robinson writes that the stars indicate fine weather is coming. When they are vertical, fine weather has come. A group of stars rising in a particular orientation (such as in a horizontal row) will always do so in the same orientation when rising. For example, the three stars of Orion's belt are roughly horizontal when they rise at due east at dawn. At dusk, they set at due west but are vertical to each other, due to their declination and orientation with respect to each other and the horizon (see Figure 7).
- **Season:** Seasonally locating 'fine weather' in the calendar year will approximate a date to then test for stars that are vertical at this time. The clan territories that name the stars are from the North, East, West, and South of the island, indicating that 'fine weather' would (on average) be experienced across the whole of Tasmania. Meteorological data shows that Tasmania experiences constant rainfall

through the year, with winter having the most, and can experience multiple seasons in one day⁹. Based on this data, 'fine weather' could be considered the “summer” months, most likely January; since records have been kept this month has seen the least rainfall.

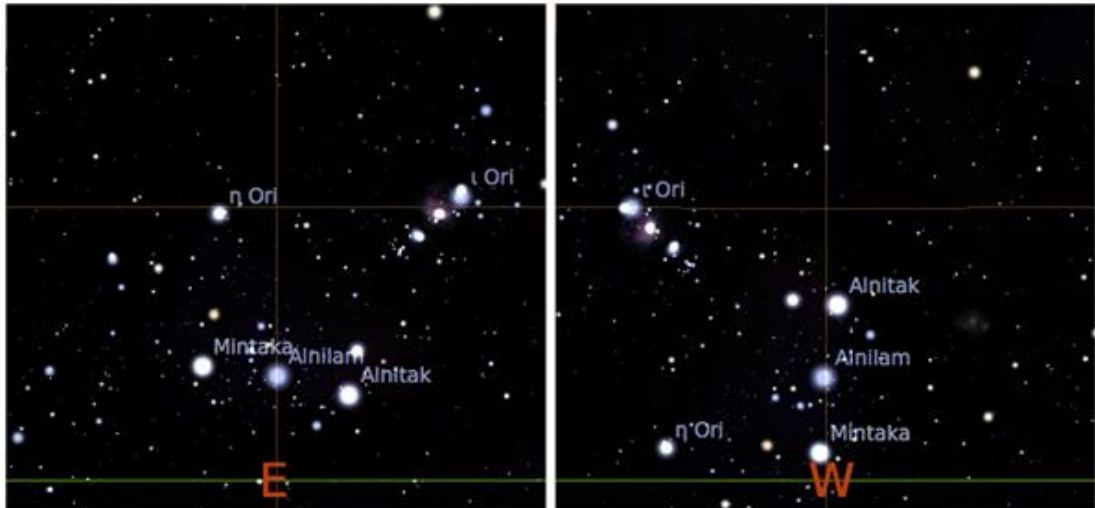


Figure 7: The three stars of Orion's belt (Mintaka, Alnilam, and Alnitak) rising at dawn (left) and setting at dusk (right) as seen from Hobart when Alnilam is at an altitude of 2 degrees, showing the change in their orientation at these two times of the day. These stars have rotated by roughly 90 degrees anti-clockwise from dawn and dusk. Source: Stellarium

With these variables in mind, Plomley's identification can be tested. Plomley classified the three stars as the Pointer stars, Alpha and Beta Centauri (ibid: 953). On the morning of 30 June 1834 (when the sun is 10 degrees below the horizon: see Hamacher, 2015), the Pointer stars appear in the southwest (Az = 185-190 degrees), not the east. The Pointer stars are both of similar brightness and a third barely visible star in a line with these is difficult to identify. The Pointers are circumpolar as seen from Tasmania (they never set below the horizon), so they can appear to be horizontal on some occasions in the morning and vertical in others.

⁹ Australian Bureau of Meteorology (2015). *Australian Climate Averages - Rainfall (Climatology 1961-1990)*. URL: www.bom.gov.au/jsp/ncc/climate_averages/rainfall/index.jsp?period=dry&area=ta#maps

The Pointer stars are also of similar brightness ($V_{\text{mag}} = +1.33$ and $+0.61$ for Alpha and Beta, respectively). The Pointers are vertical (having the same azimuth) in the morning sky in mid-January and are horizontal (having the same altitude) high in the sky a month later in mid-February, or horizontal low in the sky in late July/early August.

Plomley's identification is inconsistent with the information drawn from the journal entry. Despite lining up vertically at certain times of the year, Alpha and Beta Centauri encircle the south celestial pole. Robinson states that the three stars sit eastward. In subsequent publications, researchers have mistranscribed Plomley's hypothesis by claiming the stars in question are Alpha and Beta Crucis (of the Southern Cross), causing confusion (Coon, 1971: 288).

While it is difficult to accurately label the stars from the description given, there are a number of stars sitting on the eastern horizon on that morning. Many move to a vertical position on the western horizon, on a mid-January morning.

The following stars appear prominently 'eastward' at 'day dawn' on 30 June 1834:

- The Pleiades star cluster (Messier 45)
- Sirius (Canis Major)
- Aldebaran (Alpha Tauri)
- Betelgeuse (Alpha Orionis)
- Bellatrix (Gamma Orionis)
- Orion's Belt (Mintaka, Alnilam, Alnitak).

This list identifies the most prominent stars visible at this time. Canopus is not included in this list as it sits closer to southeast, never goes below the horizon (circumpolar star) and has been previously identified as creator ancestor Droemerdeene.

Table 4a: Possible groupings of three stars as recorded by Robinson. The groupings of three stars are given by common name, Bayer designation, visual magnitude (Vmag), general spectral type (colour), and the star's coordinates (right ascension and declination in J2000).

Common Name	Bayer Designation	Vmag	ST (Colour)	RA (J2000)	DEC (J2000)
Rigel Kent	α Centauri	0.01	G (Yellow/White)	14 ^h 39 ^m 36.5 ^s	-60° 50' 02.4"
Hadar	β Centauri	0.61	B (Blue)	14 ^h 03 ^m 49.4 ^s	-60° 22' 22.9"
Hip 70264 A	n/a	4.90	K (Orange)	14 ^h 22 ^m 38.02 ^s	-58° 27' 36.7"
Mintaka	δ Orionis	2.23	O/B (Blue)	05 ^h 32 ^m 00.4 ^s	-00° 17' 56.7"
Alnilam	ϵ Orionis	1.69	B (Blue)	05 ^h 36 ^m 12.8 ^s	-01° 12' 06.9"
Alnitak	ζ Orionis	1.77	O/B (Blue)	05 ^h 40 ^m 45.5 ^s	-01° 56' 33.3"
Sirius	α Canis Majoris	-1.46	A (Blue / White)	06 ^h 45 ^m 08.9 ^s	-16° 42' 58.0"
Adhara	ϵ Canis Majoris	1.50	B (Blue)	06 ^h 58 ^m 37.6 ^s	-28° 58' 19.0"
Wezen	δ Canis Majoris	1.82	F (White)	07 ^h 08 ^m 23.5 ^s	-26° 23' 35.5"
Aldebaran	α Tauri	0.87	K (Orange)	04 ^h 35 ^m 55.2 ^s	+16° 30' 33.5"
Bellatrix	γ Orionis	1.64	B (Blue)	05 ^h 25 ^m 07.9 ^s	+06° 20' 58.9"
Meissa	λ Orionis	3.50	B (Blue)	05 ^h 35 ^m 08.29 ^s	+09° 56' 03.3"
Betelgeuse	α Orionis	0.42	M (Red)	05 ^h 55 ^m 10.3 ^s	+07° 24' 25.4"
Mirzam	β Canis Majoris	1.99	B (Blue)	06 ^h 22 ^m 42.0 ^s	-17° 57' 21.3"
Beta Monocerotis	β Mon	4.60	B (Blue)	06 ^h 28 ^m 49.16 ^s	-7° 01' 58.2"
Rigel	β Orionis	0.17	B (Blue)	05 ^h 14 ^m 32.26 ^s	-8° 12' 06.0"
Mirzam	β Canis Majoris	1.99	B (Blue)	06 ^h 22 ^m 42.0 ^s	-17° 57' 21.3"
Saiph	κ Orionis	2.09	B (Blue)	05 ^h 47 ^m 45.4 ^s	-09° 40' 10.6"
Bellatrix	γ Orionis	1.64	B (Blue)	05 ^h 25 ^m 07.9 ^s	+06° 20' 58.9"
Saiph	κ Orionis	2.09	B (Blue)	05 ^h 47 ^m 45.4 ^s	-09° 40' 10.6"
Gamma Monocerotis	γ Mon	3.95	A (White)	06 ^h 14 ^m 51.40 ^s	-06° 16' 26.0"

Table 4b: Possible groupings of three stars using the description recorded by Robinson. The groupings are tested to see if they match the criteria using Robinson's recorded descriptions.

Star Groupings	Non-Red Stars	Eastward	Dawn	Sketch and magnitude	Vertical in mid-January
Group 1	√		√		√
Group 2	√	√	√		√
Group 3	√	√	√	√	√
Group 4		√	√		√
Group 5		√	√	√	√
Group 6	√	√	√		√
Group 7	√	√	√	√	√

The drawing does not show the stars in a linear form, indicating the orientation of the stars when turned 'vertical' would not be positioned in a straight line. This is clear when looking at any of the above three stars in summer; the orientation is tipped vertical but the stars do not appear in a straight line. The third star is described as being barely visible. Due to the faint magnitude of the third star there are multiple possible candidates. When grouping the three stars I took into consideration the orientation of the third star as well as the magnitude; only picking stars that were fifth magnitude or brighter.

Group 3 and *Group 7* match all the criteria described by Robinson. Out of the two, Sirius, Adhara, and Wezen (*Group 3*) are the more likely candidates. Sirius is a first magnitude star (-1.45), and is the brightest star in the sky. Sirius sits eastward at day dawn. It's orientation with Adhara (Epsilon Canis Majoris) and Wezen (Delta Canis Majoris), reflect the sketch drawn by Robinson (Figure 8). Adhara is a second magnitude star (+1.50) and Wezen is a star of lesser (second) magnitude but still visible (+1.80). In mid-January the three stars sit in a vertical position in the west at dawn.

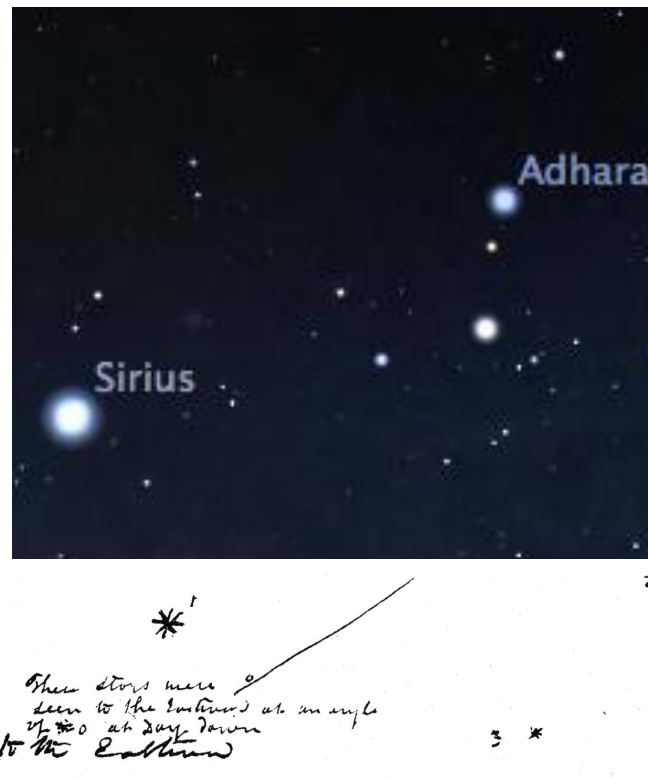


Figure 8: Sirius, Adhara and Wezen (Group 3) in line with Robinson's description and sketch of the three seasonal stars. Source: Stellarium

Bellatrix, Saiph and Gamma Monocerotis (Group 7) are less likely as they straddle Orion's Belt. Orion's Belt is mentioned by Robinson in earlier entries, indicating he knew the asterism and is likely to have labeled or located them when describing the three stars.

