

The Sky of Knowledge
A Study of the Ethnoastronomy of the Aboriginal
People of Australia

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Abstract

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Aboriginal Australia encompasses a diverse range of cultures, each of which has developed in a distinct landscape and environment. Most cultures cultivate their own astronomy as a response to the surrounding environmental conditions. This work is a study of the accounts of Aboriginal astronomy that have been recorded over the last two hundred years. An in-depth review of the main contributors to the subject, their unique biases and their influence over Aboriginal astronomy is examined. Many of the common perceptions of Aboriginal astronomy are based on stories that were recorded over a hundred years ago and have been misinterpreted several times during the course of the last century. These errors are investigated and corrected. In total, the ethnographers and anthropologists recorded over five hundred stories and they are brought together here for the first time. Stories originate from every region in Australia and cover many objects and phenomena in the night sky. Each story is classified according to the object, location and source, allowing a direct comparison of related material. The aim of this research is to demonstrate where the differences and similarities arise within three distinct areas of Australia; the tropical north, the central desert and the temperate south. The analysis of the material focuses on each object individually and how it was perceived in each of the three environmental zones. The main themes discussed centre around the characters involved in each of the stories, how they are depicted in the sky and in the creation of Aboriginal constellations. The results of the analysis demonstrate the close connection between the land and the sky in the Aboriginal world and that in many areas of Australia the sky is simply a reflection of the land.

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I declare that this research is entirely my own, conducted during a four-year period of registration at the University of Leicester.

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1. Introduction

This thesis is a study of the ethnoastronomy of the Aboriginal people of Australia, with a focus on the historical records relating to the subject that have been collected over the last 200 years. Ethnoastronomy is the analysis of the knowledge and interpretations held by contemporary cultures with respect to celestial objects and phenomena. The study of Aboriginal ethnoastronomy draws on a range of topics, as it is necessary to have an understanding of the broader subjects of astronomy, anthropology, landscape studies and Aboriginal history and culture. The depth of knowledge demonstrated by the Aboriginal people about the night sky provides a unique insight into the intricate connection they have with their surroundings. Accounts relating to Aboriginal astronomy have been recorded by a large number of ethnographers and anthropologists working with communities throughout Australia. The aim of this work is to complete a comprehensive review of this historical data and to contribute towards a deeper understanding of the Aboriginal interpretation of the night sky. It is these stories, myths and descriptions about astronomy that form the data on which the following analysis is based. This material is presented here in the form of a database (Appendix A), which includes details of each story, the ethnographer who originally recorded it and the location it originates from. Although a significant amount of data has been recorded about Aboriginal astronomy it has been done so in a diverse range of formats and methods. By collecting these accounts together and presenting them in the form of a structured database it makes a direct comparison of the stories possible. Each of the stories can be classified according to the object in the sky it refers to and the location from which it originates, this will breakdown the data into groups which can be analysed independently. The analysis of each of these groups will identify any common themes and relationships which can be used to obtain a better understanding of Aboriginal astronomy.

The format of this work adheres to the following structure. The methods of data collection and the overall processes followed during the course of this work are described in the methodology. A review of the ethnographers who have contributed the most data to this subject forms section 3. An in-depth study of the material in the database is conducted in the analysis, which is divided into sections relating to specific night sky objects and into further subsections about stories from three defined zones in Australia. The conclusion draws

together the themes identified in the analysis and, where possible, suggests some overall theories which can be applied to the whole of Australia.

1.1. Background

Australia is a vast country; covering over 30 degrees latitude it encompasses a diverse range of environmental zones from the tropical and monsoonal north, the large and unforgiving central desert and the varied temperate regions in the south. It is often thought of as one country simply because it is one single landmass, but before the arrival of the British in 1770 and the subsequent colonisation in the late 18th and early 19th centuries there were about 250 distinct language groups living in Australia (Peterson, McConvell et al. 2005; Tindale 1974). The difference between the groups in the north and the south could be compared to the difference between communities in northern Africa and those in some of the northern European countries, as the actual distance would be similar. Although trade routes existed across the country, some neighbouring communities only had limited contact, and most would have had no contact at all. For this reason alone it is hard to understand why in anthropology and archaeology Australia has often been described as one complete unit. Aboriginal Australia is not one country; the diversity of languages, cultures and beliefs that existed throughout the country are a clear testimony to that.

1.2. The Dreaming

It has been suggested that the Aboriginal culture is one of the longest surviving continuous cultures in the world, the basic elements of Aboriginal culture having remained the same for thousands of years (see for example Arden 1994; Chambers 1999). A concept that is unique to Australia and is found to exist throughout the country is the Dreaming. The Dreaming is the way in which Aboriginal people conceptualise the transformation of the world, it is their ancestral history and is used as a moral guide, but it is not seen as a place and time that is past, instead it is something that has always been, and will continue to be, here and now. It is one of the most difficult concepts for Westerners to understand because the easiest description would be in terms of space and time, but both space and time were alien to Aboriginal people, so to explain the Dreaming in this way would be incorrect (Swain 1993).

The use of the word “dream”, in this context, is inappropriate and it was only used because of an initial mistranslation of an Aboriginal word by Spencer and Gillen (Spencer and Gillen 1899). “Dreamtime” is also technically inaccurate because the Aboriginal interpretation of this word does not include time, the emphasis is much more on space and events, rather than the linear form of time (Swain 1993).

Recent studies acknowledge that the Dreaming is more than just a concept or creation theory, and it is constantly changing and being brought up to date by including modern ideas and technologies (Clarke 2003; David 2002). The arrival and colonisation of Australia by the British and later by the Europeans was something that had to be accounted for in terms of the Dreaming, but this did not take place over a long period of time, the invasion into their culture and world happened within a matter of years. The Dreaming is a belief system that is able to incorporate change, but the events that unfolded after 1770 were on such a grand scale that it is hard to imagine any Dreaming story that could have justified the atrocities that befell the Aboriginal people. The Dreaming changed dramatically after the arrival of the first fleet, especially in the southeast area and it is very difficult to track those changes. It has been shown, however, that in some regions the Dreaming may have been a more recent development than was originally thought (David 2002). The overall concept of the Dreaming must have originated somewhere and slowly become universal in Australia, but the details about the myths and stories that make up the Dreaming are unique to each community and possibly to each person. The Dreaming is such an important concept with respect to Aboriginal culture that it is impossible to study their astronomy without reference to it.

Aboriginal people have a strong connection with the land and their surroundings, one which is shown through their interpretation of the night sky. The relationship is so intimate that an Aboriginal person removed from their land feels lost and un-connected to something they consider to be part of them. This is important when considering Aboriginal astronomy because in many areas the interpretation was such that the land, sky and sea were considered together, creating a “cosmoscape” rather than just a *landscape* (Cairns and Harney 2003). People so in touch with their surroundings did not make a differentiation between the land, the sea and the sky. It should be possible by looking at the data to show whether the profound Aboriginal relationship with the land also extended into the sky. Nonetheless, one cannot define the exact relationship an Aboriginal person has with their land and understand

how this relates to the sky. In many cultures the earth is thought of as being the profane part of the world, and the sky is the sacred location where the gods reside. The situation in Australia is different: the earth is sacred and there are many Dreaming stories about how the landscape was created by the Dreaming ancestors. The sacred spirits are thought to live in the land, not in the sky, and so in this respect the sky has a less important role in Aboriginal culture. It is expected that some of the stories will show that the spirit ancestors travelled between the earth and the sky and that some of them lived in the sky, but the emphasis is not the same as in other cultures. Some studies have further shown that the sky was perceived as a reflection of the land (or in some cases the sea) and that what was seen on earth was also found in the sky (Bradley 1997; Maegraith 1932). Even the most superficial analysis of the data shows a strong link between the earth and the sky, but it is not easy to define. It is hoped that this situation can be clarified; a link established between the land, sea and sky and also how this relationship changes over the country.

1.3. Problems with the Data

Ethnographers in Australia only began to see the importance of recording Aboriginal ideas about the night sky during the later stages of the 19th century, but by this time a significant amount of the data had already been lost. The historical sources of data about Aboriginal astronomy are inconsistent and there has been no comprehensive review of the subject to bring these studies together. The data was recorded by hundreds of researchers, all of whom had a different view of Aboriginal culture. There are gaps in the data; some of it is unreliable but is the only source for that area; some of the data was recorded over 150 years ago, and some of it within the last 10 years. There are also issues with recently implemented access conditions for some of the more sensitive references. In general the historical data set is confusing. Not only are there doubts over some of the original recordings of the stories, but mistakes are still being made. In many cases the original stories are repeated in later modern publications, but there are often inconsistencies between the two accounts. The scope to obtain any original and reliable information from modern Aboriginal communities about their astronomy has diminished and anyone hoping to gain a fresh insight faces many obstacles. With all of these problems it is difficult to develop a clear understanding of Aboriginal astronomy, but the historical data is invaluable and the subject depends on the analysis of this material.

Aside from the issues with the source data, there are also problems with the sheer size of Australia, as different areas of the night sky would have been seen in the north and south of the country. The night skies would also have been observed in different environments. Some parts of the northern night sky would never have been visible in the southern areas, so there are no accounts relating to certain stars and phenomena. Even when objects were visible, however, there is no guarantee that there were any stories, or that these were actually recorded by an ethnographer. Although parallel communities on the east and west coasts would have seen the same stars their perception of the sky could be very different simply because of where the sun, moon and stars rise and set (i.e. on the east coast everything would rise from the sea and set over the land and vice versa on the west coast). The situation is not easy and it requires a lot of clarification, but there is also a huge amount of data that has been unused in a study of this subject which has so much potential. This research brings all the historical records together, provides a comprehensive analysis of the data and demonstrates how the diverse Australian environment has had an impact on the development of Aboriginal astronomy.

One other issue that makes the analysis of the historical data difficult is the fact that so much of it is biased and seen through Western eyes. It is only recently that the idea of impartial recording of ethnographic and anthropological data has become so important. Some of the earliest researchers lived with the communities for months or years, but they were often living there as missionaries and their aim was to “convert the savages” to Christianity. Several ethnographers writing about the southeast of Australia suggested that the Aboriginal people held a similar religious belief to that of Christianity, in that they believed in only one “Supreme Being” or “all spirit father” who lived in the sky (see for example Howitt and Siebert 1904; Ridley 1873a, 1873b). The ideas and beliefs about one god are interesting as the concept is not widespread throughout Australia and is restricted to the southeast communities; exactly the region where the Western influence was the strongest. Some of the early missionaries actively sought out an Aboriginal concept or Dreaming ancestor onto which they could superimpose the Christian notion of God (Clarke 2003, 215), although many early anthropologists did not ascribe to this view (see for example Basedow 1925, 295). It is possible that this is where the idea of the All-Father comes from and that it is not a concept that is necessarily indigenous to Australia and it can similarly be inferred that some of the beliefs about astronomy may also have been imported.

Aboriginal people do not perceive the same constellations that are used in classical astronomy, and some communities did not use constellations at all. One cannot expect there to be any similarities between the European and Aboriginal world views, but there is an inherent problem in that all of the historical data was recorded by a non-indigenous person. Their frame of reference was made up of the gods and creatures of the Greek night sky, and to try and re-align this to the Aboriginal perception is virtually impossible. One of the clearest examples of this issue is when researchers write about the “constellation of Orion”, or the “constellation of Scorpio”. Very few communities in Australia constructed constellations so the use of this terminology is not always valid in this context. Although this is an important issue, there is no clear solution, one cannot completely step out of a frame of reference and have a totally impartial view of the night sky. The night sky is difficult to represent by words alone, and many authors have included maps and diagrams in their work to illustrate the Aboriginal night sky. The problem is that the majority of these diagrams show the Western constellations rather than any of the indigenous groups of stars (see for example Johnson 1998, 62 - 67). Any map or diagram in this context needs to be neutral and should show the night sky as it is, not how Western interpreters perceive it. Perhaps the *star* names (instead of the constellation names) could be used to identify where the Aboriginal constellations were located in the sky. This, however, is not possible in some cases where the original reference only states “Scorpio” or “Sagittarius” without any further explanation as to exactly which of the stars of the constellation were involved in the story. This complicates the analysis of the material because so much of the data is written in this way that you cannot escape from encountering this issue.

1.4. Summary

The study of Aboriginal ethnoastronomy is complex, there are many issues to address and the data is subject to many biases, all of which need to be taken into account. There is, however, a large amount of information available, which makes a study of this kind important, especially as very little work has previously been done regarding comparison of this material. It is hoped that the analysis of this data will provide some common themes about Aboriginal astronomy.

2. Methodology

This section focuses on the methods employed for the collection of the data, and how that data was then formatted for inclusion into the final database. A description of how the material was divided into relevant sections according to location and object is included and why it was necessary to separate the data in this way.

2.1. Data collection

The data used in this research is defined as being any story, myth, description or account relating to the night sky that was recorded by an ethnographer or anthropologist working with an Aboriginal community. The initial research involved studying all the recent publications on Aboriginal astronomy and determining what information was available and in what format. From here it was established where the accounts originally came from and if these sources could be accessed directly, rather than through an intermediate publication. The stories and sources were followed back through the various references until the original was found. The outcome of this process was that a set of ethnographers and authors who contributed a significant amount to the subject were found. These authors are Stanbridge, Ridley, Dawson, Howitt, Langloh Parker, Spencer and Gillen, Strehlow, Bates, Tindale, Mountford and Maegraith, a review of each of these ethnographers follows in section 3. Every effort was taken to find all accounts of the astronomy they recorded, a significant amount of which was only noted in fieldwork journals and never published. Once the main sources of information had been studied it was necessary to look at all the smaller sources where only one or two stories were recorded by an author.

Material and archival collections from the following locations was consulted:

- National Library of Australia
- Australian Institute of Aboriginal and Torres Strait Islander Studies (AIATSIS)
- South Australian Museum
- State Library of South Australia
- Melbourne Museum
- State Library of New South Wales

One of the most valuable sources of information on the location of stories about astronomy was the Australian Institute of Aboriginal and Torres Strait Islander Studies (AIATSIS) library. The AIATSIS library is dedicated to items that relate to Aboriginal culture, heritage and society and is the largest research facility of its kind. Their cataloguing system includes classifying each item with respect to what topics are discussed in the item. Over 180 items held in this library contain a reference to stars, over 130 relate to the moon and there are more than 60 items which discuss the topic of “Indigenous astronomical knowledge”. A certain proportion of these are duplicates but it demonstrates how much information is available. The collections of fieldwork journals and items held in special or restricted access collections in libraries and museums in Sydney, Melbourne and Adelaide expands the range of data. It was through these fieldwork collections that a vast majority of the data was found, especially those items which have not been covered in any other recent articles. It was found that some of the items were of little value, and only made passing comment on Aboriginal astronomy or stars, but every reference was checked if it was thought to relate to this study. Records were made of all the material that was thought to be original, and a note was made if the story originated from elsewhere or was a copy. When all the sources had been examined, the material was entered into a database (see Appendix A), which includes information on the object of the story, the source of the story, the location where the story comes from and notes of any copies or repeats by other authors. The database is the backbone of this research, and forms a valuable resource for others studying this subject.