The results of the grouping show possible combinations of the three stars described by Robinson; *Group 3* is the most suitable identification within the research so far. Unfortunately, the three stars are unable to be identified conclusively in this thesis. Table 4b displays combinations of stars investigated, and how they measured against the description given by Robinson. What is known is the knowledge passed on contained rotational knowledge of the stars. This investigation confirms this. The stars do rotate to a vertical position in summer, confirming astronomy as an important element of Aboriginal life in Tasmania.

4.3.3 Time and the Moon

Entries from June 1832 indicate that the appearance of stars in the night sky was not only used to identify seasonal change, they were utilised in measuring shorter intervals of time. An altercation between the Tarkiner group of North West Tasmania and the Robinson's party occurred and a fight scheduled by the moon and stars was to take place at Nongor (West Point). The below two entries were made by Robinson regarding the timing of this fight (Plomley, 2008: 652)

19 June 1832

"I learnt that the TARKINER natives were to come and fight them when the rest came back from Robbins Island - the TARKINER would come two dark nights after the moon was gone (it was now moonlight)."

20 June 1832

"Learnt that the greater part of the natives had gone to Robbins Island and were engaged in getting spears, that they would return again when two darks or when the three stars come."

The new moon (denoting the days where less than 3% of the moon facing the earth is illuminated) occurred from 26-28 June 1832. The fight with the Tarkiner is scheduled two nights after the 'disappearance' of the moon (29 June 1832). This factored in the time it would take to return from Robbin's Island to collect spears, allowing themselves nine days. This shows a secure understanding of their place within the cycles of the moon and the ability to recognise the moon's phases and apply it to their daily lives in a way the Gregorian calendar is used today.

The entry on 20 June 1832 provides another timing measurement: "when the three stars come" (Plomley, 2008: 652). Coincidentally this timing falls nearly exactly two years earlier to the day that Robinson was shown the three stars indicating seasonal change, suggesting that perhaps the same three stars are being described in both accounts. The earlier mention of the three stars in 1832, written as "when the three stars come", indicates that they have not yet appeared in the sky. If this is the case, a look into the heliacal rise of stars

at this time could reveal more answers. This hypothesis also ties in with the later entry in 1834 where the stars were seen to the east at dawn, an essential element of heliacal rising.

The heliacal rise of a star is when a star is first visible for a short time (~15 minutes) as it rises just before the sun rises and drowns out the star's light. The visibility of the star depends primarily on its magnitude and altitude (and to some extent, its colour). Most first magnitude stars experience an extinction angle of between 2 and 5 degrees (altitude). The lower the visual magnitude of the star, the lower altitude the sun needs to be below the horizon for the star to be visible. For example, 3rd magnitude stars need the sun to sit at an altitude of -16° to -17° to be visible when 5 degrees above the horizon (Hamacher, 2015).

The heliacal rise of a star is used across Australia, and the world, to signify seasonal events. The Yirrkala of Northern Australia used the heliacal sighting of Scorpius in the morning sky to prepare them for coming Macassan (Indonesian) traders (Haynes, 1997: 73). The Pitjantjatjara of the Central Desert, upon seeing the heliacal rising of the Pleiades, know the dingo breeding season is about to peak and winter has started (Leaman and Hamacher, 2014: 4). Many cultures based their calendars of the heliacal rising and setting of stars, like Egypt with the star Sirius, the Maya with the planet Venus, and the Aztecs with the Pleiades (Schaefer, 2000: 124).

In the morning skies of June, Orion's belt reappears above the horizon after a period of absence. Its helical rise occurs between 8 June and 22 June 1834. The emergence of the three stars of Orion's belt is in line with the description as they rise, yet they are visible on the morning of the 19 June as well as the 30 June; they do not suddenly emerge on 29 June. Indicating the appearance of the three stars mean the time of day, not the day of the month; in Western societies, appointments are made on a specific date and time (e.g. Thursday at 9am). This may have been indicated by 'two dark nights' and 'when the three stars come' translating to Friday, 29 June 1832 at around 5:30 am in the morning, providing a clear way of indicating the time and day through sky knowledge.

Chapter 5: Discussion and Conclusion

Tasmanian Aboriginal people lived with the stars for thousands of years. A glimpse into their body of astronomical knowledge is possible through the nineteenth century Tasmanian literature. This thesis explores how fragments in the historical record can be used to reconstruct and inform the ways in which astronomy was used in Tasmanian Aboriginal life. Using methodology based in grounded theory, I categorise the data and interrogate multiple lines of enquiry through the five action categories:

1. Textual analysis
2. Comparative analysis
3. Linguistics analysis
4. Database Compilation
5. Knowledge Reconstruction

The results show that, despite a fragmentation of the astronomical information in the nineteenth century corpus, historical data can be used to reconstruct a more detailed picture of Aboriginal astronomy in Tasmania. The thesis also explores regional difference within recordings of Tasmanian Aboriginal astronomy. Difference is evident through names of stars and the way these stars are perceived; Bruny Island beliefs vary slightly compared to those of Cape Portland and Oyster Bay regarding actions of creation attributed to the two stars in the Milky Way. While variations of knowledge in some cases are evident, there is continuity with Dreamings describing the creation of man, *Parlevar*.

Mainland Aboriginal traditions share fundamental similarities with those of Aboriginal Tasmanians, as the Dreaming underpins Australian Aboriginal theology. Locality affects individual group's astronomical traditions across Australia, as the adaptive nature of the Dreamings reflects the natural world. Stingrays and sharks feature more prominently in coastal groups compared to those confined to the interior. Astronomical objects commonly associated with Aboriginal oral traditions on the mainland of Australia are the Milky Way, Orion, the Pleiades, the Magellanic Clouds, dark nebula (Coalsack), the sun, and moon. All are represented in Tasmania except for the Pleiades and Magellanic Clouds. The absence of recorded oral traditions relating to the Pleiades and Magellanic Clouds in Tasmania is peculiar. These objects are distinguished by nearly all Aboriginal nations across Australia. Johnson (2011) believes it is unlikely there are no Tasmanian traditions about the Pleiades, but for some reason they were simply never recorded. Although this

thesis did not find traditions related to these objects, further research may prove otherwise (ibid: 295).

The thesis reveals an insight into how Aboriginal Tasmanians utilised the landscape and skyscape, such as how the diurnal motion of the sun was used to navigate through country, how the movements of the stars were used to denote seasonal change and timekeeping, and how transient astronomical phenomena (e.g. eclipses and aurorae) are found to be associated with death or bad omens, most likely due to the infrequency of their appearance. The Moon's importance as a symbol of restoration and healing may have symbolic representation on cicatrising marks found on bodies and explained through Dreamings. This research shows how the night sky is a blackboard on which Dreamings are drawn with stars, retold to educate generations on moral code and law.

5.1 Summary of Astronomical Objects and Phenomena Described

Table 5 is a summary of the main findings of this thesis sorted by astronomical categories.

The Moon

The Moon, according to a Bruny Island tradition, is a woman named Vetea who is married to Parnuen (the Sun). I propose that the moon was related to crescent scarring reported on the bodies of men and women. The scars were associated with healing qualities, especially in the east of Tasmania. The phases of the moon were known and applied to daily life by the Aboriginal people of Tasmania, using this knowledge to schedule the timing of a fight or celebration. Rare lunar eclipses were received with fear and trepidation from members of the south and east nations of Tasmania. This reaction was also found with people from the north and west in the occurrence of aurorae, lighting, or meteors.

The Sun

The Sun, according to Bruny Island tradition, is a man named Parnuen and is married to Vetea, the Moon-woman. The diurnal, or east to west, motion of the sun is clearly known by Aboriginal Tasmanians, who crossed paths with the La Billardiere party and communicated to him, through hand gestures, how they used this motion to tell time.

Table 5	Aboriginal meaning and use	Bruny Island /Southern Tasmania	Cape Portland/ North Eastern Tasmania	Oyster Bay / Eastern Tasmania	Northern Tasmania	Western Tamania
Milky Way (Black) or Coalsack Milky Way (White) Milky Way Star (1) Castor or Pollux Milky Way Star (2) Castor or Pollux	Stingray in the Sky/ Creation of Fire Pathway to earth Creation of Fire Creation of Fire	lar.der law.way.teen.ne py.le.bay law.way	py.er.dreem.me tone.ner.muck.kel.len.ner pul.len.ner pum.per.me.howl.le pine.ter.rin.er	lar.ner (stingray) puck.ar.ne.pen.ner lore.ne.pen.ner (wife)		
The Southern Cross	Four points represent the two fire stars and the two women (Oyster Bay) The spear in the stingray Dreaming (south & east Tasmania)					
Pointers to the Southern Cross Saturn Mars	The foot of an ancestor	par.le.de law.way lar.ner	law.way dever.er			
Auroora	Ominous sign tied with death or harm		no.hoi.ner		no.hoi.ner	gen.ner
Auroora	Ominous sign tied with death or harm		num.mer.gen		num.mer.gen	purnenyer
Lunar Eclipse	Ominous sign tied with death or harm					
Canopus	Dromerdeene (creator ancestor)	Dromerdeene (creator ancestor)				
Betelgeuse	Dromerdeene brother (Beegerer or Pimerner)	Dromerdeene brother (Beegerer or Pimerner)				
Sirius	Dromerdeene brother (Beegerer or Pimerner)	Dromerdeene brother (Beegerer or Pimerner)				
Orion's Belt	landmark asterism used by Robinson. Aboriginal meaning yet to be identified					
Moon Sun Three Seasonal stars Venus groupings	Healing and change Navigation (Nortnen Tasmania) Indicator of fine weather The Moons children	vetea (wife of Parnuen), weetah parnuen (huband of Vetea) pur	too.wer.er noi.heen.ner	lutana, wiggetena pugganoobranah parng.ger.lin.ner luer.er.rer.mike.er.tud.dy	car.ca.rer (Ben Lomand) tone.ner, loi.ner noe.go	ween.nar (Robbin Island) weenah leah tonah leah lon.ner.ton
Electric Spark	Ominous sign tied with death or harm		noi.hee.ner		nar.no.bun.ner (Port Sorell)	
Twilight Early morning at twilight		nunto neenah nunawenapoyla		teggrymony keetana narra long - boorack tuggamarannye		
Sunrise		panubre roeelapoerack		mue.nat.te.me.lar	war.ka.la we.tin.ne.ger	
Sunrise Midday Midday Sunset Sunset Moonlight Starlight		toina wunna wer punubra tongoieerah weetapoona oarattih		puggalena parrack boorack tooggy malangta wietytongmena par.to.pe.lar wiggetapoona teahbertyacrackna		weenapooleah

propose that solar navigation is used by Aboriginal Tasmanians, the knowledge of which was communicated through songlines, demonstrating strong familiarity with the landscape and the shifting pattern of the sun throughout the year.