Equal value cannot be placed on each of the stories because of the many biases that affect the data, but it was felt that it was more important to include all the available information rather than to exclude some on account of its questionable reliability. Obviously the data included here is not complete, as some references were not possible to track down, and some have been restricted and cannot be reproduced. Where feasible, the aim has been to identify the ethnographer who originally recorded the story, and the exact location which it relates to. For a number of the stories, some of the details are vague, only where one can be certain of the information have these been included, unless specified in the text.

2.2. Data classification by location

The database contains 559 stories about Aboriginal astronomy, 526 of which are original stories (the copies and repeats have been kept for the sake of continuity). The structure of the database is such that one is able to search for items by a particular author, location and aspect of astronomy. It was necessary to classify each of these stories carefully so that it is possible to determine which of the stories relate to each other and can be compared. There are 15 stories where it has not been possible to identify a location; these stories hold less value because the landscape is an intimate part of the story and not being able to relate the story to a particular location means that some of the context has been lost. Some authors were able to record the specific community, or tribal group that recorded the story and this was also included in the database. The community names and locations were taken from the map of Aboriginal Australia produced by David Horton (see Appendix B, Horton 2000; see also Dousset 2005, an online searchable database of Aboriginal community names and locations). This map is the most up to date resource available; it shows that there are several hundred distinct groups in Australia, which Horton classifies into 18 larger regional groups. Within each of these 18 regions the communities share enough of a similar culture to form the wider cohesive region. This categorisation was done by looking at the watershed areas and comparing this to the groups, and also using factors such as culture, language and trade to suggest where the regional boundaries were. The information in the database has been classified according to these groups, as it was felt that the 18 regions were local enough to demonstrate the unique stories of one area, but also large enough not to be too diverse. Because of the discrepancies with respect to the recording bias in Australia, there are several regions where very little is known about their astronomy, in contrast, for some regions there is a vast amount of information. Ultimately it was found that it was necessary to classify these regional groups into three zones: north, central and south (following the divisions suggested by Clarke 2003). The 18 regional groups and the 3 environmental zones are shown in Table 1 and Figures 1 and 2. See also Appendix B for further images of some of the landscapes.

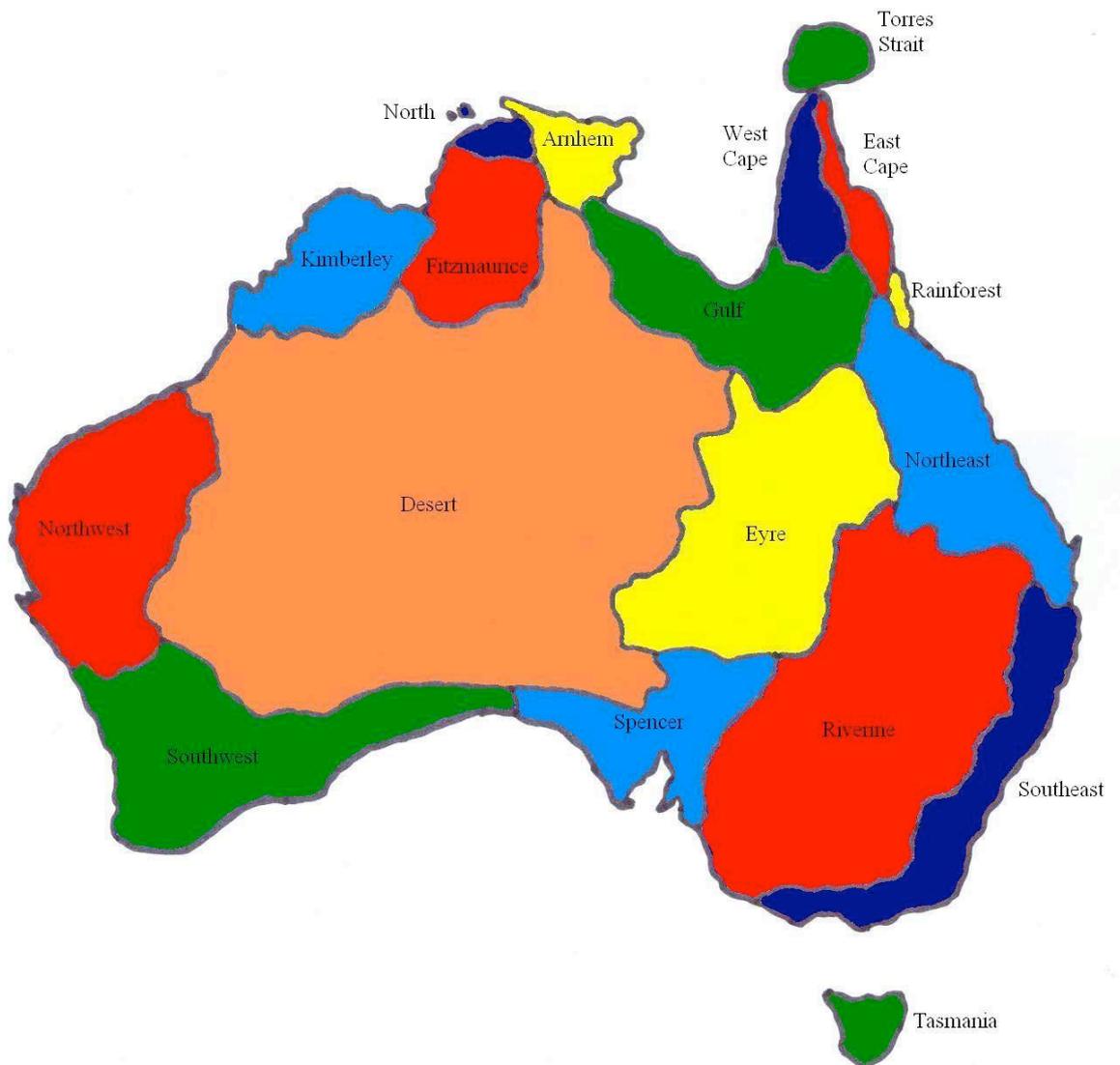


Figure 1: Map of the 18 regions in Australia used in this research (areas based on those created by Horton, 2000. The original map by Horton is shown in Appendix B).

North	Central	South
Kimberley	Desert	Northwest
Fitzmaurice	Eyre	Southwest
North		Spencer
Arnhem Land		Riverine
Gulf		Southeast
West Cape		Tasmania
East Cape		
Torres Strait Islands		
Rainforest		
Northeast		

Table 1: The division of the 18 regions in Australia

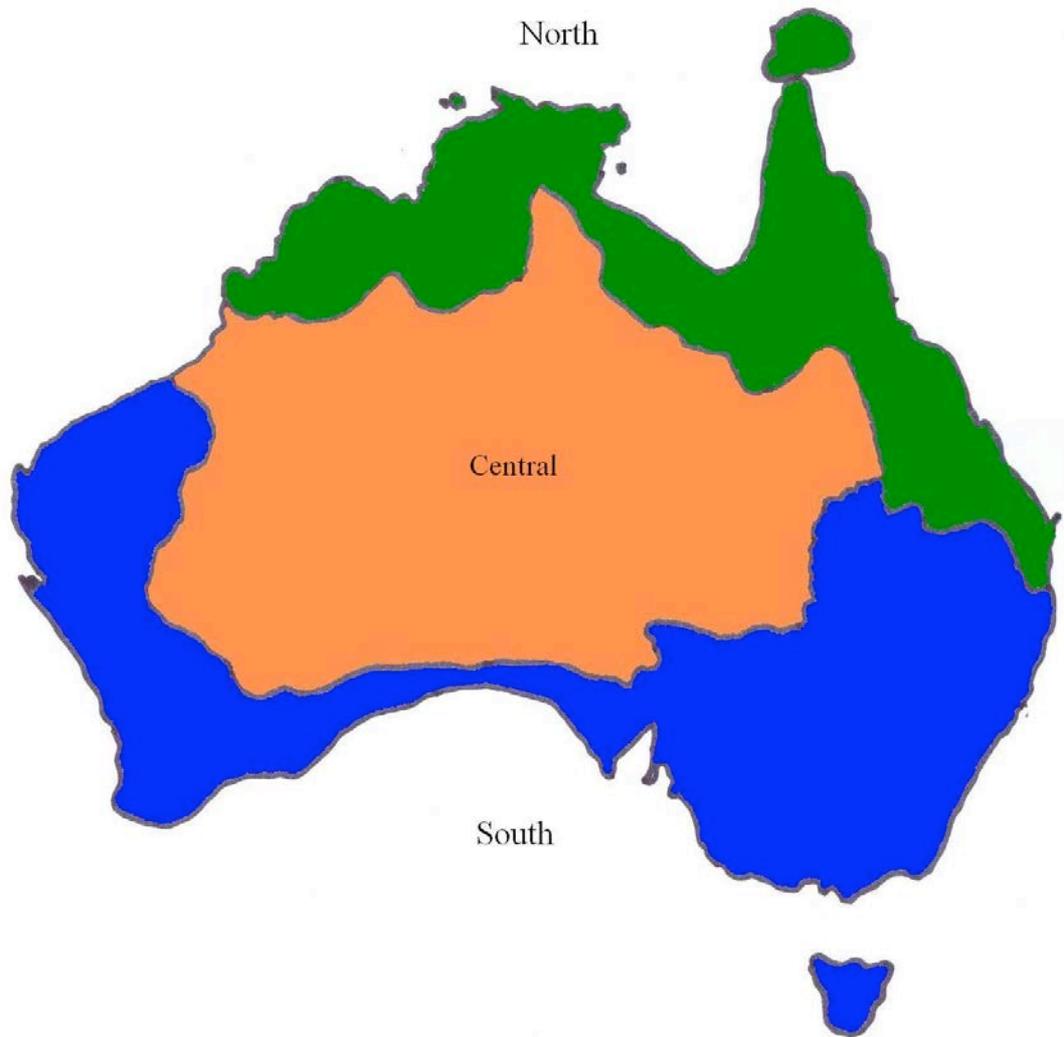


Figure 2: Map of the three environmental zones, the tropical north, the central desert and the temperate south. These divisions have been made to follow the regional boundaries shown in the previous map.

It can be seen that the number of regions in the three groups does not relate to the area covered: all ten of the groups in the north of the country are small, whilst the two regions in the central area cover a huge amount of land. The regions in the north are much smaller owing to the higher population density in this area; the desert environment can only support a small population, so the communities are more widespread. These groupings were made essentially because they could be classified not only as north, central and south but also as tropical, desert and temperate. All of the regions and communities in the northern area of Australia enjoy a tropical climate and the majority are close to the coast. The climate is relatively unchanging from day to day, and the environment provides a wide variety of food

with very little effort. Because this region supported a higher population density and a diverse culture, there was a greater diversity with respect to the range of myths and stories about astronomy. In stark contrast, the central desert of Australia is a difficult place to live, the seasons are not strongly defined but the days can be fiercely hot and the nights freezing cold, and water and food are often scarce. The Aboriginal person's dependence on the land is totally different from that in the tropical regions. They are thought to have been more widely nomadic and had access to a much larger area of land; which was necessary when a drought struck and the regular water sources dried up. In the temperate south, life was not as difficult as in the desert, nor as easy as in the tropics. The land provided plenty of food and water but the climate could also be harsh, causing drought, floods, bushfires and, in the far south and Tasmania, freezing conditions. It is in the temperate regions where the greatest range of weather conditions and climates are found although life would not have been difficult, as was shown by the population density at the time of colonisation. The ethnographic record is biased to the temperate south because this was the region where Europeans first arrived and settled, and so had the most contact with the Aboriginal communities.

2.3. Data classification by object

The regional classification of the material was vital to the progress of the work. Without this the material would have no context, and no patterns could be determined in the wider area. Aside from the location groups, it was necessary to classify the material according to the night sky object which is described in the story. The following groups have been used:

- The Moon
- The Sun
- The Sun and Moon
- Orion and the Pleiades
- The Southern Cross, the Pointers and the Coal Sack
- Milky Way
- Magellanic Clouds
- Venus
- Planets

- The Aurora Australis, Comets, Meteors and Eclipses
- Other Stars
- Mixture/Combination Stories

All the stories in the database have been given an object classification, the categories being chosen after an initial analysis showed that these groups would be appropriate. The group “other stars” is the largest group; many stories relate to different stars and constellations, but do not form a cohesive enough group to be considered independently. Similarly the stories about Venus were common enough throughout Australia to form a group, but there are so few stories about the other planets that these have been brought together. The largest single-object category is that of the Moon, stories accounting for over 15% of the total. In several stories the main characters are the Sun and the Moon together, so it was necessary to include these as a separate category. The final category includes all the stories which contain elements of two or more of the previous groupings (for example stories have been recorded about the Moon and the Pleiades) which do not fit into any other group. It was impossible to escape Western preconceptions about the constellations because so many stories were recorded in terms of them. The constellations Orion and the Pleiades and the Southern Cross (Crux) have been included because there are enough independent stories about these groups of stars where they are Indigenous constellations as well as Western ones. Where the groups were not equivalent to the Western constellations the star names have been used, rather than suggesting it was the whole constellation involved in the Dreaming story.

2.4. Summary

Once all the data had been classified into the appropriate groups it was decided that the most effective way to look at the data was to look at the stories in their object groups and within each of these groups, dividing the material into the north, central and south regions. This will give an insight into the material whilst it is still related to its original context, and should provide an opportunity to establish any relationships in the data. The recording bias has made this a complex procedure and it can be assumed that some of the stories have been classified incorrectly, but it should still be possible to isolate any general patterns.

3. Ethnographer Review

In this section a brief history of the study of Aboriginal astronomy in Australia is followed by a chronological review of the ethnographers who have recorded a significant amount of data about the subject. The 12 ethnographers discussed here have provided the majority of the material in the database and that it is therefore important to have an understanding of their background and any influences that might have biased the stories they recorded.

3.1. Background

In recent years only a handful of people have been researching the subject of Aboriginal astronomy and during the past 200 years little attention has been paid to Indigenous people's sky knowledge and myths. There are a few ethnographic reports from the mid to late 19th century about the astronomy of certain communities and further work has filtered out very slowly over the past 100 years. Whilst most of the older articles concentrated on only one or two communities, the more recent attempts have been a mixture of studying both smaller groups within Australia and the whole country. The most recent comprehensive study of Aboriginal astronomy is Dianne Johnson's monograph which was produced in 1998 (Johnson 1998). Other current accounts include several articles by Roslyn Haynes (Haynes 1992, 1995, 1997, 2000), an unpublished MA thesis by John Morieson (Morieson 1996), an account of Wardaman astronomy by Hugh Cairns and Bill Yidumduma Harney (Cairns and Harney 2003) and a posthumous publication of an article written over 20 years ago by Norman Tindale (Tindale 2005). Some general accounts of Aboriginal society from the late 19th and early 20th centuries contain information about astronomy but it is often lost in an ocean of details about daily life and culture. Many of the early ethnographers were not necessarily looking for information about astronomy but events from daily and ceremonial life were recorded and contain valuable information about astronomy. It may now be very difficult to obtain any new material about Aboriginal astronomy. In my own experience, after discussions with several Indigenous groups and other researchers in the field, it was found that communities are reluctant to talk about the subject (Wallace 2006, pers.com.). No original ethnographic data is presented in this research.

The first recording of Aboriginal astronomy was made by Watkin Tench in 1788: when he wrote about the expedition to Botany Bay, he briefly mentioned that some people were afraid of particular alignments of stars (Tench 1996 [1788, 1789]). There are a few 19th century reports that focus solely on the astronomy of the Aboriginal people: the earliest detailed account was written by W.E. Stanbridge in 1857 (Stanbridge 1857), a short but invaluable account of the astronomy of a southern Victorian community. Dawson published a comprehensive insight into the culture of some of the communities of southern Victoria, which included a chapter about the astronomy of the area (Dawson 1881). Maegraith described the astronomy of the Aranda and Luritja groups of the central desert and used his anthropological background to assess any information and judge the reliability of the data (Maegraith 1932). The earliest accounts all have inherent problems because there is only a limited amount of information provided, none of which can be confirmed today. These authors also wrote at a time when Aboriginal people were treated badly and the common assumption was that they were savages with no distinctive culture. It is possible that when asking about the astronomy the men were told only the information that they wanted to hear, and then interpreted the data so that it made sense to them. The main problem with these early accounts is their unreliability; the variety of methods used to record the information did not necessarily lead to the most accurate data. Only now that there is so little data left do we have the methods and techniques for recording this kind of information with an awareness of our cultural biases.

The reliability issue has become a more serious problem as time has gone on because people have misinterpreted the earlier accounts and added in their own mistakes. The importance of one of the characters in the myth may be incorrectly emphasised, or the wrong location for the story may be used. There is no value in simply re-telling the stories, as the errors just accumulate over time. Most of the more recent accounts of Aboriginal astronomy have relied heavily on the 19th and early 20th century reports. Within their true setting in the Aboriginal culture the stories are not static and are constantly developing over time to incorporate changes to the Aboriginal world. The ethnographers and researchers discussed here are those who have contributed the most material to the database. There are others who were more important within Aboriginal ethnography and anthropology but who recorded little or no information about astronomy and are therefore not directly relevant to this research.

3.2. William Stanbridge

William Stanbridge was perhaps the first person to appreciate the importance of recording details about Aboriginal astronomy. He spent a considerable period of time living with the Boorong (Wergaia) community in central Victoria; the report published in 1857 is the result of all the material he gathered whilst he was living with this community (Stanbridge 1857, 1861). The article is short, but there is a substantial amount of information contained within it; because he lived with the community and in the more remote regions of Victoria for nearly 20 years he was able to gain a very detailed picture of the Wergaia astronomy (Stanbridge 1861). The main section of the article concentrates on identifying the Wergaia constellations and the myths associated with the different groups of stars.

It is clear from the details he includes that Stanbridge understood the strength with which the Aboriginal people believed the myths and creation stories connected with the Dreaming and how this was the framework of their world-view. The data Stanbridge collected suggests that the majority of the constellations and names of the stars were devised because of the Dreaming stories and how they envisaged these stories being played out over the night sky. It can be inferred that the gender of the star or constellation and the relationships that existed in the night sky were of huge importance as this is how Stanbridge initially describes each of them. He does not give any details as to how their gender was determined but neighbouring stars were often related or involved in the same creation stories. For example Stanbridge was told that Sirius (α CMa)¹ was a male eagle, his wife was Rigel (β Ori) and that his brother was Canopus (α Car, a male crow) who was married to a nearby red star and that the stars surrounding Canopus and his wife were all of their children (records 44 and 46). These stars are located within a relatively small area of the sky and it is easy to imagine why they were thought to be a family.

In the article Stanbridge discusses some of the other objects that were identified by the Wergaia and what significance they had; he also indicates that the year started in autumn and finished in summer and that they had names for the four seasons of the year. Many of the European accounts of Aboriginal seasons from temperate Australia are inaccurate and it

¹ This is an example of the three-letter abbreviation used by astronomers for the constellations. Where possible the names of the stars have been used rather than these abbreviations. For a list of the constellations and their corresponding abbreviations see Appendix D.

seems unlikely that Aboriginal communities developed the same seasons that exist in the Western world (Clarke 2003, 132). Stanbridge quite possibly presumed that the Wergaia community had the same four seasons as the Western world, and just recorded what he expected to hear. Little other information to support this definition of the seasons has been recorded by any other ethnographers.

The article by Stanbridge is very short but there is a great range of information. He says that the Wergaia community, on which all his work was based, was thought to know more astronomy than any of the surrounding communities. The archaeoastronomers of today have a significant amount of material to work with from this article and are indebted to Stanbridge and how he managed to accumulate such a wide range of material. Very little is known of his personal life and the reasons he recorded such intricate data, but the study of Aboriginal astronomy would be difficult without it. A later article by MacPherson based on the Stanbridge data offers some improbable connections with lines of stars and compares Australian, Asian and European linguistics and cultural astronomy (MacPherson 1881). MacPherson implies that Aboriginal, Asian and European astronomy all developed from a single heritage, for which there is no supporting evidence. Some of the more recent authors on this subject reference this work, however, and they appear to make the assumption that it is accurate without really questioning its validity (see for example Haynes 2000 and Johnson 1998). In contrast, recent work by Morieson has added a new dimension to the understanding of Stanbridge's work (Morieson 1996, n.d.).

3.3. William Ridley

William Ridley was born England in 1819, and arrived in Sydney in 1850 on a missionary operation. It is thought that Ridley originally wanted to work with the Aboriginal communities, but he was asked to become a classics professor at the Australian College, later being ordained by Reverend Lang. By 1853 he started his missionary work having become good friends with the Aboriginal people he was living with. In 1861 he became a journalist, devoting a lot of his time to his Aboriginal studies and publishing several articles about this subject. Ridley died in Sydney in 1878. Relatively little is known about his life although it can be assumed that his religious background may have influenced some of the stories he recorded.

Although Ridley originally recorded over 20 of the records in the database, most of these only contain a very small amount of data, describing the object in the simplest terms. The material was originally published in only three articles by Ridley, a considerable amount of the data was repeated in his later work and copied by other authors (Ridley 1873a, 1873b, 1875, 1878; Squire 1896). The number of records in the database from Ridley is significant but the material is basic and there are only a couple of stories where there is any depth that would offer an insight into Aboriginal astronomy.

3.4. James Dawson

James Dawson produced a valuable account of Aboriginal culture when he published *Australian Aborigines* in 1881 (Dawson 1881). Apart from the volumes by Brough-Smyth and Curr there had been relatively few contemporary attempts to produce a comprehensive account of the life and traditions of the Aboriginal people (Curr 1886; Brough-Smyth 1878). Dawson was not a native Australian (as was common amongst the majority of the early ethnographers); he arrived in Australia in 1840 at the age of 34 (Critchett 1981). Dawson established friendly relationships with the Aboriginal people in Victoria and in 1876 he was made Local Guardian of the Aborigines. Dawson had a good rapport with the local Aboriginal people, he was concerned with the preservation of their culture, and he also cared about their treatment at the hands of government officials (Critchett 1981). He had no formal academic training and was only an amateur ethnographer who cared a great deal about the people he was living with. Despite this he produced one of the most comprehensive insights into Aboriginal culture of Victoria. *Australian Aborigines* was said to “contain a good deal of trustworthy and minute information” at the time of its publication (Curr 1886, 55). Curr also says, however, that there was one clear error with Dawson’s work. Dawson states that there were all-powerful tribal chiefs, but Curr suggests that Aboriginal people who had been too strongly influenced by Western concepts misled him on this point. In spite of this criticism, Dawson’s work remains one of the best and most reliable historic sources of information on the Aboriginal people of Victoria.

Dawson wrote about a wide range of topics concerning the life of the Aboriginal people and only one very small section of his book concentrates on “Meteorology and Astronomy etc.”, but it does contain a wealth of information. Like Stanbridge before him, Dawson mostly just lists what each of the stars/constellations represented to the Mopor (Gunditjmara) community. Because of their proximity, the two communities studied by Stanbridge and Dawson (the Wergaia and Gunditjmara communities are about 280m/450km apart) there are some obvious similarities, the parallels perhaps being more indicative of the relationship between the two communities than any of the discrepancies. Stanbridge and Dawson independently found that Sirius represented a male eagle, Canopus was a large male crow and the Magellanic Clouds were male and female native companions (commonly known as the Brolga or the Australian crane). The stories relating to Venus, Antares (α Sco) and the Pleiades from the Wergaia and the Gunditjmara are also similar. The stories and myths that

were similar refer to the brightest or most recognisable objects in the sky. If other evidence confirms this, it points towards there being one basic set of beliefs about the night sky and that each of the communities just interpreted this information in a slightly different way. All of this may have been due to the way the mainland of Australia was populated, which led to many of the tribal groups in each region sharing similar cultural values (see Mulvaney and Kamminga 1999, 302 - 309 for a discussion of the demography in this area). If the Guditjmara and Wergaia communities share the same ancestry then it is clear why some of their ideas about the night sky are similar.

In contrast with many accounts of Aboriginal astronomy Dawson says that the stars were used for navigation during the night, in particular the constellation of Hydra (Dawson 1881, 101). He uses the term “constellation of Hydra” which could refer to any group of stars within a certain region. There is a small cluster of stars at the head of Hydra but otherwise the constellation is relatively insignificant, there are no particularly bright stars, the constellation does not lie on the ecliptic nor is it part of the Milky Way. One reason that this group of stars might have been used as a reference point is because of the story surrounding the stars. Dawson gives quite a detailed account of the myth concerning the stars of Hydra and it may simply be that the Guditjmara community had a strong belief in this story and used it for navigation (record 79).

Dawson was able to see the similarity between a story he recorded about the Pleiades and Canopus (record 74) and the classic Greek myth about Orion and the Pleiades. This made him doubt its reliability, so went to great lengths to confirm the story.

“...the strictest inquiry has been made through Mr. William Goodall, the superintendent of the Framlington Aboriginal Station; and the result of this inquiry has been to confirm the story and to show that it is well known in the Western District, and, with some variation, in South Australia also.” (Dawson 1881, 100)

The fact that Dawson went to such trouble to confirm this account indicates that he was aware of the wide-ranging effects that the influence of Western culture was having over these people. This indicates that the data and information collected by Dawson from the Aboriginal people of Victoria were accurate as he adhered to the highest standards and from this he has provided an invaluable account of their life and culture.

3.5. Alfred William Howitt

Alfred William Howitt was born in England in 1830, and his family moved to the Victorian goldfields in 1852. In 1861 he was appointed a leader of an expedition to establish the fate of Burke and Wills, the leaders of the doomed first expedition to cross Australia on land from north to south. In 1880 Howitt published his first major work “*Kamilaroi and Kurnai*” with Lorimer Fison, which was a revolutionary publication with respect to the development of modern anthropology (Fison and Howitt 1880). His next book *The Native Tribes of Southeast Australia* was published in 1904, and has recently been re-issued. In this book he demonstrates his immense knowledge of the culture and society of the communities in the southeast (Howitt 1904). Howitt was one of the first people to study Aboriginal culture scientifically, specifically their marriage and kinship systems, even though he only did this in his spare time. The vast majority of the material Howitt collected is held at the National Museum of Victoria in Melbourne, a smaller amount is also held at the AIATSIS library in Canberra. His work has been the focus of some modern criticism, especially with respect to his data collection methods.

The 25 myths included in the database that Howitt collected are reliable only up to a point. It appears that Howitt sent out a series of letters to the Aboriginal protectors, missionaries and other people living in the communities to ask them to provide him with data. As a result the data comes from a wide variety of locations in Australia but there is no consistency between the stories. Myths included in the database have either been obtained from his personal correspondence or from the 1904 publication. Howitt did nothing to confirm any of the stories he obtained through this correspondence and just assumed they were true. The data from Howitt should be treated with some scepticism and it should be understood that there is more than one source of error.

3.6. Katherine Langloh Parker

Katherine Langloh Parker was born in Encounter Bay, South Australia in 1856. She later went to live on her husband's station in New South Wales where she took an interest in the local Aboriginal people and began to record their stories and vocabularies. The local community was the Kamilaroi and the results of her studies were published in several collections between 1896 and 1930, she published her only ethnographic work in 1905 (Langloh Parker 1905, 1954). Although little is known of her personal life it is thought that her interest in Aboriginal culture was established when she was saved from drowning in a river at the age of six by an Aboriginal girl. She moved to Adelaide sometime after 1905 where she remained until she died in 1940.

Langloh Parker was not formally trained and there are some questions regarding the ethics of her research. It has been suggested that the older Kamilaroi people were not happy about her making some information public, when it was originally told to her in confidence. However, it is thought that she was scrupulous with respect to her collection methods and went to great lengths to confirm the stories she was told. Two of her stories were copies of material originally recorded by Stanbridge and Ridley, but there were many authors who copied a significant amount of her work (see for example Greenway 1901; Haynes 1992; Isaacs 1980; Kunike 1928; Massola 1968; Thomas 1923). Langloh Parker was one of the very few women who paid attention to the Aboriginal culture she was surrounded by, and endeavoured to represent them in a serious and sympathetic way in her books and articles. She was probably one of only three women who had the opportunity to access the knowledge of astronomy held by Aboriginal women during the early part of the 20th century (the other women were Phyllis Kaberry and Daisy Bates). Neither she nor Kaberry or Bates had the inclination to record very much data regarding this point and the information is now irrevocably lost. The 20 stories in the database that Langloh Parker recorded about the astronomy of the Kamilaroi are familiar because so many other authors have repeated them. In comparison with some of the other formally trained ethnographers her work has been recorded in a simple way but is also similar to some of the other from this area, suggesting that the data is reliable.

3.7. Walter Baldwin Spencer and Francis J. Gillen

Walter Baldwin Spencer and Francis J. Gillen are perhaps some of the best known ethnographers of their generation. Their collaborative books, produced over several years, are a landmark in anthropological history. Spencer was born in England in 1860 and was trained as an evolutionary biologist. He developed an interest in ethnology and later travelled to Australia after being awarded the chair of biology at the University of Melbourne, where he arrived in 1887. He worked at the university for many years and took part in many expeditions, on one of which he met Gillen and went on to form an enduring partnership.

Gillen was born in South Australia in 1855. He worked as a telegraph operator for a while and was eventually appointed as post and telegraph station master in Alice Springs in 1882. He was interested in justice for Aboriginal people and became a special magistrate and Aboriginal sub-protector. Spencer and Gillen met in 1894 in Alice Springs. Gillen told Spencer about some of his ethnographic knowledge and was encouraged to contribute to the resultant volumes of the Horn Expedition, of which Spencer was editor (Spencer 1896). Spencer later returned to Alice Springs and worked with Gillen again when they conducted intensive field-work and published *The Native Tribes of Central Australia* (Spencer and Gillen 1899). The importance and influence of this book with respect to the development of anthropology and the theories on social evolution has made it one of the most significant works on Australian anthropology.