The Milky Way

It is no surprise the Milky Way was often identified in Tasmanian Aboriginal traditions. Before light pollution, the Milky Way would have dominated the night sky. The Milky Way is identified as a place of two ancestral spirits who lived in the Milky Way and used it as a pathway, linking the terrestrial world with the sky world.

The Coalsack Nebula

The Coalsack was described as the “Black Milky Way” and associated with a stingray by Aboriginal people from the south and east of Tasmania. The significance of the stingray is shown in the Oyster Bay Dreaming, *Legend of the Origin of Fire*. This Dreaming, tied to the Coalsack nebula, informs sea-hunting conduct, healing practices, and possibly annual hunting festivities.

The Southern Cross

The constellation Crux, or the Southern Cross, is identified as two fire ancestors (Alpha and Beta Crucis) and the two women they saved (Gamma and Delta Crucis).

The Pointer Stars

The Pointers (Alpha and Beta Centauri) are identified as a spear in the stingray Dreaming. The pointers are also hypothesized by Plomley as being *the three stars* discussed in Chapter 3.3.2, but I reject this association as it does not fit with the descriptions provided in the historical records.

Orion's Belt

Despite Orion's Belt being described by Bonwick as “furnishing many traditions,” there is no recorded connection with Tasmanian Aboriginal traditions in the literature. Robinson does refer to the belt, firstly in relation to the Dark Milky Way. However, my analysis

identified the Dark Milky Way as the Coalsack nebula. I argue G.A Robinson used Orion's Belt as a landmark to locate other stars.

Stars and Planets

Stars have been identified as ancestral spirits: Canopus as Dromerdenne, Castor and Pollux as the two fire ancestors (with Mars identified as their foot), and Betelgeuse and Sirius represent Dromerdeenn's two brothers. Moinee is identified as an unidentified 'Great South Star', possibly a reference to an unknown nova or supernova. Venus and Saturn have Aboriginal vocabulary yet this research found limited information beyond this. Venus was referenced as 'the moons children' by Plomley (1976) in his consolidated vocabulary (ibid: 402).

Aboriginal knowledge of the rotational movement of stars is evident in the literature. Broad statements are given by Robinson, to a breakdown of how this knowledge works given in Chapter 3.3.2 *Seasonal Time*. This breakdown revealed combinations of potential three stars, yet the exact identity of the stars was not definite.

5.2 Further Investigation and Education

The three stars described by Robinson is a subject requiring further investigation. The importance of linguistics to this research became increasingly obvious. Although vocabulary was addressed, more time investigating the syntax of Aboriginal Languages and the background of those who recorded them, would undoubtedly present new leads to understanding the identity of these three stars.

Working with the original papers of George Augustus Robinson (held at the Mitchell Library) may present a blank slate on which to base future research, removing the editing process of Plomley. Plomley's publications have been a valuable source for this research, yet words relating to stars have been left out of the consolidated wordlists. Vocabulary that may look irrelevant to Plomley could be invaluable to discovering new astronomical traditions in Tasmania.

Through more investigation, widening the scope of sources can improve our understanding of Tasmanian Aboriginal astronomy. Further research must be conducted in conjunction with Tasmanian Aboriginal communities ¹⁰. Research that is done outside of the community, while being beneficial, should be identified as a starting point only. Placing this research back into the context of current cultural knowledge in community is vital to a rounded understanding of the traditions. Tying research back into communities where continuing culture is very much thriving also helps to stamp out the idea that Tasmanian Aboriginal culture died out.

Despite the progress made to correct this misperception, I was surprised to discover during my stay in Tasmania in 2015 that this belief is still perpetuated today. One man, upon hearing about my thesis project, considered this to be a near-impossible task, as he believed the Aboriginal culture in Tasmania was “nonexistent.” When I explained to him this was incorrect, he reminded me, as a researcher, that I had to remain impartial, smiled, and walked away.

I believe this research can aid in mending the gap of misperception that is still prevalent in Tasmania today. Using astronomy as a conversation starter, giving this information back to Indigenous communities, educators, researchers, and the general public can give new insight and appreciation to one of the oldest living cultures in the world.

Social media is a great starting point to engage wider Australia with this information. *Australian Indigenous Astronomy* is a Facebook group started by Hamacher. This group, currently has 2,161 likes (as of 26 October 2015), is steadily growing. This is a page that is collaborative run with others in the field, including myself. Updates are given on progress in research as well as current affairs within science and Indigenous communities, Figure 9 shows a post made by PhD Candidate Trevor Leaman that reached 1,207 people.

¹⁰ Time constraints do not normally allow ethnographic fieldwork to be carried out during an Honours program. That is best suited for a PhD or postdoctoral project.



Australian Indigenous Astronomy

Published by Trevor Leaman [?] · October 20 at 7:21pm · Edited ·

If you happen to be awake in the early hours of the morning, look towards the eastern sky for the constellation known as Orion. In the Aboriginal traditions of the Kokatha people and APY lands around Ooldea, He is Nyeeruna, the warrior-hunter in pursuit of Yugarilya, the seven Mingari Sisters, represented by the Pleiades. In defiance of Nyeeruna, Kambugudha, the eldest of the Mingari sisters (The Hyades) stamps her foot (Aldebaran) and places a row of Dingo puppies in Nyeeruna's way, and Babba, the father Dingo (horns of Taurus), also comes in for the attack.

According to Daisy Bates, who recorded the astronomical traditions of this region, sparks can sometimes be seen emanating from Nyeeruna's club, which is held in his right hand. This may be in reference to the Orionids, the meteor shower which has its radiant (point of origin) in this region of sky, and which reaches a peak on the 20th-22nd October. See if you can spot Nyeeruna in the early dawn sky, shooting sparks from the point of his club.

Reference: <http://www.narit.or.th/.../2014JAHHvo.../2014JAHH...17..180L.pdf>



1,207 people reached

Boost Post



Figure 9: A screen shot of a post made by Trevor Leaman on the Australian Indigenous astronomy Facebook page.

The adoption of new technologies and software can aid in this process. In Figure 9 Leaman has customised the constellation art specific to the traditions of the Kokatha people of Anangu/Pitjantjatjara/Yankunytjatjara Lands near Ooldea, South Australia. Having the Aboriginal constellations mapped into Stellarium is a great educational and visual tool. At the moment, this can only be applied manually to individual Stellarium packages. The goal is to have Aboriginal astronomical traditions from all over Australia, including Tasmania, set up as a default-optional setting.

In Tasmania, Patsy Cameron and Dr Linn Miller's *Telling Places in Country* or *Carne Nemerranner* project with the University of Tasmania, includes an interactive component on the university's website. The interface encourages viewer participation with short documentaries and interviews with elders. There are quick links to key people in history and journey line flyovers, where site visitors can view the country via a Google Earth simulation, adding another experience to the online component of this research. This is a great example of how information from Robinson's journals has been used by an Aboriginal community project to take ownership of these stories. The Ethic and Governance model of the *Telling Places in Country* project is one that endorses community leadership (Miller and Cameron, 2015) and a model that I would like to replicate in astronomy-based research involving Tasmanian Aboriginal communities.

There is immense potential to create cross-platform educational resources. Dr Peter Morse has made full-dome documentaries that can be screened onto planetariums in museums, such as *Jangura*¹¹. In this film, Aboriginal elder, Stella Tittums, and historian, Mary Ann Jebb, explain Aboriginal sky traditions from the Gascoyne region of Western Australia (Morse, 2012). This innovative way of presenting information should be considered when creating educational materials. If the content has the ability to traverse multiple platforms (e.g. Stellarium, web, planetariums, 3D, and traditional forms), coupled with public talks, observatory programs, and research publications, there is greater potential for interested engagement in Aboriginal Astronomy and recognition of Australia's rich Aboriginal cultural history.

¹¹ Peter Morse 2012, *Jangurna Story: Indigenous Astronomy – Fulldome in Western Australia*
<http://www.petermorse.com.au/2012/06/jangurna-story-4k-fulldome-in-western-australia/>

Appendix


LEGEND of the origin of Fire and the Apotheosis of two heroes, by the Aborigines of Tasmania, as related by a Native of the Oyster Bay Tribe.

"My father, my grandfather, all of them lived a long time ago, all over the country; they had no fire. Two black fellows came, they slept at the foot of a hill - a hill in my own country. On the summit of a hill they were seen by my fathers, my countrymen, on the top of the hill they were seen standing: they threw fire like a star, - it fell among the black men, my countrymen. They were frightened - they fled away, all of them; after a while they returned, - they hastened and made a fire, - a fire with wood; no more was fire lost in our land. The two black fellows are in the clouds; in the clear night you see them like two stars. (Footnote given * Castor & Pollux) These are they who brought fire to my fathers."

"The two black men stayed awhile in the land of my fathers. Two women (Lowanna) were bathing; it was near a rocky shore, where mussels were plentiful. The women were sulky, they were sad: their husbands were faithless; they had gone with two girls. The women were lonely; they were swimming in the water, they were diving for crayfish. A stingray lay concealed in the hollow of a rock - a large sting- ray! The stingray was large, he had a very long spear; from his hole he spied the women, he saw them dive: he pierced them with his spear, - he killed them, he carried them away. Awhile they were gone out of sight. The stingray returned, he came close in shore, he lay in still water, near the sandy beach; with him were the women, they were fast on his spear - they were dead! The two black men fought the stingray; they slew him with their spears; they killed him; - the women were dead! The two black men made a fire, - a fire of wood. On either side they laid a woman, - the fire was between: the women were dead! The black men sought some ants, some blue ants (puggany eptiettd): they placed them on the bosoms (parugga poingta) of the women. Severely, intensely were they bitten. The women revived, - they lived once more. Soon there came a fog (maynen - tayana), a fog dark as night. The two black men went away, the women disappeared: they passed through the fog, the thick, dark fog! Their place is in the clouds. Two stars you see in the clear cold night the two black men are there the women are with them: they are stars above!"