Spencer and Gillen went on to produce several more books together about Australian anthropology (Spencer and Gillen 1904, 1912 and 1927), the last of which was published several years after Gillen died. They did not record a huge amount about the astronomy of the people they worked with; only 15 stories have been included in the database from their publications. The stories they recorded from the central desert are similar to the other accounts from this area, showing how reliable their information is. Spencer's academic training was balanced by Gillen's natural affinity with the Aboriginal people in the Alice Springs region, the result being that they produced excellent work. Although their focus was not on recording the astronomy of the people they worked with, they noted some data which shows how important the night sky was in the central Australian Aboriginal communities.

3.8. Carl Strehlow

Carl Strehlow was a Lutheran missionary who was born in Germany in 1871; he went to Australia to serve the migrants of his faith in 1891. He worked initially at the mission in Killalpaninna with the Dieri community (in northern South Australia). He later took charge of the mission at Hermannsburg, just east of Alice Springs in the Northern Territory, where he was responsible for looking after the Arrernte and Luritja communities. He lived at the mission at Hermannsburg for the next 28 years, leaving briefly only four times during this time. In 1922 he became very ill and was persuaded to leave Hermannsburg to seek medical attention, but died before he could reach Adelaide.

Some of his colleagues found him difficult to work with and he was thought to have had a high opinion of his own ability. He always put his job first and placed his obligations to God before everything else, only allowing himself to study the Aboriginal culture during his free time. He understood the importance of their culture but refused to attend any of their ceremonies, knowing this refusal would not allow him the chance to understand their religion enough to convert them to Christianity. He was one of the first authorities on the Aboriginal people of central Australia, although other people were working in the same area at about the same time. There was quite a rivalry between Strehlow and Baldwin Spencer although they never met or corresponded in any way; it is presumed this rivalry existed due to their different approaches towards Aboriginal culture and research methods. In general, Australian anthropology and ethnography has ignored one of its greatest contributors, possibly because Strehlow originally published his work only in German. His greatest achievement was his work on the myths and legends of the Arrernte and Luritja communities (Strehlow 1907). This has since been translated into English although this has never been published and there are still access restrictions with respect to this material. The material collected by Strehlow is good quality and exhibits some similarity to the data collected by the other ethnographers in this area, which enhances its reliability.

3.9. Daisy Bates

Daisy Bates was one of the most prolific writers on the subject of Aboriginal astronomy and published numerous articles about the beliefs of the people she lived with. She was born in Ireland in 1863 and moved to Australia permanently in 1899 (Salter 1983). She lived in Perth and Ooldea until about 1935, before moving to Adelaide where she died in 1951. Her first contact with Aboriginal people was during the late 1880s, presumably around the time she first arrived in Australia. Most of her data used in this research was never published and is only held as papers in the AIATSIS library and National Library of Australia in Canberra. The majority of the stories were recorded sometime between 1904 and 1912, a period during which she was living with various Aboriginal communities in the south and west of Australia. During the time she was living in Aboriginal communities her only income was from journalism which is why some stories were published as newspaper articles.

In general her work is not something that can be wholly relied upon: she was unmethodical, regularly over emphasised the cannibalism issue within Aboriginal culture, stated that the entire Aboriginal race was doomed and that half-castes should not to be integrated into society. However, for most areas in Western Australia her work is the only data that exists and as such is invaluable. She lived with the communities by herself for most of the time, so there is no way to validate any of her evidence or her collection methods (Reece 2005). Although she had genuine concern for the Aboriginal culture and communities, she spoke of the people she lived with as “subjects” and always considered them to be very much inferior. She was appointed as an “honorary protector of the Aborigines” in 1912 and thought that they would not survive without her (Salter 1983). She believed that she had gained their complete confidence and that her method of obtaining evidence was faultless in comparison with the academics. Most of the details about her private life have been obtained from the vast number of letters she wrote while she was living in the communities and then later at Ooldea. None of her letters exist, either sent or received, before 1901 and she possibly burnt all her letters and diaries from before about 1899. The value of her data cannot be measured, but similarly neither can the reliability of her work, for the purposes of this research it has been assumed that her work provides a valid account of Aboriginal astronomy in the south and western areas of Australia.

3.10. Norman B. Tindale

Norman B. Tindale was born in Perth in 1900, and he was employed by the South Australian Museum in Adelaide in about 1917-1918. His first field trip with the museum was made in 1918 to Groote Eylandt. It was on this fieldtrip that his interest in Aboriginal society began to develop. One of the Aboriginal men on Groote Eylandt explained, in great detail, the Aboriginal ownership and management of the land, and Tindale began to question the idea of Australia being a *terra nullius*. For the next twenty years he dedicated his research to proving that Aboriginal people were intimately connected with their land and that regional groups could be mapped. The result of this work was originally published in 1940, before being revised in 1974 and it is one of the most radical publications with respect to Aboriginal culture of the 20th century (Tindale 1974). Tindale suggested that Australia was not a *terra nullius*; that the colonists had acted illegally and that Aboriginal occupation of the land was an important issue. This issue was not tackled by the government in Australia until the Mabo case, which made history by saying that Aboriginal people did have rights to the land (ATSIC 1993).

Aside from this work he was also a pioneer in Australian archaeology, challenging the idea of the Aboriginal settlement date of Australia. It is through his dedication and meticulous approach to excavation that he was able to prove that a particular Aboriginal rock shelter was inhabited for over 5000 years and that their subsistence strategy had changed in response to the environmental demands. This scrupulous attention to detail was instilled in him when he was sent to learn the basics of anthropology from Baldwin Spencer before the first trip to Groote Eylandt. One piece of advice that he followed for the rest of his life was to keep a detailed fieldwork journal which he wrote at the end of every day. These journals were later bequeathed to the South Australian Museum and are one of the most important and valued accounts of Aboriginal life during the period the early part of the 20th century (Jones n.d.; Tindale 2003). He published a number of books and articles during his career before retiring from the museum in 1965; he later took up a teaching position in America where he lived until his death in 1993. He continued to contribute to the field well into his 80s and was awarded honorary degrees both in Australia and America. He remained an honorary associate of the South Australian Museum until his death, a connection which lasted over 70 years.

Of the records in the database that were recorded by Tindale, almost 80% of them are from the central desert area, which is where he conducted most of his work. Other myths were recorded from the Cape York area in Queensland, from the Southeast and Southwest areas and from the Spencer region close to Adelaide. Some of the material in the database is from his unpublished fieldwork journals and an article published posthumously in 2005 (Tindale 1930, 1934, 1935a, 1960 and 2005). His material does not exhibit any strong patterns and he does not seem to have influenced the data or been biased about what he recorded. He is perhaps not the best known source of information about Aboriginal astronomy but, as the database here shows, he was certainly one of the most prolific authors on the subject, despite so much of his material remaining unpublished.

3.11. Charles Mountford

Charles Mountford is one of Australia's best known ethnographers. He produced a large amount of material on the Aboriginal people of Australia, covering a wide range of topics in a wide variety of environmental locations within the continent (see for example Mountford 1956, 1958 and 1976). Born in 1890 in a remote Outback town in South Australia, he was acquainted with the local Aboriginal community and culture from a young age (see the detailed biography written by Lamshed 1973). He worked for a few years in Darwin where he became friends with the local Aboriginal people. His interest in their life and culture grew over time and he was able to travel to neighbouring communities, where he experienced more of the Aboriginal culture. He later returned to Adelaide where he and his father found some Aboriginal rock art in a cave near to his father's home and took tracings of these to the South Australian Museum in Adelaide. The ethnographer who saw this material was Norman Tindale.

Tindale immediately saw the value in this work, which was presented to the Royal Society of South Australia in 1926 (Tindale and Mountford 1926). Mountford slowly gained recognition as an authority on the life and culture of Aboriginal people although he was a little distant from the pure academic research. In 1948 he was chosen to lead a large expedition to Arnhem Land, even though he had very little experience of leading a party of this size. The results of this expedition were published in a series of books from 1956 (the relevant astronomy information is in Mountford 1956, 449-483). This work is some of the most detailed that has ever been produced about the Arnhem Land area. Following on from this he produced many books and articles and he was eventually awarded a series of academic degrees from both the UK and Australia. In some ways he received more accolades for his unconventional but productive work than some of his scholarly peers.

With reference to the material in the database, Mountford originally recorded almost 15% of the stories. This shows how much impact his work has had on research into Aboriginal culture. He is also known to be one of the most reliable sources, recording only what he was told and endeavouring not to influence the data with any Western ideas. Mountford published one article about specific stories relating to the astronomy (Mountford 1939), but most of the information he gathered was published in books about the whole culture and society of the people with whom he stayed. In many of his expeditions Mountford was

welcomed by the community and became an honorary member; this offered many benefits, but in some ways this also caused problems as he was often treated as an initiated man. His book, *“Nomads of the Australian Desert”* was withdrawn from circulation immediately after it was published because it included details of ceremonies that were only meant to be seen by men (Mountford 1976). The data used as part of this research has been obtained from a variety of sources, including some fieldwork journals and unpublished items from the H. L. Sheard collection at the State Library of South Australia (records from the following have been included in the database Mountford 1937-1942, 1939, 1946, 1948, 1954, 1956, 1958, 1965 and 1976; Roberts and Mountford 1973). Essentially the data Mountford recorded can be split into three groups, the data from Arnhem Land, data from the central desert region and data from the Spencer region (the Flinders Ranges). He recorded no data from the east or west coasts, but he travelled extensively through the central communities.

The majority of the work covered by the expedition to Arnhem Land concerned the art and the various art forms found in the area. Information was also obtained about the astronomy of the four communities they worked with in Groote Eylandt, Oenpelli, Milingimbi and Yirrkala. Because of the remote nature of this area and the fact that most 19th century ethnographers had studied the southeast regions of Australia, this work by Mountford was one of the first accounts of Aboriginal astronomy from this tropical north Australian environment. The four locations that were visited also had their own microclimates; Groote Eylandt is an island of the east coast of Arnhem Land, Milingimbi is a small island located just a short distance away from the mainland, Yirrkala is on the coast and Oenpelli is inland, which created differences in their astronomy. The work he conducted with the Pitjantjatjara and the Junkandjara in central Australia is very different as the land is barren and can only sustain a small nomadic population. Communities in this area are sporadic and contact would have been less intense. As with the records from Arnhem Land, it can be seen that some of the records reflect this way of life. The same can also be said about the data he recorded from the Flinders Ranges area, although this is less of an environmentally extreme area.

3.12. Brian G. Maegraith

In August 1929, Brian G. Maegraith stayed at the Hermannsburg mission in the Northern Territory, where Strehlow had previously worked. The knowledge and understanding he gained with respect to Aboriginal astronomy during this time was published in 1932 (Maegraith 1932). The article concentrates on the Aranda (Arernte) and Luritja communities of the central desert region of Australia. Maegraith was aware that, at the time, very little research had been done with respect to the Aboriginal understanding of the night sky. From his anthropological background he learnt the importance of interviewing the informants individually and gaining as much confirmation of the evidence as possible. He states that he has only included evidence that was “*common to all accounts*” (Maegraith 1932, 19), and comments on how he went about getting the informants to teach him their astronomy.

Maegraith learnt that the sky was divided in two by the Milky Way, one half representing the Aranda camps and the other half the Luritja camps. Mountford also describes the sky as being split into two; the summer and winter halves by the Pitjantjatjara and Junkandjara, which suggests this could have been a widespread concept in the central region (Mountford 1976). The basic interpretation of the night sky by the Aranda and Luritja was made even more complex because of the family and kin relationships that existed between some of the stars and constellations. Maegraith discusses one particular constellation, Iritjinga (the Eagle-hawk), which is made up of four stars, two from the Southern Cross and two from Centaurus (record 115). He says that the four bright stars that make up the Southern Cross were not grouped together because the brightness of a star was not always the most important factor. The reason some of the brighter stars were ignored in favour of the dimmer ones is because they had to conform to family and kin relationships and division of the sky. The initial comprehension of the Aranda and Luritja astronomy is complex because of their complicated marriage and class system and how this is represented in the night sky.

Another difference noted by Maegraith was that he was repeatedly told that the four stars that made up the constellation of Iritjinga represented the Eagle-hawk as a whole and that one star did not represent the beak or foot of the bird. Maegraith unfortunately does not mention this point again when discussing any of the other Aranda and Luritja constellations although he does indicate that single stars were commonly thought to represent whole

animals or the tracks of animals. This is an interesting point as it gives an insight into the way these communities created images in the sky and perhaps how they saw their landscape and whole world. In the desert one of the most important skills was the ability to track and hunt animals successfully. Some evidence suggests that the most experienced hunters were able to identify individuals and animals simply by their footprints (Lewis 1976), so it is clear how important an aspect of their life this was. For the Aranda and Luritja communities not only have their social rules been applied to the stars but so too have their hunting methods. The way they envisage and interpret the markings on the ground and the way they interact with other members of their society has become part of their astronomy. The evidence Maegraith obtained on this specific aspect of Aranda and Luritja astronomy lends support to the idea that a community's astronomy can be strongly dependent on the culture and environment of which it is a product.

One of the most interesting points that Maegraith discusses is that it is only the older and initiated men who are said to have any knowledge of astronomy.

“The knowledge is handed down by the old men to the boys at the time of their initiation, and it is carefully concealed from the women, who know practically nothing about the stars” (Maegraith 1932, 25)

It is impossible to determine if Maegraith was told this only by the men or if some of the women agreed with this opinion and admitted that they knew nothing of astronomy. One of the common features of early anthropological and ethnological work in Australia is that it was assumed the women were ignorant of many aspects of life. Other work has shown that women understood and knew a lot more about all spheres of life than the men gave them credit for, but just from a different perspective (see for example Bell 1983; Kaberry 1939). Information was divulged by the men to Maegraith because he was a man, and similarly the indication is that women may well have only been prepared to share information with another woman. Although Maegraith went to great lengths to make sure the information he was provided with was reliable, it is only reliable from the point of view of the informant; presumably an initiated man.

Maegraith was only at Hermannsburg for about a month and he said he encountered great difficulty in encouraging people to stay up late or get up early to discuss astronomy with him. He suggests that Aboriginal people have a strong dislike of the dark, but it is not

possible to establish if this was despite their myths and stories about the night sky or if they were afraid because of this knowledge (see also Hall 1987). One possibility is that Aboriginal people became a bit lost in the dark because they could no longer “read the landscape” and find their way, which made them reluctant to move about after dark and giving the impression that they were afraid of the night. Nowhere in their landscape is featureless, it is filled with sand hills, rocks or gullies that all have a sacred meaning established during the Dreaming (Clarke 2003, 136). Because these features cannot be seen at night there is a loss of familiarity with the surroundings and this has not been replaced by the skill of navigation by the stars. The suggestion is not that they *couldn't* use the stars to travel at night but that they *chose* not to, and therefore they made their perspective of the night sky very different to people who used stars to navigate. Perhaps in this respect Aboriginal astronomy could be considered less analytical than other indigenous astronomies; they never needed to use the stars with such precision to be able to guide them back to familiar territory, but one cannot assume that their interpretation was less perceptive because of this.

The article by Maegraith is one of the best references available, with a strong indication that he took a lot of care to record only the most reliable data. Although he has displayed a high level of understanding and consideration towards the Aboriginal people there is still an undertone running through the article that is common in material from the late 19th and early 20th centuries, relating to the general attitude and prejudices against Aboriginal people, especially Aboriginal women.

3.13. Review Summary

This section has provided a brief account of the history and development of the study of Aboriginal astronomy, and how this complex development has caused inherent problems in the data currently available. The variety of biases that the ethnographers were subject to have been discussed; the differences in approaches to anthropology, how each of them were (or were not) trained to record data has a direct bearing on the reliability of their stories. Most of the data was recorded by white men, who were often not born in Australia, which would also affect their understanding and interpretation of the Aboriginal world. The two women discussed here have very different backgrounds and approaches but neither of them considered it important to record any stories known only by their gender. By knowing something of the history of these ethnographers and anthropologists it makes interpreting their data more intuitive. It is clear that the data from Bates, for example, has less academic standing than some of the material recorded by someone like Tindale. This shows how important it is to know the source of the data in order to have a complete picture of the context in which the data was recorded. The review of the ethnographers provides an opportunity to understand their background and how this impacts on the value that should be placed on their data.

4. Analysis

In this chapter the stories collected from the historical and ethnographic literature are considered. A brief introduction to the material and the initial results regarding the division of the data is followed by a discussion of each of the object groups previously defined (e.g. Moon, Sun, Orion and the Pleiades etc.). Within each of these object groups, the data is further subdivided into the south, central and north environmental zones to make the analysis easier. The division of the material in this way makes direct comparisons of similar stories straightforward, and should allow for the identification of any common themes.

4.1. Introduction

All the stories from the sources discussed in chapter 3 and from the other ethnographic literature were entered into a database (see Appendix A). A total of 525 original stories make up the database, each of which was classified into one of the object groups and environmental zones mentioned previously. Tables 2 and 3 and Figure 3 show the breakdown of the results.

Object Groups	Number of Stories	Percentage of Stories
Moon	85	16%
Sun	34	7%
Sun and Moon	17	3%
Orion and the Pleiades	58	11%
Southern Cross (inc Coal Sack)	48	9%
Milky Way	43	8%
Magellanic Clouds	17	3%
Venus	23	4%
Planets	16	3%
Other Phenomenon	45	9%
Other Stars	102	20%
Mixture	38	7%
	526	100%

Table 2: Breakdown of the stories into their object groups

Zone	Number of Stories	Percentage of Stories
Tropical North	141	27%
Central Desert	118	22%
Temperate South	252	48%
Not Specified	15	3%
	526	100%

Table 3: Number and percentage of stories within each environmental zone.

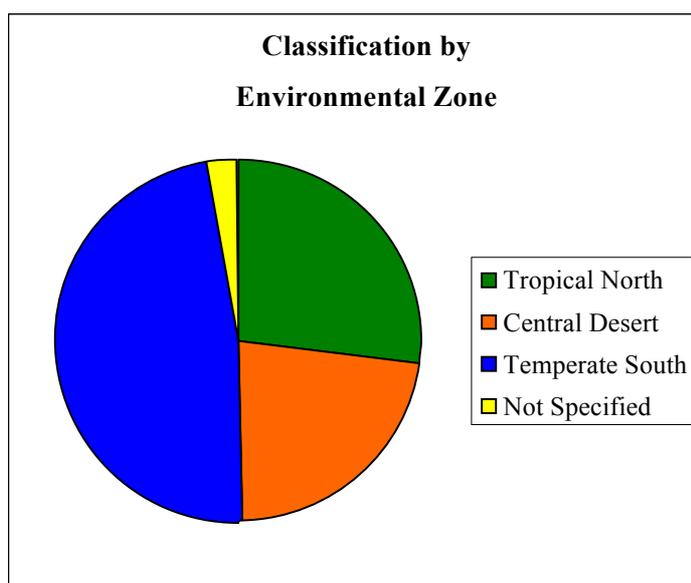


Figure 3: Chart showing the breakdown of the results by environmental zone

These results give a good indication of where the majority of data originates from and which of the night sky objects are most commonly involved in the Dreaming stories (Table 2). Nearly half the data comes from the south of Australia, the remaining half being almost equally split between the desert and the north (Table 3 and Figure 3). A more detailed analysis shows how the results are divided with respect to the 18 regional zones and is shown in Appendix C. It shows for example that only one story has been recorded from the Fitzmaurice area in north central Australia, and only five from Tasmania, also that over 40% of the stories originate from only two areas (the Riverine and Desert areas). In this respect the data is not a true representation of the whole of Australia, and this distortion must be taken into account in the overall analysis. The highest proportion of the stories relates to the other stars group, followed by the Moon and Orion and the Pleiades, but very few relate to the Magellanic Clouds or Planets. Further analysis shows that of the 16 stories recorded

about the Planets none originate from the north of the country (this excludes the stories about Venus, which are common in this area), suggesting that they were not an important part of the astronomy in this area. Simple analysis of the data in this way is interesting, as it shows what objects were important in which areas, it must be remembered, however, that there is a southeast bias. The proportion of stories about each of the objects is more accurate, assuming that there was no bias with respect to the focus of the stories that the researchers recorded. The analysis that follows looks at each of the object groups in turn, focussing on the three environmental zones independently.

4.2. The Moon

The Moon is the most important object in the night sky and holds an important place in the mythology of Indigenous Australian culture. The stories about the Moon constitute about 16% of the database. Cultures throughout the world have identified with the Moon in different ways but it is commonly thought that the Moon is female because of the link between the lunar and menstrual cycle. In Australia the situation is different: the majority of communities thought that the Sun was female, and that the Moon was male. There have been suggestions that some ceremonies and corroborees were timed by the changing phases of the Moon, the Moon being one of the most obvious features of the environment to note the passing of time by (Hull 1857; Mathew 1928, 534; see also Love 1988 chapters 5 and 6). The Moon is a constantly changing object in the sky, which disappears for a couple of days every month and then “comes back to life” and there are many stories that give a reason as to why or how the Moon behaves in this way. In some places the Moon is thought to control life and death, suggesting that during the Dreaming creatures lived forever, until something happened to upset the situation and it was decided that only the Moon would be able to come back to life once he had died.

4.2.1. South

Only two original stories from the southern temperate region state that the Moon is female. Meyer recorded his account of the female Moon in 1846, from the people living in Encounter Bay in the far south-west corner of the Riverine area (record 404) (Meyer 1846). Another account of the Moon being female was published by Berndt in 1993 from the people in the neighbouring group but this version appears to be heavily based on the Meyer account (record 363) (Berndt, Berndt et al. 1993). Both accounts suggest the Moon is a promiscuous woman who has too much sex, gets very thin and then is told by one of the spirits that she must leave, so she goes away and gathers lots of food, quickly becoming fat and the cycle starts all over again. The Berndt version differs from the Meyer account here as the suggestion is that the Moon gets pregnant which is why she gets fat again. Although the Berndt version is a valid explanation as to the changing phases of the Moon, it is likely that some elements of this were copied from Meyer, as other sections of this work were repeated by the Berndts without acknowledgement. The only other story where the Moon is thought of as female is one that was recorded by Brough-Smyth in 1878 (record 227) (Brough-Smyth

1878). In this account the Moon was able to wander the sky during the Dreaming, until her motion was controlled by one of the spirits. She was told to die for a couple of days and then allowed to live again, but had to follow a specific path across the sky. This account is the only one where the Moon is initially able to wander across the sky, so is this perhaps the reason the Moon was female. The data from Brough-Smyth may be a little unreliable, however, as he says in the same publication that the Moon is always regarded as male in Victoria, apparently contradicting his own data.

Apart from the generalisation that the Moon was male in nearly all of the southern areas, there are no other conclusions that can be drawn regarding the Moon stories. The Moon was a significant feature of the night sky and it is clear from the variety of accounts that there was a wide range of beliefs about what the Moon was. In several stories the Moon was a grumpy old man who does bad things, either by arguing with his relatives or by upsetting some girls of a neighbouring community (see records 402 and 432 for example). In other stories the Moon is accompanied by some of his relatives, mostly two grandsons, a nephew, or his hunting dogs (records 512, 513 and 463 for example). If there are any girls in the story they are often abused by the old Moon man, the girls' family then take revenge and either kill the Moon or banish him to the sky (see for example Barker 1971, this material has been removed from the database due to access restrictions). The idea that the Moon was hunting with one or more of his younger male relatives is quite common and several versions of this myth have been recorded from the southeast and central south coast of Australia (records 102, 402, 403, 512 and 513). Several other records from southeast suggest that the Moon was crossing a river and had to ask for help (records 401, 430 and 432). The Moon either falls off the log he is being carried on, the girls push him into the water because he has abused them, or something else happens that means he never reaches the other side of the river. The Moon either gradually sinks to the bottom of the river (presumably representing the waning of the Moon) or escapes into the sky saying to all the people on Earth that they would not be able to live forever because they didn't help him, and that only he would be able to die and then come to life again. It is difficult to understand why the Moon is a weak old man crossing a river; one can see how this would be appropriate if it was the Milky Way river that the Moon was crossing, but several stories specifically mention that it is a river on Earth.

Two stories from the southern areas say that the Moon was involved in some kind of fight and his bowels were speared, his guts spilt out onto the floor (records 284 and 392). None of his own people would help him back to his campsite because he smelt so bad, only some of the grass and fern men would help him. For their help he rewarded them with eternal life, which is why the grasses and ferns are able to come back to life again, even when there has been a fire. This shows a connection between what had the ability to live forever; the Moon, grasses and ferns all have the same unique quality in that they can re-generate themselves even after they have supposedly “died” for a time. This is a good representation of how characters on the land and in the sky were connected, although it is not clear why the waning of the Moon was represented by the cutting open of his bowels.

The stories from the southwest coast differ slightly in that that the Moon is mostly accompanied by an animal and is not always hunting. The majority of the stories from this area were recorded by Bates, whose data has inherent problems (see section 3.9). Of all the stories from the southwest region of Australia, over three quarters of the material comes from Bates, and there are only two stories about the Moon from this area which were not recorded by her. When most of the material is recorded by one person there is, of course, a slight bias, and this is clear with respect to these accounts regarding the Moon. In this area, there is simply not enough data to assess this situation further, and unfortunately there are many more examples of this. In the southwest it has been recorded that the Moon is a man who is involved in some kind of discussion or disagreement with another creature and he either decides (or it is decided for him) that he will die for a few days each month before being able to come back to life again.

As mentioned above, there are several stories from the southern zone which appear to have the same basic theme, where the Moon is an old man or grandfather who is looking after two of his young male relatives while their mothers are away. He cheats them out some food that they are entitled to, the two boys take revenge by getting the old man to climb a tree, then making it grow tall so that he gets stuck in the sky and has to stay there forever, or the boys escape from the old man by going up into the sky (records 102, 103 and 402). A similar version of this, recorded in Arnhem Land, suggests that the Moon is an old man who is looking after his two young sons or grandsons. He sends them away to search for food but they eat it before they bring it back to him, he punishes them by drowning them or burning them, but their mothers find out what the Moon has done and set fire to his hut while he is

sleeping. The women were happy at the thought that they had killed him, but they saw him rise out of the fire, go up into the sky and say that from then on only he would be able to live forever (record 15). Similar stories have also been recorded in the West Cape area of northern Queensland and in the Flinders Ranges in Southern Australia (see records 305, 512 and 513). The stories about the old man and his nephews or grandchildren are found in the southern regions area and in the northern tropics, but none have been recorded in the central desert region. It may be that these stories have captured the imagination somehow and have been copied and publicised more, but they appear in the literature about Aboriginal astronomy a lot. It is difficult to identify a reason for the Moon to be so commonly thought of as a grumpy old man who kills children, but the hunting aspect is easier to rationalise. Because the Moon is a man it would be expected that he would be involved in a hunting activity, as this would conform to the gender division of labour on Earth.

4.2.2. Central

The majority of the stories from the desert areas were collected by Spencer and Gillen, Strehlow and Mountford, and other than representing the Moon as male, the stories bear very little relation to each other. Several records, however, mention a connection between the Moon and possums, either suggesting that the man who carried the Moon was of the possum totem or hunting possums, or that the Moon was a man of the possum totem. Strehlow and Spencer and Gillen recorded stories with these elements from the Arrernte and Luritja communities (Spencer and Gillen 1899; Strehlow 1907). Possums are nocturnal animals found throughout Australia. Many animals in the desert are nocturnal so it is difficult to understand why there would have been a particular association between the Moon and possums. Mountford only recorded one story about the Moon from the desert regions; there were two Moons, who were father and son (Mountford 1976). The son had to persuade his father every night not to go into the sky because he was too big, instead he went into the sky and provided light for people on Earth. The nose of the older Moon is running with mucus, the kind of mucus that makes the stars shine, and if he went into the sky, he would blind all the people on Earth (record 132). Of all the stories recorded by Mountford this is probably one of the most confused, he gives no suggestion where this idea comes from, or why there are two Moons in the sky.

A couple of other stories about the Moon have been recorded in the desert area, but are somewhat confused so no real pattern can be established. One area in Australia where only a very limited amount of research has been conducted is the Eyre district. It covers a large area of central eastern Australia, it is not on the coast, nor is it tropical or temperate, but contains both the Simpson and Strzelecki Deserts. Only 11 stories in total have been recorded from this area, 5 of which are about the Moon. Two of these stories are from the Dieri community; they are quite similar in that the Moon was a mean man who would not share any of the food he collected with his two sons (records 346 and 534) (Howitt and Siebert 1889, 1904). The two boys were not happy with this and tricked their father into climbing up a tree to gather more food, they then caused the tree to grow up to the sky and their father, the Moon, got stuck there when the tree became small again. This is very similar to some of the accounts from the Riverine area, showing that the same elements of this story are found throughout a wide area of Australia.

Another account from the Eyre area was recorded by Janet Mathews in 1974, and although it is not a real story about the Moon, it is a very interesting discussion of which members of the community were allowed to learn the stories about the Moon (Mathews and Dixon 1975). A female of the community spoke to Mathews about her knowledge of the Evening Star and the Moon, but she admits that she did not know very much about the Moon because the men protected that information. Mathews was told that there was a man in the Moon, and that on very dark nights you could see a horse, cart and man all sitting in the Moon (record 335). She acknowledges that this is quite a European point of view and one which was perhaps imported rather than indigenous, which the woman agrees to, but says that she never knew very much about the Moon anyway. This shows how European and Western stories have infiltrated the Aboriginal culture, and how easy it was for people to pick up stories, especially where their own knowledge was limited.