Milligan, J. [1859] (1890) *Vocabulary of the dialects of some of the tribes in Tasmania*. Hobart. William Thomas Strutt, Government Printer. Pp 13

CATEGORY	SUBJECT	Region	Environment	Tradtional Word	Date Recorded	STORY or INFO	SOURCE	Page	Related to	SIMILAR TO/COMMENTS
Vocabulary	compass	Tasmania				EAST Nirtir// NORTH Linnegerbun// SOUTH Larmauhe Luppente// WEST Loneer// "Moihernee was a person who lived at the creation time and who made the first beings who were blackmen. He lived in the ocean off Louisa Bay, where he used to fight with the devils in this area, plenty of devils lived in the Toogee Low. Moinee another person from the time of creation, came out of the sky and lived on the land, where he stayed at Louisa Bay. When Moihemee died he turned into a large pillar of stone which now stands in the water at this point." (Wilson) Witzel suggests that the fall of Moihernee from the sky may suggest the end of the primordial golden period but there is not enough evidence to support this (p.g 305)	Wilson, E, 1999, Astronomy and other seasons, Manuta Tunapee Puggluggalia, Lindisfarne, Tasmania.pdf	15		Wilson belives these are names of places given to the "invader" not compass directional points
The Dreaming	Moihernee & Moinee	Louisa Bay near Coxes Bright, Tasmania	large pillar of stone which now stands in the water at this point?			Beergerer (Sirus) is brother to Pineerner (Belteguese) & Dromerdreen (Canopus) who live in the sky and are part of Orions Belt	Wilson, E, 1999, Astronomy and other seasons, Manuta Tunapee Puggluggalia, Lindisfarne, Tasmania.pdf	17	The Cotton Papers shares a similar story but uses the spelling and pronuciation instead Moinee instead. - Wilson says this is common.	Wilson Suggests this Geological formation mentioned in the story is called Larmauhe Luppente supporting her own idea of the list of compass points are in fact names of places - this is not supported by any evidence.
The Dreaming	Moihernee	Louisa Bay near Coxes Bright, Tasmania					Michael Witzel, 2012, The Origins of the World's Mythologies, Oxford University Press.	300 - 305		Witzel overview of Tasmanian mythology is taken mostly from 19th Century Anthropolocial work Plomely, Roth, Clark and Schmidt
The Dreaming	Sirus	Orions Belt	Star			Pineerner (Belteguese) is brother to Beergerer (Sirus) & Dromerdreen (Canopus) who live in the sky and are part of Orions Belt	Wilson, E, 1999, Astronomy and other seasons, Manuta Tunapee Puggluggalia, Lindisfarne, Tasmania.pdf	61		
The Dreaming	Belteguese	Orions Belt	Star			Dromerdreen (Canopus) is brother to Pineerner (Belteguese) & Beergerer (Sirus) who live in the sky and are part of Orions Belt	Wilson, E, 1999, Astronomy and other seasons, Manuta Tunapee Puggluggalia, Lindisfarne, Tasmania.pdf	61		
The Dreaming	Canopus	Orions Belt	Star				Wilson, E, 1999, Astronomy and other seasons, Manuta Tunapee Puggluggalia, Lindisfarne, Tasmania.pdf	61		
Vocabulary	Mars		Planet	Packarnepenne		Packarnepenne - Mars	Wilson, E, 1999, Astronomy and other seasons, Manuta Tunapee Puggluggalia, Lindisfarne, Tasmania.pdf	68		
Vocabulary	Saturn		Planet	Parled		Parled - Saturn	Wilson, E, 1999, Astronomy and other seasons, Manuta Tunapee Puggluggalia, Lindisfarne, Tasmania.pdf	66		
Vocabulary	Venus		Planet	Martennure		Martennure - Venus	Wilson, E, 1999, Astronomy and other seasons, Manuta Tunapee Puggluggalia, Lindisfarne, Tasmania.pdf	64		
Vocabulary	Orion?		Constellation	Lowten		Lowten "possibly the three stars in a wing shape in Orion"	Wilson, E, 1999, Astronomy and other seasons, Manuta Tunapee Puggluggalia, Lindisfarne, Tasmania.pdf	63		
Vocabulary	Mars & unknown		Planets			"Packarnepenne lawway devener Lorenepener "- Lorenepener is wife of Packarnepenne	Wilson, E, 1999, Astronomy and other seasons, Manuta Tunapee Puggluggalia, Lindisfarne, Tasmania.pdf	70		
Vocabulary	Large Bright star near the moon		Star			Mikertuddy could be Venus?	Wilson, E, 1999, Astronomy and other seasons, Manuta Tunapee Puggluggalia, Lindisfarne, Tasmania.pdf	71		
Vocabulary	The large bright star by the moon that has a small star nearby as its companion					Luererrer Mikurtuddy - these two stars are the moons children.	Wilson, E, 1999, Astronomy and other seasons, Manuta Tunapee Puggluggalia, Lindisfarne, Tasmania.pdf	73		
Vocabulary	Milkyway		Constellation	Pormener		Pormener	Wilson, E, 1999, Astronomy and other seasons, Manuta Tunapee Puggluggalia, Lindisfarne, Tasmania.pdf	76		
Vocabulary	megallenic clouds			Lawway Teeny		Lawway Teeny Pyerdeenme, also refers to a deity who came down from the dark place in the milky way to tell the ancestors of Palaways Death -"Long long ago when the land was very young Pyerdenme walked for a long long time along the Lawway Teeny, or the white part ofthe milkyway. It took a long long time until he reached the small island ofland at the bottom of the ocean called Trowena. Trowena is the Traditional Tasmanian Aboriginal People's name for Tasmania. After he arrived atTrowena he went down to the sea. For many days Pyerdenme searched and searched until he found the Traditional People, and then after calling a great corroboree he spoke to the People and told them that Palaway and/or Parlevar were dead." (pg 78)	Wilson, E, 1999, Astronomy and other seasons, Manuta Tunapee Puggluggalia, Lindisfarne, Tasmania.pdf	77		
Vocabulary	Dark space in Milky way						Wilson, E, 1999, Astronomy and other seasons, Manuta Tunapee Puggluggalia, Lindisfarne, Tasmania.pdf	77- 78		

Directions						"Dr. Milligan has collected from the Tasmanians on Flinders Island two expressions for the "Jump up Whitefellow" belief. The eastern tribe called it winya waumetya; the southern Tasmanians had the phrase, ria warappe noile." 186 "The presence of the full moon was a focal point to the Traditional People and their culture. The full moon ballshed an evil spmt called Riggaropa who walked the land during the dark nights, and sneaked up on the unsuspecting winds blew." Moinee created Rageorappa to punish the people but lost control of him only the little white frog Rala could control him but she slept at night so night was the most dangerous time for people to walk at night as that was the time that Rageorappa would sneak up and hurt them under the cover of darkness "The moon shared in the affections of the rude tribes. The eastern Tasmanians called it wiggetena ; the southern, weetah ; the north-western, weenah Leah."	Bonwick, J, 1870, Daily life and origin of the Tasmanians, Sampson Low, Son, and Marston, London, pp. 1-356.pdf	mention of evil spirit that comes at night Robinson, Wilson and Cotton but wth 186 different spelling	"Dr. Milligan has collected from the Tasmanians on Flinders Island two expressions for the "Jump up Whitefellow" belief. The eastern tribe called it winya waumetya; the southern Tasmanians had the phrase, ria warappe noile." 186
Vocabulary	Evil spirit	Tasmania, south	Appears at night	ria warappe noile					
Vocabulary	Evil spirit	Tasmania	Appears at night	Riggaropa			Wilson, E, 1999, Astronomy and other seasons, Manuta Tunapee Puggluggalia, Lindisfarne, Tasmania.pdf	11 see Bonwick and Cotton and Robinson	
Vocabulary	Evil Spirit	Tasmania	Appears at night	Rageorappa			Cotton, W.J. <i>Land of the Sleeping Gods : Untold History and Mythology of the Tasmanian Aborigines</i> . Allen & Unwin Sydney2013 Bonwick, J, 1870, Daily life and origin of the Tasmanians, Sampson Low, Son, and Marston, London, pp. 1-356.pdf	50 similar to Robinson, Wilson, Bonwick	illustrations of Rageorappa in book.
Vocabulary	Moon	Eastern Tasmania		Wiggetena			Bonwick, J, 1870, Daily life and origin of the Tasmanians, Sampson Low, Son, and Marston, London, pp. 1-356.pdf	192	
Vocabulary		Southern Tasmania		Weetah			Bonwick, J, 1870, Daily life and origin of the Tasmanians, Sampson Low, Son, and Marston, London, pp. 1-356.pdf	192	
		North Western Tasmania		Weenah Leah			Bonwick, J, 1870, Daily life and origin of the Tasmanians, Sampson Low, Son, and Marston, London, pp. 1-356.pdf	192	
Song		Tasmania				" Kano kano wimmari (lizard) Kano kano kanwemuka (cryltal) Kano kano makkitya (flint) Kano yernka makkitya .Makkitya mulyeria." "They are quite at home on the subject, that is, they have names for the stars and constellations and are aware that they revolve.....They call the black spot in the Milky way or Orions Belt a stingaree and say the blackfellows are spearing it. The Natives of the south call it Larder, which is their name for fish, and the natives of the east cal it Larner. They spoke on the subject of stars with great zest." (895) "The native shewed me the three stars which they say is a sign the fine weather is coming and when those stars are verticle the fine weather is come. They appear in the heavens eastward. No. 1 was large and is called the mother, No. 2 the husband of lesser magnitude and No. 3the offspring is hardley visble." (pg 926)	Bonwick, J, 1870, Daily life and origin of the Tasmanians, Sampson Low, Son, and Marston, London, pp. 1-356.pdf	194	
Constellations	Dark spot	Tasmania	Milky way / Orions Belt	Larder - South/ Larner - East	13 March 1834 11pm		Plomley, N.J.B. Friendly Mission: The Tasmanian Journals of George Augustus Robinson 1829 – 1834, 2 nd edn, Launceston and Hobart: Queen Victoria Museum & Art Gallery and Quintus Publishing, 2008.	895	
Seasons	stars	North Western Tasmania	?	Brune - Pur, western-Loneerten, northern - Noego, Oyster Bay - parngerlinner	30th June 1834 Day/Dawn		Plomley, N.J.B. Friendly Mission: The Tasmanian Journals of George Augustus Robinson 1829 – 1834, 2 nd edn, Launceston and Hobart: Queen Victoria Museum & Art Gallery and Quintus Publishing, 2008.	926 maybe Sirius and Wezen? Pomley foot notes it as the southern cross I belive he is mistaken.	This Origin of fire story can beused to shed light on occurances in Robinson's journals ... “The women went to dive for crawfish. Soon returned and said they had been chased by a large shark. Said that the women was sulky and that made the sharks come. LYGDUGEE said that a NEED.WON.MEE woman was eaten by the sharks.” (Pp. 302.
The Dreaming	stars	Oyster Bay	Castor and Pollux?		1859	The origin of fire	Milligan, Joseph [1859] 1890. Vocabulary of the dialects of some of the Aboriginal tribes of Tasmania. Hobart: William Thomas Strutt. Plomley, N.J.B. Friendly Mission: The Tasmanian Journals of George Augustus Robinson 1829 – 1834, 2 nd edn, Launceston and Hobart: Queen Victoria Museum & Art Gallery and Quintus Publishing, 2008.	13 See pg 497 ref to Fire	
Anecdote	Planets	Swan Island	Mars and Jupiter		24 June 1831	"An Aborigine who was domesticated, asked me one nightwhilst gazing at the stormy firmament if I knew the planets Mars and Jupiter, and said if the sky had not been so obscured he would point it out to me. Gave him a piece of paper and a pen and he drew me a ship.	Plomley, N.J.B. Friendly Mission: The Tasmanian Journals of George Augustus Robinson 1829 – 1834, 2 nd edn, Launceston and Hobart: Queen Victoria Museum & Art Gallery and Quintus Publishing, 2008.	Others have thought these two sentences are connected the stars and a ship. I think he just drew a ship as they were harboured off the coast of Swan Island.	
Vocabulary	stars		Stars Near the moon	LUER.ER..RER MI.KEER.TUD.DY	27 June 1831	"large bright star near the moon and having a small star near it, these stars have been seen in the WNW. The two stars were called the moons children."	Plomley, N.J.B. Friendly Mission: The Tasmanian Journals of George Augustus Robinson 1829 – 1834, 2 nd edn, Launceston and Hobart: Queen Victoria Museum & Art Gallery and Quintus Publishing, 2008.	Plomley suggests "the large star could have been Altair, which has a small companion near it; but the MS is confused and Venus may have been the 497 star referred to.	
The Dreaming	Stars		Two stars in the milky way	Pormener & lawway	27 June 1831	"by the Cape Portland natives these stars were said to have given fire and made the rivers, but the Bruny people did not ascribe the same effects to them."	Plomley, N.J.B. Friendly Mission: The Tasmanian Journals of George Augustus Robinson 1829 – 1834, 2 nd edn, Launceston and Hobart: Queen Victoria Museum & Art Gallery and Quintus Publishing, 2008.	This is a summary given by Plomely of the notes found. Maybe need to see 497 them in person.	Mulligan's account of the Origin of fire. Shaula and Lesath (Scorpius)?

The Dreaming	Stars	Bruny	Stars near Saturn	Saturn - Parlede	27 June 1831	" All the stars and contellations near to Saturn and the planets are figurative to men: natives fighting, courting; husband and wife; men's legs, limbs."	Plomley, N.J.B. Friendly Mission: The Tasmanian Journals of George Augustus Robinson 1829 – 1834, 2 nd edn, Launceston and Hobart: Queen Victoria Plomley, N.J.B. Friendly Mission: The Tasmanian Journals of George Augustus Robinson 1829 – 1834, 2 nd edn, Launceston and Hobart: Queen Victoria Museum & Art Gallery and Quintus Publishing, 2008.	497	Screen grab stellarium add in ... see Wilson 2nd gen
The Dreaming	Mars	Cape Portland	Mars	Lawway Deverer	27 June 1831	"The natives say that Mars is the foot of the two men, i.e LAW.WAY DEVER.ER (Cape Portland). Stars (1) and (2) are in the milky way."			Plomley suggests "These stars would probably be Procycon and Gamma in 497 the constellation of Gemini."
Time keeping	time	Cape Grim/ The West point	Scheduling a fight		19 June1832	"I learnt that the TARKINER natives were to come and fight them when the rest came back from Robbins Island - the TARKINER would come two dark nights after the moon was gone (it was now moonlight). Informed that the TARKINER PANER had taken away this man's wife and now they were going to fight and try and get her again."	Plomley, N.J.B. Friendly Mission: The Tasmanian Journals of George Augustus Robinson 1829 – 1834, 2 nd edn, Launceston and Hobart: Queen Victoria Museum & Art Gallery and Quintus Publishing, 2008.		According to www.timdanddate.com. The new moon fall on June 28. two days after this would be July 1. The fight 651 would happen in 10 days.
Vocabulary	Thunder	Cape Grim/ The West point	beyond the clouds	NOW.HUM.MER	18 June 1832	"The thunder they call NOW.HUM.MER, which is the name they call the evil spirit.""	Plomley, N.J.B. Friendly Mission: The Tasmanian Journals of George Augustus Robinson 1829 – 1834, 2 nd edn, Launceston and Hobart: Queen Victoria Museum & Art Gallery and Quintus Publishing, 2008.	650	
The Dreaming	Thunder	Brune	Weather		5 December 1830 (Sunday)	"The Brune natives said that the Brune Devil is thunder and lightning."	Plomley, N.J.B. Friendly Mission: The Tasmanian Journals of George Augustus Robinson 1829 – 1834, 2 nd edn, Launceston and Hobart: Queen Victoria Museum & Art Gallery and Quintus Publishing, 2008.	321	
Vocabulary	Origin of Thunder	Cape Grim/ The West point	beyond the clouds	RINE.DER.ROUN	18 June 1832	"The West Point and Cape Grim natives have a tradition that the thunder and lightning come a long distance from the clouds."	Plomley, N.J.B. Friendly Mission: The Tasmanian Journals of George Augustus Robinson 1829 – 1834, 2 nd edn, Launceston and Hobart: Queen Victoria Museum & Art Gallery and Quintus Publishing, 2008.	650	
Vocabulary	Electric Spark	Cape Portland	sky	NOI.HEE.NER	12 August 1832	"The natives last night saw and elctric spark in the atmosphere, at which they appeared frightened , and one of them told them not to metion it as they would be sick if they did."	Plomley, N.J.B. Friendly Mission: The Tasmanian Journals of George Augustus Robinson 1829 – 1834, 2 nd edn, Launceston and Hobart: Queen Victoria Museum & Art Gallery and Quintus Publishing, 2008.	430	
Vocabulary	Electric Spark	Port Sorell	sky	NAR.NO.BUN.NER	12 August 1832	"The natives last night saw and elctric spark in the atmosphere, at which they appeared frightened , and one of them told them not to metion it as they would be sick if they did."	Plomley, N.J.B. Friendly Mission: The Tasmanian Journals of George Augustus Robinson 1829 – 1834, 2 nd edn, Launceston and Hobart: Queen Victoria Museum & Art Gallery and Quintus Publishing, 2008.	430	
The Dreaming	Creation spirit	Told by WOORRADY	Coxes Bight	MOINEE	12 July 1831	"They say that MOINEE was hurled from heaven and dwelt on the earth, and died and was tunrned into stone and is at Coxes Bight, which was his own country. The natives say there is a large stone standing up which is MOINEE and that he was native and turned into this stone. "	Plomley, N.J.B. Friendly Mission: The Tasmanian Journals of George Augustus Robinson 1829 – 1834, 2 nd edn, Launceston and Hobart: Queen Victoria Museum & Art Gallery and Quintus Publishing, 2008.	409	
The Dreaming	Creation spirit	Told by MANNALARGENN A			17-Aug sun."	"In conversation with chief: said the moon made the	Plomley, N.J.B. Friendly Mission: The Tasmanian Journals of George Augustus Robinson 1829 – 1834, 2 nd edn, Launceston and Hobart: Queen Victoria Museum & Art Gallery and Quintus Publishing, 2008.	436	
The Dreaming	Creation spirit	Told by WOORRADY		LALLER	12 July 1831	"Said that LALLER the small pissant perforated the penis... Also say that LALLER a small ant first made the natives(query)."	Plomley, N.J.B. Friendly Mission: The Tasmanian Journals of George Augustus Robinson 1829 – 1834, 2 nd edn, Launceston and Hobart: Queen Victoria Museum & Art Gallery and Quintus Publishing, 2008.	409	An ant or LALLER is given healing powers in the Dreaming story Origin of Fire recorded by Milligan

The Dreaming	Creation spirit	Told by WOORRADY	said to believed by the southern &west coasts of the island	LALLER	7 July 1831	"LALLER made all the rivers; he cut little streams and thus made big rivers. Said that he mad ethe Kangaroo out of the ground and that they run away: he described it by putting his hand on the ground and shewing how they comw out and run away." "They say that DROMEDEENE made the natives; also that sun comes from England; and that seal comes from England, and that the NEEDWONNE natives made large catamarans and went to England, that PARLEVAR sleep plenty night at sea, lost plenty of days, that there was big wind and big sea, that they see plenty of seal." "I told them they would have to church likeLUG.GE.NE.MENE.NER and attend prayers; said it was very good. Asked them the name of the good spirit; said TYE.RE.NO.YER.PAN.NER god (Ben Lomond), PLUCK.ER.TEE.BUR.RER god (little Swanport); WY.ER.KAR.TEN.NER bad spirit or devil."	Plomley, N.J.B. Friendly Mission: The Tasmanian Journals of George Augustus Robinson 1829 – 1834, 2 nd edn, Launceston and Hobart: Queen Victoria Museum & Art Gallery and Quintus Publishing, 2008. Plomley, N.J.B. Friendly Mission: The Tasmanian Journals of George Augustus Robinson 1829 – 1834, 2 nd edn, Launceston and Hobart: Queen Victoria Museum & Art Gallery and Quintus Publishing, 2008.	An ant or LALLER is given healing powers in the Dreaming story Origin of Fire 405 recorded by Milligan
The Dreaming	Creation spirit	Brune		DROMEDEENE	13 July 1831		Plomley, N.J.B. Friendly Mission: The Tasmanian Journals of George Augustus Robinson 1829 – 1834, 2 nd edn, Launceston and Hobart: Queen Victoria Museum & Art Gallery and Quintus Publishing, 2008.	409
The Dreaming	The Good spirit	Ben Lomand	Spirit world	TYE.RE.NO.YER.PAN.NER	21 November 1830 (Sunday)		Plomley, N.J.B. Friendly Mission: The Tasmanian Journals of George Augustus Robinson 1829 – 1834, 2 nd edn, Launceston and Hobart: Queen Victoria Museum & Art Gallery and Quintus Publishing, 2008.	315
The Dreaming	Creation	Told by WOORRADY		DROEMERDEEM	7 July 1831	"Droemerdeener is the bright star seen in the south; Woorrady says he comes out of the sea, because seen from Brune which is on the south part of the island he must necessarily do so." "As far as this conversation went, it corresponded with the account given by Woorraddy, that (according to the cape portland natives) the fire was first made by PORM.PEN.ER, the two stars in the Milky Way - the Brune natives call them LAW.WAY, but do not ascribe to them the same powers as the others - and that they made it by rubbing their hands together; and that they also made the river."	Plomley, N.J.B. Friendly Mission: The Tasmanian Journals of George Augustus Robinson 1829 – 1834, 2 nd edn, Launceston and Hobart: Queen Victoria Museum & Art Gallery and Quintus Publishing, 2008.	406
The Dreaming	Fire	Told by MANNALARGENNA	Two stars in the milky way	PORM.PEN.ER	14 August 1831 (Sunday)		Plomley, N.J.B. Friendly Mission: The Tasmanian Journals of George Augustus Robinson 1829 – 1834, 2 nd edn, Launceston and Hobart: Queen Victoria Museum & Art Gallery and Quintus Publishing, 2008.	432
Death	Death	Cape Portland			14 August 1831 (Sunday)	"Memo: The Cape Portland Natives said that when black men die they go to the islands." "In conversation with the chief and the natives respecting the stars. Asked the chief who made the black man: said that it was (1) PUM.PER.ME.HOWL.LE, (2) PINE.TER.RIN.NER, the two stars in the milky way; that he stop up in the sky a long way. The Brune natives said the two stars in the milky way are two men, and mars is his foot and the Milky way is his road. The Cape Portland natives confirmed this , that Mars was the foot. Our conversation this night was brief."	Plomley, N.J.B. Friendly Mission: The Tasmanian Journals of George Augustus Robinson 1829 – 1834, 2 nd edn, Launceston and Hobart: Queen Victoria Museum & Art Gallery and Quintus Publishing, 2008.	433
The Dreaming	Creation	Told by MANNALARGENNA	Two stars in the milky way	(1) - PUM.PER.ME.HOWL.LE (2) - PINE.TER.RIN.NER	15 August 1831		Plomley, N.J.B. Friendly Mission: The Tasmanian Journals of George Augustus Robinson 1829 – 1834, 2 nd edn, Launceston and Hobart: Queen Victoria Museum & Art Gallery and Quintus Publishing, 2008.	Antares was up in the sky perhaps this 433 could have been confused for mars? (1) PUM.PER.ME.HOWL.LE, (2) PINE.TER.RIN.NER, the two stars in the milky way are mentioned twice in two days. Plomely suggests that these are no the literal name of the stars but the name of the creator spirits of Cape Portland the jottings have 'M' & 'CP' after the words suggest Cape Portland 436 dialect.
The dreaming	Creation	Told by MANNALARGENNA	Two stars in the milky way	(1) - PUM.PER.ME.HOWL.LE (2) - PINE.TER.RIN.NER	16 August 1831	"In converstation with the chief and other natives on the creation of man. The chief said that (1) PUM.PER.ME.HOWL.LE, (2) PINE.TER.RIN.NER, the two stars in the milky way made man, made rivers, gave the fire &c. The Cape Portland natives belive the same."	Plomley, N.J.B. Friendly Mission: The Tasmanian Journals of George Augustus Robinson 1829 – 1834, 2 nd edn, Launceston and Hobart: Queen Victoria Museum & Art Gallery and Quintus Publishing, 2008.	
The Dreaming	Fire		Fire		24 January 1834	"The natives said that PARPEDAR gave them fire, that when the lightning fired the trees the natives got it." "On crossing the the Bluff Mountain saw numerous concavities in the ground resembling a basin some of them deep. These the natives said were made by PARLEDEE, God."	Plomley, N.J.B. Friendly Mission: The Tasmanian Journals of George Augustus Robinson 1829 – 1834, 2 nd edn, Launceston and Hobart: Queen Victoria Museum & Art Gallery and Quintus Publishing, 2008.	872
Art/ Enviroment	Concavities	Crossing the bluff mountains	concavities	PARLEDEE	24 January 1834		Plomley, N.J.B. Friendly Mission: The Tasmanian Journals of George Augustus Robinson 1829 – 1834, 2 nd edn, Launceston and Hobart: Queen Victoria	871