4.2.3. North

The majority of the stories from the tropical northern areas of Australia were recorded in Arnhem Land, which is the same for all aspects of astronomy. An initial analysis shows that there are many similar accounts from this region, indicating that the stories have endured over time and still exist in communities today. Looking at the data more closely, however, it is apparent that the stories have simply been copied several times and changed slowly over

time. Mountford recorded four stories from the Arnhem Land communities which were published in his 1956 book, and due to the amount of data that was contained in this book it received a lot of attention (records 7, 15, 19 and 20) (Mountford 1956). These four stories form the basis of the interpretation of the Moon in the Arnhem Land area, as Berndt and Warner also previously recorded similar accounts of two of these stories (records 191 and 212) (Berndt 1948; Warner 1937). The four stories recorded by Mountford all state that there is a connection between the Moon and the sea (or water). In two of the stories the other character in the myth is a fish or marine creature (records 19 and 20), in one the Moon is thought to control the tides and in the other the Moon drowns his two sons in the sea (records 7 and 15 respectively). The communities where these stories were recorded are dependent on the sea, the tides and the seasonal floods to provide them with food; this is in contrast to the desert communities where all of their food comes from the land. The story where the old man drowns his two grandsons because they do not share food with him, has not only been repeated many times but is again quite similar to some of the accounts from the south-eastern area of Australia, as previously mentioned.



Figure 4: Bark painting by Kulpidja, collected by Mountford in Groote Eylandt in 1948. The upper crescent represents the full Moon, although only half the disc is shown, the lower image is the new Moon who is supporting his wife and family.

Image taken at the National Museum of Australia, Canberra.

It is not only Mountford who records stories in this area that are closely connected with the sea, out of the 13 original accounts from the Arnhem Land area, most of them connect the Moon with the sea, tides, fish or some other sea creature. Although most of the stories from the northern zone were recorded from Arnhem Land, it would be expected that the other communities along the northern coast of Australia had similar views, but this is not necessarily the case. The connection between the Moon and the changing tides is straightforward, but only three communities in the whole of Australia make this association clear in their stories (the Warnindilyakwa on Groote Eylandt, the Yolngu at Yirrkala and the Gayardilt on Bentinck Island, see records 7, 20 and 507). Two detailed stories were recorded in Cape York in far north Queensland, in both stories the Moon was a man who lived on Earth before there were any women (record 393 and 394) (McConnel 1931, 1957). He waited until his brother, or a man of the opposite moiety was asleep, cut off his genitals, made him into a woman and took her as his wife. In one story the Moon man later becomes a lizard bone and appears in the sky, in the other the Moon and his wife (who is Venus) both go up into the sky after creating the landscape as it is today.

4.2.4. Boomerangs, Rib Bones and Changing Phases

One particular aspect which has been a focus of the myths over a large area of Australia is how the Moon got into the sky in the first place. Several stories suggest that the crescent Moon was a rib bone or a boomerang which was thrown into the sky and got stuck there. Stories containing this particular idea have been found in the northern tip of Queensland, Cape York, in the central deserts and in the southern regions (see for example records 303, 304, 257, 357, 375 and 537). The accounts from the tropical areas suggest that the Moon was once a boomerang, in the desert stories the Moon is an animal bone, and in the south the Moon is either a boomerang or a bone. It is interesting to note that this story covers a large area of Australia, but that there is also a visual connection between the shape of the crescent Moon and a boomerang or rib bone. Some of these stories state that there was originally no light during the night, and the bone or boomerang was placed there to provide light, the object often being thrown to the west, south and north first, before finally being thrown to the east where it stayed. Another story that seems to be found in the data from a wide area of Australia is the idea of the Moon being made of something shiny, like gypsum (see records 182, 248, 249, 294, 310 and 366). Three of these records are from central Australia

and were recorded by Strehlow and Spencer and Gillen from the Arrernte community, but the other two records come from opposite ends of the country, the Gulf of Carpentaria in the north and the Riverine area in the south (Spencer and Gillen 1899; Strehlow 1907). As with the bone and boomerang aspects of the Moon stories it is interesting to note that this is found over such a wide area of the country. One can assume that the Moon was thought of as some shiny white substance because that is how it appears in the sky and the connection between this mineral found naturally on Earth and the Moon is therefore straightforward. The stories involving this mineral all suggest that the Moon was originally on Earth and was only placed in the sky when someone stole it from the man who was looking after it. He said that the people were too selfish and that one person could not be responsible for the Moon, that it would never be brighter than the Sun, and so was only visible at night.

A large number of the myths about the Moon also mention something about its changing phases over the course of a month. Some of the data suggests that the Moon argued with another Dreaming creature about what would happen to them after they died, the Moon said they could die for a couple of days and then come back to life, but the other creature said that once they were dead they would remain that way forever. Either they died and the Moon later came back to life, or they killed each other and the Moon was proved right in that he was able to come back to life again, but condemned the rest of the creatures to die and remain that way forever (see records 19 and 284 for example). Stories about the changing phases of the Moon are found all over Australia, the steady waxing and waning of the Moon during a month is easy to observe and would probably have been used as marker of time. Some stories actually describe the whole process, whilst others only make suggestions as to why the Moon appears full or disappears for a couple of days. In some areas it is thought that the Moon becomes fat and round because of all the food he is fed (see record 296 and Mountford 1954, p584 the details of this story cannot be included here because of access restrictions), other stories about the changing phases of the Moon have already been discussed above.

4.2.5. Summary

There are some broad-ranging generalisations which can be made in relation to the stories about the Moon. The Moon man is often involved in an incident with two younger male relations which causes him to end up in the sky and it is interesting to note that different

versions of this story are found within all three environmental zones, within each of the regional areas and within different clans of the same community. This could suggest that there was one original source of this story which gradually spread over Australia rather than several astronomies all developing independently. There are many other stories which are not related to this theme but none which show any other kind of pattern, within each region there are some similarities that relate to the environment but there is not enough to establish any kind of reliable relationship.

4.3. The Sun

We depend on the Sun to light the day, warm the Earth and provide energy. It is the most important object in the sky and without it there would be no life; as such it is often at the centre of stories about the creation of the Earth in cultures throughout the world. In Australia the situation is no different, few communities are found without stories about the Sun, which is female in most areas. Of the 34 original stories in the database about the Sun 26 of them have the Sun as being female, and the other 8 give no gender and originate from only two small areas. Two stories that do not give a gender are from the Northeast section and the others are all from the Riverine section in the southeastern corner of Australia. The two stories from the Northeast suggest that the Sun is a body of fire, and is the source of warmth during the day, although neither story states how the Sun was created nor how it was placed in the sky (records 267 and 546). In the stories from the Riverine area where the Sun is genderless, it was often thought of as an egg, which was thrown up into the sky, struck a pile of wood and started a fire (Beveridge 1883; Stanbridge 1857). For the importance placed on the Sun, there is very little data about this object; the stories make up only 7% of the total. Mountford suggested that this was because the Sun is female and therefore less important than the male Moon, despite the fact that she is mostly seen as a positive female influence over daily life providing all the essential light and warmth (Mountford 1956, 503).

The Sun takes on several different roles, she is the daughter, sister, mother or grandmother, sometimes she collects food during the day, sometimes she carries her torch across the sky looking for the son she has lost, and sometimes she takes different paths across the sky during the different seasons (see for example records 28, 64, 97, 256, and 522). In general the Sun is a woman who is thought to go out on some kind of journey during the day, travelling across the sky until she reaches the western horizon where she either goes underground or changes into an animal and makes the return journey just in time to rise again in the east in the morning. The Sun is a good presence in the sky providing the light and warmth that are needed during the day; there is only one account that says people did not think that the Sun provided heat. Manning recorded a contrasting story that suggested the heat of the day comes from the Pleiades (record 145) (Manning 1882). His informants stated the reason for this was because the Sun was seen in the sky every day but that it was not warm every day; it was only warm when the Pleiades were high in the sky at night during the summer. Several other authors picked up the idea of the heat of the summer being provided

by the Pleiades rather than the Sun, the story being repeated by both Howitt and Frazer (Frazer 1925; Frazer and Downie 1939; Howitt 1904).

4.3.1. South

In the Riverine communities there was only one real theme found in the stories about the Sun, but this was copied heavily over time and has become distorted from the original accounts. The basis of most stories about the Sun state that it is a pile of wood that has been set on fire, either by an egg being thrown at it, or it was seen by one of the spirits who saw what a good thing it was and instructed it to burn wood every all day and to re-light in the morning (records 29, 98, 226, 365, 370 and 411). This takes place during the Dreaming, before which there was no Sun in the sky, although none of the records state why it is a pile of wood. Two of these stories state that the Sun was originally in the sky all day and night but that one of the spirits saw how much of a problem this was and instructed it to burn all of its fuel and set at the end of the day so it could rise in the morning and give everyone on Earth a break (records 226 and 370). Brough-Smyth and Bulmer recorded identical stories, the story by Brough-Smyth was published in 1878 and the work by Bulmer is from an unpublished undated manuscript (Bulmer n.d.; Brough-Smyth 1878). Howitt repeats this story in some of his work in 1906 and states that the original account was recorded by Bulmer, but without a date this cannot be confirmed, and the original may have been recorded by Brough-Smyth (Howitt 1904). The other stories from the southern zone are not as cohesive and display more wide-ranging beliefs about the Sun. None of these stories exhibit any kind of pattern or similarity and it must be assumed that the communities in this area did not share the same beliefs about the Sun.

4.3.2. Central

The relatively limited amount of data from a small area in the central zone shows a surprising similarity; the Sun is a woman who comes from a place located somewhere in the east, climbs up a tree and into the sky, travels west all day and then sinks below the horizon (records 131, 180, 246 and 256). Mountford and Strehlow both recorded that the Sun woman was thought to take a longer road during the summer and a shorter in the winter (records 131 and 256). This shows that their informants understood the motion of the Sun

during the course of the year and how it changed over the seasons. Isaacs also noted this as part of a story from Arnhem Land, but she may have just copied the data from Mountford or Strehlow (Isaacs 1980, 141-142).

4.3.3. North

One of the most important myth cycles in the Arnhem Land area of Australia is that of the Djanggawul myth, which was first recorded by Berndt in 1952 (Berndt 1952). It tells of how the Sun woman was married to a man who committed incest with two of his sisters. The man and his two sisters were banished from Bralgu (the land of the dead) and guided to the Australian mainland by the light of the Sun. Once they had arrived in Australia they went on to populate the country and make the landscape as it is today (record 548). Various elements of this story have been repeated in many forms and in many different publications. This creation myth tells of how people first came to Australia and created the landscape. It is thought that people first arrived in Australia about 50,000 to 60,000 years ago by boat from Papua New Guinea and Indonesia, at first only a couple of family groups would have made the journey (Clarke 2003, 5; Thorne 2005, 38)². Groups of people have slowly continued to arrive in Australia in this manner and it is possible that this myth has its origins in an exploratory journey to Australia. The Djanggawul myth is found in various forms in several communities and areas of Arnhem Land.

Two other stories from Arnhem Land suggest that the Sun is a mother who has to leave her children during the day and travel across the sky, and wants to hurry home to them because she can hear them crying (records 28 and 215). She does not take her children with her during the day because she knows that the heat of two Suns in the sky would scorch the Earth and kill people. In the stories from the tropical region of Australia there are several accounts in which the Sun has a daughter and one or the other of them travels across the sky during the day and returns home during the night (records 99, 271 and 526). Sometimes the mother and daughter argue about who should go into the sky, but they both know that the heat of two suns would be too strong. It is difficult to imagine why so many communities in this area would believe that there were two (or more) suns in the sky. The fact that this is found throughout a wide area of northern Australia demonstrates that it must have been an

² The date of Aboriginal settlement in Australia is a matter of current academic debate and is subject to change.

enduring belief, which is supported by the number of different ethnographers who recorded it.



Figure 5: Bark painting collected by Mountford at Yirrkala in 1952, showing the Sun woman and her daughter.

Image taken at the South Australian Museum, Adelaide.

The two stories recorded in the Tiwi Islands are the only ones from this area that differ significantly from this generalisation. In the Tiwi Islands the Sun was a woman named Wuriupranala, who was one of the first women on Earth (records 208 and 407). In the Dreaming she had been given the task of keeping alight a bark torch and carrying it all day, after the death of one of the chief spirits all the men and women changed themselves into creatures and plants and she became the Sun woman travelling from east to west every day. Mountford suggested that these differences in astronomy between the Tiwi Islands and the mainland were an indication that the two communities had been separated for a long time (Mountford 1958, 177). He says that this isolation provided the Tiwi with the opportunity to develop unique myths and stories that could not have formulated on the mainland because of the trade and exchange between neighbouring communities.

4.3.4. Summary

A large proportion of the stories mention something about the Sun rising or setting, and where the Sun is thought to go during the night. There is no pattern with respect to this point, one story suggests that the Sun turns into a wallaby, one that she hides in the armpit of a man, others say that the Sun goes underground or into the sea to come back in the east in time to rise again in the morning (records 28, 256/246, 407). One community in the central desert that thinks the Sun sets into the sea at the end of the day, when they are at least 500 miles away from the coast. On the east coast of Australia the communities would have seen the Sun (and Moon) rise up out of the sea and one would assume that this would make their interpretation of the Sun different from the inland communities. In general, the Sun has a home in the east, in the inland areas this home is underground and in some of the coastal areas the home is in sea. It was originally hoped that there would be sufficient data on this point from the east and west coasts of Australia to determine if there was a significant difference in the beliefs depending on if the Sun and Moon rose or set on land or in the sea. Unfortunately this is not the case. Some stories give a reason as to why the sky is red at dawn and dusk, saying that the Sun woman covers herself with red ochre and spills some of it on the sky, or that the Sun woman has been given a red kangaroo skin by a lover which she is wearing at dawn (records 403 and 407).

Throughout most of Australia the Sun is considered to be a woman travelling west across the sky for a variety of reasons, and travelling back to the east via a range of different methods. Several stories contain discrepancies to this simplification but there is no pattern to these differences, they are spread throughout the country and do not indicate a coherent development of a different branch of astronomy. It has been suggested that the Sun was a woman carrying a bark torch in so many regions, especially the temperate south, because it was the women in the community who were responsible for maintaining fire and carrying it with them when they travelled (Tindale 2005, 361). Women are always up at dawn to tend to the fire and it is probably because of these associations that the Sun is a woman. In the desert and tropical regions their dependence on fire was slightly different, which might account for the difference in stories from these areas. The desert peoples saw the Sun as a woman with a body made of fire, who travelled on different roads during the summer or winter. In the tropics the Sun is thought of as a woman although it is not mentioned whether

she carried a bark torch or her body was a ball of fire (only one story from this region states that the Sun woman is carrying a torch, record 407).