Art/ Enviroment	Cicatrices	Port Davey	Tattoo	5 April 1830	"The Port Davey natives have the same customs as the Brune aboriginies in the burning of the dead, manufacture of baskets, relics of the dead &c. All their females had three scars or cicatrices on the back of each leg, about the middle of the calf, which is peculiar to themseleves."	Plomley, N.J.B. Friendly Mission: The Tasmanian Journals of George Augustus Robinson 1829 – 1834, 2 nd edn, Launceston and Hobart: Queen Victoria Museum & Art Gallery and Quintus Publishing, 2008. Plomley, N.J.B. Friendly Mission: The Tasmanian Journals of George Augustus Robinson 1829 – 1834, 2 nd edn, Launceston and Hobart: Queen Victoria Museum & Art Gallery and Quintus Publishing, 2008.	see Francios Peron's accounts of 174 cicatrices	
Art/ Enviroment	Cicatrices	Eastern Tasmania	Form of the moon	1 November 1830	"Most of these eastern natives had the form of the mooncut on their flesh. This mark seems peculiar to them, and they count by the moon." "On enquiry I found that those circles were made by means of fork and stick the same manner as we use a compass. I tried and made the same, with which they were much pleased. Mr Hellyer, the Company's surveyor, happening to meet with circles done in charcoal, supposed that they were made to resemble the sun, and drew a face in the centre and sent it to his friends in England. How mistaken are such people; and it shows how fond these persons are to show off with some story respecting the natives. Those circles are emblematical	Plomley, N.J.B. Friendly Mission: The Tasmanian Journals of George Augustus Robinson 1829 – 1834, 2 nd edn, Launceston and Hobart: Queen Victoria Museum & Art Gallery and Quintus Publishing, 2008.	297	
Art/ Enviroment	Circles	Big River Tribe / greater Tasmania	Circles	6 December1831	devises of men and women." "The aboriginal females on the island have round circles cut into their flesh in imitation of the sun or the moon. Some are much larger than this outline (a circle of about 1 half inch diameter with a thick margin, its area covered with a number of short transverse lines or dashes.) I have seen a woman with four of them on her body; others i have seen with two or three. They are very fond of them, are generally placed on each side of the backbone and about the hips."....."The Cicatrice of the sun and the moon is intended to remove inflammation and having the power of those luminaries they imagine it will have th same influences on the parts that have been affected. Some of those cicatrices are 3 and 4 inches in diameter."	Plomley, N.J.B. Friendly Mission: The Tasmanian Journals of George Augustus Robinson 1829 – 1834, 2 nd edn, Launceston and Hobart: Queen Victoria Museum & Art Gallery and Quintus Publishing, 2008.	575 Plomely - notes pp 613	
Art/ Enviroment	Cicatrices		Circles	Plomleys notes On the end pages of "one of Robinson's journals"		Plomley, N.J.B. Friendly Mission: The Tasmanian Journals of George Augustus Robinson 1829 – 1834, 2 nd edn, Launceston and Hobart: Queen Victoria Museum & Art Gallery and Quintus Publishing, 2008.	613	
The Dreaming	Fire	Told by MANNALARGENN A	Fire	28 December 1831	"Mannalargenna said that two men in the sky first gave the natives fire, that they stood all round."	Plomley, N.J.B. Friendly Mission: The Tasmanian Journals of George Augustus Robinson 1829 – 1834, 2 nd edn, Launceston and Hobart: Queen Victoria Museum & Art Gallery and Quintus Publishing, 2008. Plomley, N.J.B. Friendly Mission: The Tasmanian Journals of George Augustus Robinson 1829 – 1834, 2 nd edn, Launceston and Hobart: Queen Victoria Museum & Art Gallery and Quintus Publishing, 2008.	599	
The Dreaming	Fire	Told by WOORRADY	Fire	28 December 1831	"Woorrady said PARPEDER gave fire to the natives."	Plomley, N.J.B. Friendly Mission: The Tasmanian Journals of George Augustus Robinson 1829 – 1834, 2 nd edn, Launceston and Hobart: Queen Victoria Museum & Art Gallery and Quintus Publishing, 2008. Plomley, N.J.B. Friendly Mission: The Tasmanian Journals of George Augustus Robinson 1829 – 1834, 2 nd edn, Launceston and Hobart: Queen Victoria Museum & Art Gallery and Quintus Publishing, 2008.	PARPEDER could possible be PARNUEN the sun this would reflect the contemporary stories of fire from south 599 Tasmanaia see Toonah Leah	
The Dreaming	The Good spirit		Sky	PARLERDY	7 June 1829	"Learnt that they had had some idea of a good spirit whom they called PARLERDY, and that he stopped in the sky. (WARRANGELY)." "The Brune nativesaffirm the moon (VETEA) came from England and that she stopped at the RORE.DAIR.RE.ME.LOW, that is, the country at Oyster Bay, that thr kangaroo and mutton-fish asked the moon to stop there, that the moonwas a LOONER, a woman, and that she was roasting mutton- fish when the sun (PARNUEN) came and swept her away, and she tumbling in the fire was hurt on her side and then rolled into the sea, and afterwards went up to the sky (WARRANGERLY) and stopped there with her husband the sun. They say that the rainbow is the suns children. Told me id I looked i should see it black where she had been burnt."	Plomley, N.J.B. Friendly Mission: The Tasmanian Journals of George Augustus Robinson 1829 – 1834, 2 nd edn, Launceston and Hobart: Queen Victoria Museum & Art Gallery and Quintus Publishing, 2008.	66
The Dreaming	The Moon		Sky	VETA	17 July 1831		412	

Time keeping	The full moon	North Eastern Tasmania?				"Amongst the neighbouring tribes of Aboriginies it was customary to meet at some time-honoured trysting - place at every full moon, a period regarded by them with the most profound reverence."	Lloyd, G. (1862). Thirty-three years in Tasmania and Victoria. London: Houlston and Wright.	48
Time keeping	Time	North western tribes	Return from Robbins Island	20 June 1832		"Learnt that the greater part of the natives had gone to Robbins Island and were engaged in getting spears, that they were to return again when two darks or when the three stars come." "The general opinion of these aboriginies with me is that Black Tom is speared by the native tribe and that they had taken awaythe women; and what appeared to confirm them in this opinion was the shadow of the earth on the face of the moon, that luminary not arrived in full. This they said was Black Tom: that the natives had killed him and that he had gone up into the moon."	Plomley, N.J.B. Friendly Mission: The Tasmanian Journals of George Augustus Robinson 1829 – 1834, 2 nd edn, Launceston and Hobart: Queen Victoria Museum & Art Gallery and Quintus Publishing, 2008.	652
Death	Lunar Ecipse	Told by WOORRADY	Death of Black Tom	24 August 1831			Plomley, N.J.B. Friendly Mission: The Tasmanian Journals of George Augustus Robinson 1829 – 1834, 2 nd edn, Launceston and Hobart: Queen Victoria Museum & Art Gallery and Quintus Publishing, 2008.	444
Death	Lunar Ecipse	Patsy Cameron				"With the assistance of a local astronomer the project team was able to confirm this eclipse in August 1831."	Cameron, P. (2015). August 21-26 1831 - TPIC - Telling Places in Country (TPIC) - University of Tasmania, Australia. Utas.edu.au. Retrieved 5 September 2015, from http://www.utas.edu.au/telling-places-in-country/journey-lines/tpic-expeditions/the-emu-hunters/august-21-26	Cameron confirms the shadow on the moon spoken about on 24 August 1831(plomely pp444) was infact an eclipse.
Tattoo	Health	Cape Portland /Swan Island	Bodies	26 November 1830		"Today all the Aboriginies tattoood themselves, the shoulder of some and the back and belly of other were completely scarified.. After the operation is performed they rub in the incision powdered charcoal and red ochre mixed with grease." "In conversation with the natives respecting the stars. The Black streak in the Milky Way is called by the Brune natives (1) PY.ER.DREEM.ME (2) LAR.DER, and the white streak LAW.WAY TEEN.NY. Said that LAW.WAY TEEN.NY was the road (LAW.WAY road), and that he walked all along down to the sea: said the PARLEVAR was dead."	Plomley, N.J.B. Friendly Mission: The Tasmanian Journals of George Augustus Robinson 1829 – 1834, 2nd edn, Launceston and Hobart: Queen Victoria Museum & Art Gallery and Quintus Publishing, 2008.	Perhaps for medicinal purposes. The sentence prior to this 317 :TUNNERMINNERWAIT very sick.
The Dreaming	Milky way	Brune	The Black streak of the Milky way & the white streak	PY.ER.DREEM.ME LAR.DER	30 June 1831		Plomley, N.J.B. Friendly Mission: The Tasmanian Journals of George Augustus Robinson 1829 – 1834, 2nd edn, Launceston and Hobart: Queen Victoria Museum & Art Gallery and Quintus Publishing, 2008.	400
The Dreaming	Milky way	Cape Portland	The Black streak of the Milky way & the white streak	TONE.NER.MUCK.KEL.L EN.NER	30 June 1831	"The black milky way is called by the natives of Cape Portland TONE.NER.MUCK.KEL.LEN.NER and the white Milky way PUL.LEN.NER." "In several instances, the lives of white people were saved by the native women, who would ofter steal away from the tribe, and give notice of an instended attack. ON one occasion one of our boat's crews had landed for the night on the shore of Great Swan Port, made their preperations for supper, and lighted a fire, when two native women came stealthily to them, waring them to hurry away, as the tribe was hidden behind the nearest bank, only waiting till the moon rose to make a descent upon them."	Plomley, N.J.B. Friendly Mission: The Tasmanian Journals of George Augustus Robinson 1829 – 1834, 2nd edn, Launceston and Hobart: Queen Victoria Museum & Art Gallery and Quintus Publishing, 2008.	400
Time Keeping	The Moon	Swanport, Tasmania	Scheduling a fight This Dreaming explains geological formations including Mount Ben Lomond & South Esk River as well as astronommical objects; the moon & shooting stars.		1824 - 1853		Charles, Meredith 1853, My Home in Tasmania. Bruce and brother.	143
The Dreaming	The Moon	Cape Barren Island					Noonuccal, Oodgeroo, 1920-. - Australian legends and landscapes / Oodgeroo Noonuccal; with photography by Reg Morrison - Milsons Point, N.S.W.; Random House Australia, 1990; p. 115-119; ill.	see duanes paper on this and its 115 relationship with metrorites

						noonuccal, Oodgeroo, 1920-. - Australian legends and landscapes / Oodgeroo Noonuccal; with photography by Reg Morrison - Milsons Point, N.S.W.; Random House Australia, 1990; p. 115-119; ill.	137 - 142	
The Dreaming	Fire muttonbird/ Moon or the Moonbird	Tasman Peninsula	This Dreaming explains the creation of the sun and fire and lightening.	Pydairrerme Band	Toonah Leah, The Fire Spirit	Summers, Ronnie 2009 Tasmanian Songman Ronnie, Magabala Books Broome WA.		Tonah Leah the word for Sun for the North West and Western Tribes given by Milligan
The Dreaming		Cape Portland	First told by Manalargenna	Trawlwooway people	The Songlines of the moonbird "When the moon fell away from the face of the earth it left the moonbird behind."- Dyan Summers			Also see Songlines of the Moonbird- Dyan Summers 2013 - Dept of Education Tasmania
								Plomely notes on page 500 "The two stars to the southward and east of Orion's Belt would be Sirius and Betelguese. Dromerdeenne had already been identified as Canopus, so the text may be corrupt here and what was meant was that Beegerer and Pme.er.ner were known as
The Dreaming	Stars	Brune			1 August 1831	"Tonight the Brune natives pointed out two stars to the southward, laying eastward of orions belt, which they said was Dromerdeenne and his brother, i.e. Beegerer and Pim.er.ner. They were brilliant stars and appear to move towards the observer, rising as it were in the southern horizon and setting in the north." "As soon as the morning star appeared they would get up and commence toliet which would take their wives (sic) till after sunrise to dress a naked man, they had each woman 2 flat stones with plenty of mutton bird and penguin gfat which they pounded with a kind of ochre and sometimes charcol which they rubbed on the mens hair making it hang over their shoulders in ringlets, then each man had his body done according to fancy varying it each day." "The Aboriginies have considerable knoweldge of the signs of the weather and had attained to such celebrity that my people, i.e white men, would consult them on this subject, and always appeared satisfied at what the natives told them. If the clouds or scud fly swiftly along it is a sign , they say, there will be no rain;if a circle is round the moon it's a sure sign of bad weather, plenty of wind; if light clouds appear it is a sign of fine weather. Indeed they have numerous signs by which they judge and I have seldom found them to err.Thus they are enabled to know when to build their huts, to go to the coast to fish, travel &c. They also judge by the stars and have names by which they distinguish them."	Plomley, N.J.B. Friendly Mission: The Tasmanian Journals of George Augustus Robinson 1829 – 1834, 2nd edn, Launceston and Hobart: Queen Victoria Museum & Art Gallery and Quintus Publishing, 2008.	425 Dromerdeenne's Brothers."
Daily ritual	Morning star	Swan Island			January 1830	McKay, T. (1994). <i>Alexander McKay, this prince of bush travellers</i> . Kingston, Tas.: T. McKay.	pg 51	not convinced this is really relavant. Seem to b more of a timing indicator for Alex McKay
Gnereal Knowledge	stars				December 25th 1830	Plomley, N.J.B. Friendly Mission: The Tasmanian Journals of George Augustus Robinson 1829 – 1834, 2nd edn, Launceston and Hobart: Queen Victoria Museum & Art Gallery and Quintus Publishing, 2008.	pg334	
Directions	Sun	North Western Tasmania	???	Tone.ner - sun		Plomley, N. (1976). <i>A word-list of the Tasmanian aboriginal languages</i> . Launceston, Tas.: N.J.B. Plomley in association with the Government of Tasmania.		TONE.NER is also used in the word TONE.ER.MUCK.KEL.LEN.NER which is the Cape portland word for the dark part of the milky way pp400
Dreaming	stars	Eastern Tasmania			1890	LEGEND of the origin of Fire and the Apotheosis of two heroes, by the Aborigines of Tasmania, as related by a Native of the Oyster Bay Tribe.	Milligan, J, 1890, Vocabulary of dialects of Aboriginal tribes of Tasmania, Vol. 2, pp. 423-434	51 could possible this mean shadow? TONE.EN.ER ALSO MEANS WEST. 205 VOCAB
								related to earlier fire stories

Bibliography

- Aalto University. (2012, July 9). Sounds of Northern Lights are born close to ground. *ScienceDaily*. Retrieved October 28, 2015 from www.sciencedaily.com/releases/2012/07/120709093048.htm
- Agrawal, A.. (1995). Dismantling The Divide Between Indigenous And Scientific Knowledge. *Development and Change*, Vol. 26(3), pp. 413-439.
- Aitken, W. (2008). *Community Voices*. In *Reading Robinson: Companion Essays to Friendly Missions*, Edited by Johnson, A. and Rolls, M. Hobart: Quintus Publishing.
- Aveni, A. F. (2003). Archaeoastronomy in the ancient Americas. *Journal of Archaeological Research*, 11(2), 149-191.
- Baird, A. (2008). *Voices Of Aboriginal Tasmania Ningenneh Tunapry Education Guide*. Hobart: Tasmanian Museum and Art Gallery. Retrieved 2 Apr. 2015. URL: www.tmag.tas.gov.au/_data/assets/pdf_file/0004/66766/Voices_of_Aboriginal_Tasmania_ningenneh_tunapry_education_guide.pdf
- Berndt, R. (1940). Some Aspects of Jaralde Culture , South Australia. *Oceania*, 11, 164.
- Berndt, R.M. and Berndt, C.M. (1993). *A World That Was The Yaraldi of the Murray River*. Melbourne: Melbourne University Press.
- Bonwick, J. (1870). *Daily life and origin of the Tasmanians*. London: Sampson Low, Son, and Marston.
- Bowern, C. (2012). The riddle of Tasmanian languages. *Proceedings of the Royal Society B: Biological Sciences*, Vol. 279(1747), pp. 4590-4595.
- Breen, D. and Roughley, M. (2015). *Tasmania: A Timeline of the History of First Nations People*. Retrieved 4 October 2015. URL: nationalunitygovernment.org/content/tasmania-timeline-history-first-nations-people

Breen, S. (2015). *Lucy Beedon: Tasmanian Aboriginal Activist 1829-1886*. Australian Dictionary of Biography, Carlton: Melbourne University Press, 2005.

Cairns, H.C. and Harney, B.Y. (2003). *Dark Sparklers: Yidumduma's Wardaman Aboriginal astronomy, Northern Australia*. Merimbula, NSW: H.C. Cairns.

Cameron, Patsy. (2011). *Grease and ochre : the blending of two cultures at the colonial sea frontier*. Launceston, Tas : Fullers Bookshop Publisher

Cameron, P. (2011). *August 21-26 1831 - TPIC - Telling Places in Country (TPIC)*. University of Tasmania. Retrieved 5 September 2015. URL: www.utas.edu.au/telling-places-in-country/journey-lines/tpic-expeditions/the-emu-hunters/august-21-26

Cameron, Patsy, & Miller, Linn. (2009). Carne neemerranner: Telling places and history on the ground. *Australian Journal of Indigenous Education*, 38(Supplement), 3-9.

Coon, C., & Watson, A. (1976). *The hunting peoples* (Pelican anthropology library). Harmondsworth: Penguin.

Cotton, William Jackson 1909-1981 and Cooper, J. (compiler.) (2013). *Land of the sleeping gods: untold history and mythology of the Tasmanian Aborigines*. Hobart: Tasmania Wellington Bridge Press

Cotton, Jackson (1979). *Touch the morning : Tasmanian native legends*. O.B.M, Hobart

D'Arcy, P. (2006). *The people of the sea: Environment, identity and history in Oceania*. Honolulu: University of Hawai'i Press.

Dennis, S. (2008). *Community Voices*. In *Reading Robinson: Companion Essays to Friendly Missions*, edited by E.A. Johnson and M. Rolls. Hobart: Quintus Publishing.

Dixon-Kennedy, M. (1998). *Encyclopedia of Greco-Roman mythology*. Santa Barbara: ABC-CLIO.

Duyker, Edward. (2007). Francois Peron and the Sea. *Tasmanian Historical Studies*, 12, 3-18.

Egan, J. and Bower, C. (2015). *Tasmanian Aboriginal people had many dialects*. *Australian Geographic*. Retrieved 4 October 2015, URL www.australiangeographic.com.au/news/2012/10/tasmanian-aboriginal-people-had-many-dialects

Fletcher, M. (2003). *Dreaming: Interpretation and Representation*. Department of Archaeology. Adelaide, South Australia. Flinders University,

Florabank.org.au, (2015). *Factsheet - Acacia melanoxylon*. Retrieved 26 September 2015, from http://www.florabank.org.au/lucid/key/species%20navigator/media/html/Acacia_melanoxylon.htm

Florek, S. (2013). *Joseph Milligan (1807-1884)*. Sydney: Australian Museum. Retrieved 30 August 2015, URL: australianmuseum.net.au/joseph-milligan-1807-1884.

Fredrick, S. (2008). *The Sky of Knowledge: A Study of the Ethnoastronomy of the Aboriginal People of Australia*. Master of Philosophy thesis, Department of Archaeology and Ancient History, University of Leicester, UK.

Fuller, R., Norris, R., & Trudgett, M. (2014). The astronomy of the Kamilaroi and Euahlayi peoples and their neighbours. *Australian Aboriginal Studies*, (2), 3-27.

Fuller, R., Trudgett, M., Norris, R., & Anderson, M. (2014). Star Maps and Travelling to Ceremonies -- the Euahlayi People and Their Use of the Night Sky. *Journal of Astronomical History and Heritage*.