4.4. The Sun and the Moon

There are a significant number of records which describe events regarding the Sun and Moon together, often they are thought of as being counterparts who quarrel over something, or as a married couple. There are some records where both the Sun and Moon are the same gender; two stories suggest that they are both female, and one that they are both male (records 276, 364 and 311 respectively). There is also one story where the Sun is male and the Moon female (record 426).

4.4.1. South

Teichelmann recorded one of the earliest accounts in 1841 about both the Sun and the Moon; he stated that the male Moon was the first celestial body to leave the Earth and persuaded all others to follow him so he would have companions (record 313) (Teichelmann 1841). His wife, the Sun, beats him every month until he dies, but he revives a few days later, he also keeps a large pack of dogs for hunting all of which have two heads but no tail. Although the stories in this group are all about the Sun and the Moon, there are relatively few which have any kind of interaction between the two bodies. This record suggests that it is the Sun which causes the Moon to disappear every month, which perhaps demonstrates a greater understanding of astronomy. The phases of the Moon are caused by its changing position with respect to the Sun, so it is possible that the Sun beating the Moon until it disappears shows that this community understood that the Moon's phases were dependent on the Sun.

Only one record states that the Sun and the Moon were both male, Schurmann noted in the Spencer area somewhere near Adelaide the Sun was a man with many wives who has the power of life and death on Earth (Schurmann 1840). The Moon man is kinder to people on Earth, showing them that if they cough and spit into their hands and offer it to the Sun man he may allow them to live longer (record 311), this in contrast to many of the other stories which show that the Moon had control over life and death on Earth. The changing phases of the Moon and its "death" once a month would immediately associate it with life and death but the Sun actually has a more direct influence over life on Earth, providing the light, heat and energy we need to survive. This unique story by Schurmann does not connect in any way with the other stories from this area and as such it is an interesting account, even more so because it was recorded so early (1840). This is the only story recorded by Schurmann,

although he was involved in a lot of other ethnographic work, so it is difficult to assess its reliability.

4.4.2. Central

One account where the Sun and Moon are both female was recently recorded as part of a language project in the central desert region (record 276) (Nordlinger 1992-1998). Although the focus of this project was to record the spoken elements of some of the languages in this area, two stories about the creation of the Sun and Moon were included. Both the Sun and the Moon are female and both have babies, the Sun has a nice baby, but the Moon has a baby with sores which she didn't want. The Moon tricked the Sun into putting her baby down and while she was distracted she ran off into the sky with the nice baby. The Sun was upset and is now chasing the Moon to try and get her baby back. This is an interesting contrast to the other story recorded by Nordlinger where the Moon is a man who had an accident and condemned all other life on Earth to die, while he alone would be allowed to live forever (record 275). Because this was recorded as part of a language project the author offers no further information on this story or any reason why the Sun and Moon were two women each with babies.

4.4.3. North

In the northern tropical areas of Australia a small number of stories were recorded connecting the Sun and the Moon; on the east coast of Cape York in northern Queensland the female Sun and male Moon were married, the Moon was hungry so went out on a fishing expedition (record 418). He caught many fish and his belly became big, getting smaller again after he stopped hunting. The Sun was constantly hunting for green ants and it was thought that there were actually two suns who were sisters. The older sister visits them in the cold season and the younger one in the warm season. The idea of there being two suns in the sky has been recorded in several parts of Arnhem Land (see section 4.3.3), although this is the only account where both the suns are allowed into the sky, albeit at different times of the year. Other stories from the tropical regions only associate the Sun and the Moon because of their motion across the sky. Isaacs recorded an original story which suggested that when the Sun and Moon set at the end of the day and night they become fish and travel

back to the east underwater ready to rise again the next day or night (record 100) (Isaacs 1980). This was recorded at Milingimbi, a small community on the northern coast of Arnhem Land. From the position of this community one cannot confirm whether or not the Sun and Moon would rise and set over the water or land, the many inlets and watercourses in this area would mean that it is likely. The rising and setting positions of the Sun and Moon change during the course of the year and the campsites are not fixed either so people would have moved around in this area, all of which means that this point is difficult to analyse.

An account from the Tiwi Islands states that the female Sun and male Moon each carry a bark torch as they travel across the sky (record 210). At the end of the day and night as they reach the western horizon they each put out their torch, using only the embers to guide them to the east through the “dark underworld”. The red haze of sunrise and sunset were caused by the Sun woman throwing powdered red ochre over her body to decorate herself. Record 210 was published by Sims, who presented several stories about the astronomy of the Tiwi Islanders in 1978, although the majority of this data seems genuine his informant was a catholic missionary who lived on Papua New Guinea (Sims 1978). Mountford recorded a similar story from the Tiwi Islands, he included a lot more detail about the journeys of the Sun and Moon, but he does also state that both the Sun and Moon carry bark torches as they travel across the sky (see records 406 and 407) (Mountford 1958). He also noted that the Sun and Moon followed different underground paths at night and during the day respectively (Mountford 1954, 1976). Puruntatameri recorded one other story about the Sun and Moon in the Tiwi Islands, although this un-dated information was never published (record 437) (Puruntatameri n.d.). The data in this story is not an exact match to Mountford and Sims, but she does say that the female Sun and the male Moon were made to carry bark torches as they travelled across the sky during the day and at night. From this small island three different accounts of the Sun and the Moon have been recorded, but they all contain very similar basic elements, suggesting there must be a very strong mythological culture in this community.

4.4.4. Summary

Of all the stories that have been recorded about the Sun and the Moon there is only one author who states that the Sun is male and the Moon is female (record 426) (Scott 1907). This account from Scott is not completely reliable, the location is only given as “coastal Queensland”, and some of the other data he published was too unreliable to be used in the

database. Apart from the patterns mentioned previously in the individual Sun and Moon analyses there are no further themes which are found by looking at the stories about both the Sun and Moon together.

4.5. Orion and the Pleiades

The western constellation of Orion and the group of stars known as the Pleiades are some of the most prominent stars in the night sky. Classically, Orion, the hunter, was forever in pursuit of the Pleiades women after they spurned his advances. There are a number of cultures throughout the world which had this idea of the male pursuit of the group of women and it is also found throughout most areas of Australia (Andrews 2004). The data from Australia mostly suggests that Orion and the Pleiades are associated with each other and one of the most common interpretations is that Orion is chasing the Pleiades. The construction of the constellation of Orion is straightforward and one can easily imagine why so many cultures throughout the world made this pattern into the torso of a man. What is slightly less obvious is why the Pleiades were always a group of seven women. With the naked eye one can observe at least seven stars within the group, and their position in the sky means that Orion is always following them.

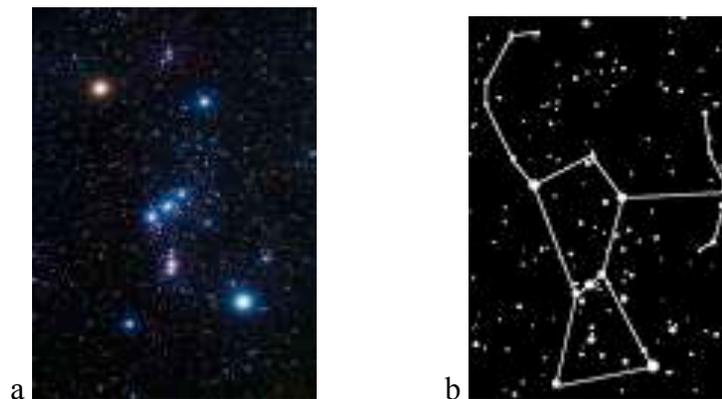


Figure 6: Photograph showing the colour of the stars in Orion (a) and a diagram showing the position of the stars in the classical constellation of Orion and the torso formation (b).

Source: <http://oobleck.ifa.hawaii.edu:8080/where/go.php#> and http://www.physics.csbsju.edu/astro/constellations/orion_1.html (both websites accessed 27th September 2007)

The western constellation of Orion is made up of a group of stars as shown in the images above, the brightest of the group represent the torso of a man, with a belt across his waist and a sword hanging from this belt. Figure 6a shows the true colour of the constellation, the red star at the top left hand corner, Betelgeuse (α Ori), and the blue star at the bottom right hand, Rigel (α Ori), appear this colour when observed with the naked eye. Figure 6b indicates the outline of the man, his one arm is outstretched above his head with a sword in his hand and the other holds a shield. Several communities in Australia found the colour of a star to be

more important than the position, and some stories specifically discuss the colours of Betelgeuse and Rigel (Maegraith 1932). These images represent the western concept of the constellation of Orion, and due to the vagaries of the ethnographic record there is no way to establish exactly which of the stars were involved in the Aboriginal “constellation of Orion”. For the purposes of this analysis the constellation of Orion is assumed to contain the same stars as the western image, unless specified. The stars that make up the Pleiades are more easily defined as a unified group, but are part of the constellation of Taurus. The most common belief was that the seven naked eye stars of the Pleiades were each thought to represent one woman or girl, although some communities thought of the Pleiades as just one woman.



Figure 7: Image of the Pleiades.

Source: <http://astrophotography.aa6g.org/Tricolors/pleiades.html> (website accessed 7th April 2008)

Analysing the data about Orion and the Pleiades as a complete set, it suggests that the beliefs about these constellations are the most consistent in Australia. Almost 90% of the stories state that Orion and the Pleiades are thought of as a man and a group of women respectively. There are some stories from all areas in Australia which suggest that either Orion or the Pleiades are believed to be something different, but the majority of the evidence shows that Australia confirms to the worldwide generalisation. What is significant about this data is that it fits the pattern a lot closer than any of the other evidence about Aboriginal astronomy. Some of the more recent authors on this subject have tried to force the data to suggest that certain aspects astronomy throughout Australia were the same, which in most cases cannot be done. The evidence about Orion and the Pleiades is different; and most of the data easily

conforms to the pattern. This is in such contrast to the majority of other data about Aboriginal astronomy that one wonders what makes these two groups of stars so special.

Concentrating on the stories that adhere to the pattern it is interesting to note that one aspect of the stories that differs slightly across the length of the country is that in some areas the pursuit of the women by the man is missing. This is especially clear in the stories from Arnhem Land and other regions in the tropics, where the data suggests that the man (or men) live in harmony with the women. In the south and central regions of the country the man of Orion is more commonly found in pursuit of the women, who are always trying to escape his advances. As with all the astronomy data, the largest number of stories comes from the southern areas, predominantly the southeast communities and those on the Murray-Darling River system. Due to the sheer number of accounts it is not feasible to discuss every single one, so the discussion here is limited to some of the more interesting ones, and those which offer a special insight into Aboriginal astronomy.

4.5.1. South

From the southeast area it was recorded that the Pleiades were responsible for heat, not the Sun, and there are also several accounts which suggested that the Pleiades produced the frost. Manning stated that it was the Pleiades position in the sky which determined the heat of the day, when they are just a little over the horizon it is spring, when they are at their highest position it is summer, when they set again it is autumn and when they cannot be seen it is winter (record 146) (Manning 1882). Although this story was copied by other authors, there may not be any truth in it; there is no reason to assume that any community in Australia had exactly the same seasons defined by the Western calendar and no other supporting data has been found. There are however, several stories which suggest the Pleiades are responsible for making the frost. These stories were recorded over a surprisingly large area of Australia, the first record of this was made by Strehlow while he was working with the Arrernte (Strehlow 1907). The Pleiades were seven sisters who lived at the place of ice and frost, they were responsible for overseeing an important initiation ritual, the timing of which Strehlow suggested was determined by the position of the Pleiades in the sky (record 251). Mountford recorded in the Flinders Range that the women of the Pleiades set about an hour before the men of Orion because they had to go and prepare the camp before the men arrived (record 147) (Mountford 1939). At a particular time of year the Pleiades can be seen at

sunrise for a short time, and this time coincided with a frost, so it is thought that the Pleiades were responsible for making the frost. Langloh Parker recorded that the Pleiades were a group of ice maidens who escaped the attentions of a man (not Orion) and they dropped ice on the ground periodically, creating the frost (records 194 and 195) (Langloh Parker 1905). The other two accounts of the association between the Pleiades and the frost were recorded from somewhere around the Brisbane area. The Pleiades are seven sisters who were taking a bath and splashing water over the side, which fell to Earth as a frost (records 332 and 428). One story recorded in the southeast area suggested that the Pleiades were responsible for the changing seasons, they went away to the west for a time and brought the winter and frost back with them, they stayed for a while and then took the cold weather away again (record 309) (Mathews 1899). From this small group of stories it can be seen that the positions of certain constellations in the sky were important and that they were often used as seasonal markers.

Bates recorded a very detailed story from the Wiilman community about the constellations of Orion and the Pleiades (Bates 1904-1912). Orion was a hunter of women, who was kept away from the sisters of the Pleiades by their older sister, thought to be the bull's head of Taurus (record 446). Orion is described as wearing a feathered headdress, a string belt (the stars of Orion's Belt) and whitened tassel (Orion's Sword) and having a red ochred body. The older sister throws out fire from her body and moves towards Orion, as she moves towards him she lifts her left foot and frightens him so much that the red magic of his arm and body becomes faint for a while. The magic comes back eventually and the sister asks for help from her family, all of the surrounding stars laugh at Orion and the redback spider (Rigel) is ready to bite Orion. There is more detail in the story than is repeated here, but one important aspect of this is the recognition of the variable star Betelgeuse. Betelgeuse is located at the shoulder of the torso, it is easily observable as a red variable star. Betelgeuse is one of the brightest stars in the sky and variable over a period of about four years. If this story is accurate this community must have been observing this star closely over a long period of time in order to understand its variability. This is also one of the very few stories which includes a spider in the sky, although the data is a little contradictory. A redback spider is partially red and one would assume that it would be associated with a red coloured star in the sky, but Rigel is slightly blue. Some of the data that Bates recorded is a little unreliable but this story about Orion and the Pleiades has so much detail that it demonstrates what meticulous observers of the night sky Aboriginal people are.

4.5.2. Central

Most of the stories regarding Orion and or the Pleiades have some element of a chase in them, but this is not comprehensive throughout Australia. There are more stories from the northern and southern areas of the country where this element is missing than where it is present. In the central desert regions it is found in most of the stories, but this bias may be due to the inconsistencies of the ethnographic record, and the limited number of people who have worked in the central area. In general in the southern regions, there is no relation between Orion and the Pleiades, they are often not involved in the same story, and although the Pleiades are sometimes being chased it is not always by the stars of Orion. Some stories state that all the stars in this area of the sky are related and are all living in harmony with one another. The situation in the central desert is quite the opposite, the bulk of the accounts from this area suggest that the stars of the Pleiades are constantly being chased or are under attack by the stars of Orion. The majority of the stories that describe this chase, however, were recorded by Mountford or are a copy of his work and all contain very similar elements (see records 138 to 143) (Mountford 1976). The stories recorded about Orion and the Pleiades by Maegraith from the Arrernte and Luritja communities do not fit in with this pattern. He says the Pleiades are tracks of uninitiated girls and that Orion is made up of a group of old men and a group of old women, the two are not thought to be associated in any way (records 127 and 128). Maegraith states that these constellations remained below the horizon during his stay at Hermannsburg and that the information he recorded is less reliable because of this (Maegraith 1932, 23).