Goldsmith, J. (2014). *Cosmos, culture and landscape: Documenting, learning and sharing Australian Aboriginal astronomical knowledge in contemporary society*. Faculty of science and Engineering. WA, Curtin University

Gough, J. (2014). Chapter 2: Forgotten Lives – The first Photographs of Tasmanian Aboriginal People, in *Calling the shots: aboriginal photographs*. Canberra: Aboriginal Studies Press.

Gough, Julie (2000) *History, representation, globalisation and indigenous cultures : a Tasmanian perspective*. In: Smith, Claire, and Ward, Graeme, (eds.) *Indigenous cultures in an interconnected world*. Allen & Unwin, Sydney, pp. 89-107.

Haines, P. (2005). Impact cratering and distal ejecta: The Australian record. *Australian Journal of Earth Sciences*, Vol. 52(4-5), pp. 481-507.

Hamacher, D. W. (2013). Aurorae in Australian Aboriginal Traditions. *arXiv preprint arXiv:1309.3367*.

Hamacher, D. W., & Goldsmith, J. (2013). Aboriginal oral traditions of Australian impact craters. *arXiv preprint arXiv:1306.0278*.

Hamacher, D.W. and Norris, R.P. (2011). *Eclipses in Australian Aboriginal Astronomy*. *Journal of Astronomical History and Heritage*, Volume 14, Number 2.

Hamacher, D.W. (2012). *On the Astronomical Knowledge and Traditions of Aboriginal Australians*. PhD Thesis, Department of Indigenous Studies, Macquarie University, Sydney, Australia.

Hamacher, D.W. & Frew, D.J. (2010) An Aboriginal Australian record of the Great Eruption of Eta Carinae, *Journal of Astronomical History & Heritage*, Vol. 13(3), pp. 220-234.

Hamacher, D., & Norris, R. (2011). 'Bridging the gap' through Australian cultural astronomy. International Astronomical Union. *Proceedings of the International Astronomical Union*, 7(S278), 282-290.

Head, L. (1993). Unearthing Prehistoric Cultural Landscapes: A View from Australia. *Transactions of the Institute of British Geographers*, Vol. (4), pp. 481-499.

Iwaniszewski, S. (2011). The sky as a social field. *International Astronomical Union. Proceedings of the International Astronomical Union*, 7(S278), 30-37.

Johnson, D.D, (1998). *Night skies of Aboriginal Australia: A Noctuary*. Sydney: University of Sydney Press.

Johnson, D. (2011). Interpretations of the Pleiades in Australian Aboriginal astronomies. *Proceedings of the International Astronomical Union*, 7(278), 291-297.

Johnson, M., McFarlane, I., and Reynolds, H. (2015). *Van Diemen's Land: An Aboriginal history*. Sydney, NewSouth Publishing.

Leaman, T. and Hamacher, D. (2014) Aboriginal astronomical traditions from Ooldea, South Australia. Part 1: Nyeeruna and 'The Orion Story'. *Journal of Astronomical History and Heritage* , Vol. 17, no. 2, p. 180-194.

Lloyd, G. (1862). *Thirty-three years in Tasmania and Victoria*. London: Houlston and Wright.

Lourandos, H. (1997) *Continent of Hunter Gatherers: New Perspectives in in Australian Prehistory*, Cambridge University Press.

McCluskey, S. C. (2011). The cultures of archaeoastronomy and the history of science. *Proceedings of the International Astronomical Union*, 7(278), 19-29.

McDavitt, M. T. (2005). The cultural significance of sharks and rays in Aboriginal societies across Australia's top end. *Marine Education Society of Australia's Seaweek*.

McKay, H. (2001). *Gadi mirrabooka : Australian Aboriginal tales from the dreaming* (World folklore series). Englewood, Colo.: Libraries Unlimited.

Miller, L. and Cameron, P. (2015). *Telling Places In Country (TPIC)*. Hobart: University Of Tasmania. Retrieved 22 Oct. 2015. URL: www.Utas.edu.au

Milligan, J. and Royal Society of Tasmania, (1890). *Vocabulary of the dialects of some of the aboriginal tribes of Tasmania*. Hobart: William Thomas Strutt .

Moore, P (1983). *Patrick Moore's History of Astronomy*. The University of Michigan.

Morse, P. (2015). *Jangurna Story: Indigenous Astronomy. Fulldome Planetarium film*. Retrieved 22 October 2015. URL: www.petermorse.com.au/2012/06/jangurna-story-4k-fulldome-in-western-australia/

Nakata, M.N. (2010). The Cultural Interface of Islander and Scientific Knowledge. *Australian Journal of Indigenous Education*, Vol. 39(2), pp. 53-57.

Nemiroff, R., and Bonnell, J. (2015). *APOD: June 5, 1999: Betelgeuse, Betelgeuse, Betelgeuse*. Retrieved 12 September 2015. URL: apod.nasa.gov/apod/ap990605.html

Nicholls, C. (2014). 'Dreamtime' and 'The Dreaming': who dreamed up these terms?. *The Conversation*. Retrieved 26 October 2015, from <http://theconversation.com/dreamtime-and-the-dreaming-who-dreamed-up-these-terms-20835>

Noetling, Fritz (1910) *The food of the Tasmanian Aborigines*. Papers and Proceedings of the Royal Society of Tasmania. pp. 279-305. ISSN 0080-4703

Norris, R.P. & Yidumduma Harney, B. (2014). Songlines and navigation in Wardaman and other Australian Aboriginal cultures. *Journal of Astronomical History and Heritage*, 17(2), 141-148

Norris, Ray P, Norris, Cilla, Hamacher, Duane W, & Abrahams, Reg. (2013). Wurdi Youang: An Australian Aboriginal stone arrangement with possible solar indications. *Rock Art Research: The Journal of the Australian Rock Art Research Association (AURA)*, 30(1), 55-65.

Norris, R., & Hamacher, D. (2009). *The Astronomy of Aboriginal Australia*. International Astronomical Union. Proceedings of the International Astronomical Union, 5(S260), 39-47.

Parks.tas.gov.au, (2015). Retrieved 13 September 2015, from <http://www.parks.tas.gov.au/file.aspx?id=32559>

Peck, D. (2015). *Tasmanian Aboriginal stories told on Mt Wellington*. ABC News. Retrieved 4 October 2015. URL: www.abc.net.au/news/2015-04-29/tasmanian-aboriginal-stories-told-on-mt-wellington/6430622

Plomley, N. (1976). *A word-list of the Tasmanian Aboriginal languages*. Launceston: N.J.B. Plomley (in association with the Government of Tasmania).

Plomley, N., & Robinson, G. (1987). *Weep in silence : A history of the Flinders Island Aboriginal settlement ; with the Flinders Island journal of George Augustus Robinson, 1835-1839*. Sandy Bay, Tas.: Blubber Head Press.

Rasmussen, M., et al. (2011). *An Aboriginal Australian Genome Reveals Separate Human Dispersals into Asia*. *Science* 334(6052): 94-98.

Reynolds, H. (2004). *Fate of a free people* (Updated & rev [ed]. ed.). Camberwell, Vic.: Penguin.

Robinson, G., & Clark, I. (1998). *The journals of George Augustus Robinson, chief protector, Port Phillip Aboriginal Protectorate*. Melbourne: Heritage Matters.

Robinson, G., Plomley, N., & Tasmanian Historical Research Association. (2008). *Friendly mission : The Tasmanian journals and papers of George Augustus Robinson, 1829-1834*. Hobart: Tasmanian Historical Research Association.

Rose, D. (2006). The Rivers of Babylon. *Manoa*, 18(2), 1-6.

Roth, H. Ling. and Walker, J Backhouse. and Garson, J. G. and Butler, Marion E. (1968). *The Aborigines of Tasmania*. Hobart : Fullers Bookshop Publisher

Ruggles, C. (2010). Indigenous Astronomies and Progress in Modern Astronomy. *Proceedings of Science*, 2010, PoS(sps5)029. 18pp.

Ruggles, C. (2011) *Pushing back the frontiers or still running around the same circles? Interpretative archaeoastronomy thirty years on*, *Archaeoastronomy and Ethnoastronomy - building bridges between cultures* Cambridge University Press.

Ryan, L. (2012). *Tasmanian Aborigines, A History since 1803*. Sydney: Allen and Unwin.

Schaefer, B.E. (2000). New Methods and Techniques for Historical Astronomy and Archaeoastronomy. *Archaeoastronomy*, Vol. 15, pp. 121-159.

Stanbridge, W.E., 1858. On the astronomy and mythology of the Aborigines of Victoria. *Transactions of the Philosophical Institute of Victoria*, 2, 137-140.

Stanner, W.E.H. and Manne, R. (2010). *The Dreaming and other essays*. Melbourne: Black Inc.

Strauss, A., & Corbin, J. (1998). *Basics of qualitative research : Techniques and procedures for developing grounded theory* (2nd ed.). Thousand Oaks: Sage Publications.

Tasman, A., Duyker, M., Marion Du Fresne, E., Duyker, E., and Duyker, H. (1992). *The discovery of Tasmania: Journal extracts from the expeditions of Abel Janszoon Tasman and Marc-Joseph Marion Dufresne, 1642 & 1772*. Hobart: St. David's Park Publishers.

Tasman, A.J. and Heeres, J.E. (1985). *The discovery of Tasmania (24 November 1642): extracts from the Journal of Abel Janszoon Tasman*. Hobart: Government Printer.

Teichelmann, C. G. & Schurmann, C. W. (1840). *Outlines of a grammar, vocabulary, and phraseology of the aboriginal language of South Australia, spoken by the natives in and for some distance around Adelaide*. Adelaide : C.G. Teichelmann and C.W. Schurmann

Thompson, L. and Tasmanian Aboriginal Community (2011). *The creation of Trowenna: a story from the Neunone People of Tasmania*. Melbourne: Pearson Australia.

Trove.nla.gov.au,. (2015). *08 Sep 1877 - The Drought.*. Retrieved 26 September 2015, from <http://trove.nla.gov.au/ndp/del/article/19761483>

Utas.edu.au,. (2015). *Mannalargenna - Telling Places in Country (TPIC) - University of Tasmania, Australia*. Retrieved 29 October 2015, from <http://www.utas.edu.au/telling-places-in-country/historical-context/historical-biographies/mannalargenna>

Van Toorn, P. (2001). *Indigenous Australian Life writing Tactics and transformations*. In *Telling stories: Indigenous history and memory in Australia and New Zealand*, edited by B. Attwood. Sydney: Allen and Unwin.

Victor O'Reeri, M. (2015). *TEDxSydney - Mary Victor O'Reeri - Indigenous Australian Wisdom. A Story of Life, Discovery & Death*. Retrieved 18 October 2015. URL: www.youtube.com/watch?v=UYAR-UYo04w

West, I. (1987). *Pride against prejudice*. Canberra: Australian Institute of Aboriginal Studies.

Whitley, D.S. (2006). *Issues in archaeoastronomy and rock art*. In *Viewing the Sky through Past and Present Cultures*, edited by T.W. Bostwick and B. Bates. Pueblo Grande Museum Anthropological Papers, No. 15. Phoenix: City of Phoenix.

Wilson, E. (1999). *Astronomy And Other Seasons, 2nd Ed*. TAS: Manuta Tunapee Puggluggalia.

Witzel, M. (2013). *The origins of the world's mythologies*. New York: Oxford University Press.