Figure 8: Images of “pitis”; women’s carrying bowls, created by Margaret Dagg and Nyupaya Kaika. Each of the pitis (a, b and c) has been covered with designs relating to the Pleiades/Seven Sisters Dreaming in the Pitjantjatjara (central desert) area, the u-shapes are the sisters, and the u-shapes with the spears are Wati-Nyiru, the man chasing the sisters.

Images taken at the National Museum of Australia, Canberra.

4.5.3. North

In the northern zone only one of the stories describes a chase between Orion and the Pleiades (see records 6, 18, 24 and 410) (Mountford 1956, 1958)³. See Figure 9a. The only story involving the chase element was recorded in the Tiwi Islands, where Orion is a pack of dingoes constantly chasing a group of wallabies, represented by the Pleiades. Mountford only records the briefest of stories here, but it contrasts in two respects to the stories recorded on the neighbouring mainland. Firstly the stars of these constellations are seen as animals rather than people, which in itself is unusual, but they are also involved in a chase, an element which is found in no other stories in the north. Although the data recorded from the Tiwi Islands is grouped together with the neighbouring communities on the mainland, it is clear that the astronomy of these two locations is vastly different and perhaps should not be compared. In contrast to the chase stories from the central desert, the main theme in the

³ See also Mountford, 1948, 639, which includes details of a story about Orion and the Pleiades, but cannot be reproduced here due to access and copyright restrictions on the material.

tales from the top end is that of the constellations living in harmony. Several stories suggest that Orion and the Pleiades are married and are travelling across the Milky Way sea/river in a canoe filled with the fish they have caught. The stars involved in these constellations cover a large area of the night sky but are more prominent during the wet season when canoes are more likely to be used for travel (see record 18 for example). See Figure 9b. It is possible that this idea of Orion and the Pleiades travelling in a canoe was created to fit in with the travel requirements during the time of year that these stars were visible. If so, it suggests that not only was the seasonal motion of the sky noticed, but this was also related to the changing landscape during the course of the year. It has also been suggested that this story was used as a warning not to go fishing when bad weather was imminent (see record 24) (Haynes 1992, 137). There are several records from the northern areas of Australia where the characters are travelling in a canoe, Roth recorded that Orion was a man crossing the sea with a group of girls, the Pleiades, in a canoe (record 421) (Roth 1903). The only two stories that exist from the Torres Strait Islands both mention the characters travelling in a canoe and it is clear that this dependence on this method of travel in this area has translated into the sky (records 95 and 237).



Figure 9: A bark painting of Orion and the Pleiades (record 6) (a) and an image of constellations of Orion and the Pleiades traveling in the canoe (record 18) (b).

Source: Mountford 1956, pages 480 and 494 respectively.

4.5.4. Other Accounts

The stories not conforming to the Orion/male and Pleiades/female pattern are found throughout Australia, and are certainly not confined to one region. These stories are from some of the most reliable ethnographers and authors on the subject, Dawson, Tindale, Mountford, Ridley and Spencer and Gillen all have differing stories about the constellations of Orion and the Pleiades. Dawson recorded several detailed stories about Orion and the Pleiades from the Gunditjmarra but there is only one which fits the pattern (Dawson 1881). One story says that the Pleiades are a “queen” and her six attendants, the star Canopus fell in love with the queen and ran away with her, since then there has only been six stars in the Pleiades (record 74). Although this is from a reliable source, one has to question the use of the term “queen”; Aboriginal communities are not thought to have had such a concept, which possibly places doubt on the validity of the story. In the text Dawson gives the name of the queen as “Gneeanggar” and Sirius as “Gneeangar” (Dawson 1881, 100). It could be assumed that this was just a mistake and that the queen is Sirius, but he does not make this connection in his work. Dawson also recorded that the three stars of Orion’s belt are the sisters of Sirius (record 75) and the Pleiades are a group of cockatoos (record 73). There are several accounts where constellations are thought to be birds, but making the stars of Orion female is quite unusual. There are no other stories from any region in Australia where these stars are female, either they are given no gender or they are male. The story states that the three stars of Orion’s belt are the sisters of Sirius and always follow him. This point cannot be true, however, Orion is seen in the sky being followed by Sirius, not the other way round. As two aspects of this story do not seem to be correct, perhaps Dawson made a mistake when he was recording this and is referring to some other stars.

Other stories that do not conform to the generalisations are as follows; Ridley suggested that the Pleiades were thought of as a bees nest (record 171), Bates was told Orion was a red-tailed black cockatoo (record 480), and Mountford stated that the Pleiades were a group of mythical beings who were blown into the sky after being eaten by a large snake (record 514) (Bates 1904-1912; Mountford 1937-1942; Ridley 1873a). All of these accounts were recorded in the southern zone. In the central zone Tindale suggested that the Pleiades were a group of white ants or termites (record 491) and Spencer and Gillen were told that Orion was an emu (record 184) (Spencer and Gillen 1927; Tindale 1930).

John Bradley recently recorded a story that probably provides one of the greatest insights into Aboriginal astronomy while he was working with the Yanyuwa people in the Gulf area of the Northern Territory (Bradley 1997). In his thesis Bradley published the results of nearly 20 years fieldwork with the community, the data provided an exceptional examination of the complexities of the Aboriginal worldview. One small aspect of his work related to the astronomy of the community; he recorded a story about the Pleiades (record 328). The Pleiades are responsible for the environment and are used as a seasonal indicator. A particular species of octopus (the blue-ringed octopus) is their physical counterpart, and when they sink to the sea during the day to look for fish the octopus is their body. When the octopus is provoked it shows glowing blue rings on its body which are the stars.



Figure 10: Image of the Blue-ringed octopus (genus – Hapalochlaena).

Source: <http://helium.vancouver.wsu.edu/~lindblad/blueringedoctopus.html> (website accessed 7th April 2008)

One could presume from this account that the community thought there were eight stars of the Pleiades rather than seven because of the eight legs of the octopus, but there may be other facts affecting this story. The blue-ringed octopus is one of the most poisonous animals in the world, so it is interesting that this community would associate this animal with the Pleiades who are responsible for looking after the environment. Perhaps the most fascinating aspect of this detailed story is the suggestion that the Pleiades have an earthly counterpart and that, in fact, their counterpart is found in the sea. The Yanyuwa live along the coast and the sea is a central part of their world, and this story suggests that the sky and the sea are seen as one, or at least they are a direct reflection of one another. There are many other accounts where certain features on Earth are thought to be a representation of the sky, but this single story by Bradley is proof that in Aboriginal cosmology the land, sea and sky are all equal and integral parts of their complete environment. As such, the significance of

this story cannot be over-estimated, but one must realise that this insight can only be gained as a result of such dedicated and long lasting connections with a community.

There are a significant number of stories where the constellations of Orion and the Pleiades are mentioned but are not necessarily the main characters. Most stories have these constellations conforming to the established gender dichotomy but, as ever, there are some anomalies. In the southeast myths have been recorded where the Pleiades are being chased by the Moon, Aldebaran (α Tau) and Canopus (α Car); in the Gulf area they are being pursued by the Pointers (α and β Cen) (records 369, 309, 74 and 508). As a generalisation it may be noted that there are a significant number of stories which place an association between the Pleiades and the Moon, specifically the stories often say that the male Moon is chasing the female Pleiades (see for example records 301, 369, 427, 495 and 505). Although the Pleiades lie close to the ecliptic (the path along the sky which the Sun, Moon and planets travel), the Moon would not always be in pursuit of the Pleiades, due to its motion during the course of the month. Both Tindale and Bates recorded several stories from the desert and southwest areas respectively where Orion and the Pleiades were involved with other stars and objects in the sky, and although the stories contain a lot of information there is very little analysis that can be done with this data as they are unique stories and do not strictly fit into one category.

One aspect of the Pleiades stories that has not been discussed is that of the number of stories which specifically state that the Pleiades are thought of as a group of seven stars. Although not immediately important it does have some significant implications. Some of the earlier sources only recorded that the Pleiades were seen as a “group” of stars (see for example Stanbridge and Dawson, records 43 and 73), but other sources specifically recorded that there were seven sisters (for example Mountford, Langloh Parker and Spencer). Recent research into Aboriginal eyesight has shown that it is substantially better than average Western eyesight, which means that it may have been possible for them to identify more than the seven stars that conventionally make up the Pleiades (Taylor 1981). However, the majority of the myths say that the Pleiades are a group, a couple suggest that there were originally seven (or in one case eight) stars but that one was lost (became faint) because she was attacked by a man, or because she married someone of the wrong marriage class (see records 142, 290, 301 and 376). It may be assumed that some of these stories were heavily influenced by Western astronomy and hence are not as accurate as originally thought. These

stories show how small discrepancies in the data demonstrate how quickly the colonial influence spread and how widespread this effect was.

4.5.5. Summary

The data regarding the constellations of Orion and the Pleiades are some of the most comprehensive myths found in Aboriginal astronomy. The number of stories which relate to these two sets of stars shows how important they were in communities throughout Australia, possibly because they were visible throughout most of the year in many areas. Those locations where they did rise and set they were used as indicators of the changing weather and seasons. It has been shown that the chase element, thought to be found in every area is missing in several regions, and further that in the north of the country these constellations are often living in harmony as a married couple. The three environmental zones have very different interpretations and do not suggest that there was ever a pan-Australian theme regarding Orion and the Pleiades, other than the broadest gender conventions. Despite these differences, the breadth of knowledge and the insights into their astronomy that is provided by these myths is exceptional.

4.6. The Southern Cross, the Pointers and the Coal Sack

One of the most prominent Western constellations visible in the southern night sky is that of the Southern Cross. In the absence of a southern polar star, this small group of bright stars provides a significant marker in this region. What makes this region even more special is the presence of one of the darkest nebula in the Milky Way, the Coal Sack, which lies just next to the Southern Cross. Often connected with these objects are the Pointers, α and β Cen. α Cen is the fourth brightest star in the sky, and with β Cen they provide a notable indicator to the Southern Cross and the South Pole. This group of stars has a special place in Aboriginal astronomy and were noted in many communities. Often the stories connected the Southern Cross, the Pointers, the Coal Sack and the Milky Way, so the myths can be quite interwoven and difficult to interpret individually. The first section of this analysis will look at the myths about the stars of the Southern Cross, followed by those where there is a link to neighbouring objects in the night sky.

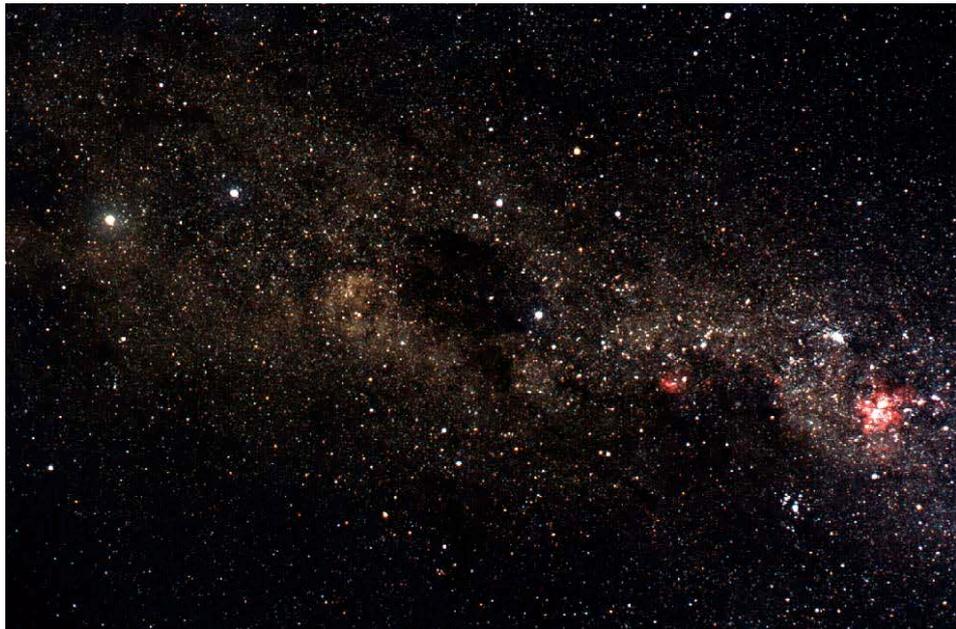


Figure 11: Image showing the Southern Cross, the Pointers and the Coal Sack. The Southern Cross is made up of the four stars above and to the left of the central dark space, which is the Coal Sack.

Source: <http://www.sas.org.au/Greg%20Bock/Southern%20Cross%20of%20March%201996.JPG> (website accessed 7th April 2008)

4.6.1. South

In the southern temperate areas the stories which focus on the stars of the Southern Cross, mostly state that they are a family group. Rankine published a story about three stars of the Southern Cross, in the Ngarrindjeri area, located in coastal southeast South Australia, these stars were a man and his two wives (record 307) (Rankine 1969). The man originally lived with just one of his wives, but saw another woman he desired to take away from her husband. One night he took her away and the three of them lived together for a long time. Eventually the other husband of the woman came after them, the three escaped but the man kept gaining on them. The women could not travel very fast and the man knew they could not escape him on land, so he tied a rope to the end of a spear and threw it up into the sky, where the three of them fled. They are now seen as the three bright stars of the Southern Cross. The fourth star of the cross could be the other man, which would imply he had caught the other three, but Rankine discusses this point no further. Hassell recorded the only other story with any detail in 1934 from the Wiilman community in the far southwest corner of Western Australia (Hassell 1934). In this story the stars of the Southern Cross are a group of young girls (record 384). The girls had been travelling with their family for a long time, finally deciding to stop and camp, the girls were sent to collect some water. The girls got the water but did not go straight back to the camp, and instead stopped to play and wasted all the water. The rest of the family became worried and the men went out to look for them, when they found the girls playing they were very angry and tried to spear the girls in the leg. The girls ran away and only escaped the men because a gust of wind came and swept them up into the sky, the men threw spears after them but the girls scattered to avoid them. The girls became the stars of the Southern Cross and are now used as a reminder to other girls that they should not loiter and play when they have jobs to do. It is also thought that because the girls are so far apart they can never find a man and get married. The small number of stories that were recorded by Hassell from southwest Western Australia show an immense insight into the Aboriginal world in an area that was neglected by other ethnographers.

Langloh Parker recorded that the four stars of the Southern Cross were two pairs of eyes, one of the spirit of death and the other of the first man to die (record 412) (Langloh Parker 1954). The man died after there was a drought on Earth; as he lay dying in front of a Yaraan (white gum) tree a black figure with two fiery eyes came and picked the man up and dropped him into the hollow centre of the tree. The tree was lifted into the sky and went towards the

South Pole; two yellow crested white cockatoos flew after the tree. The tree stopped somewhere near the Milky Way with the cockatoos still following it. Gradually the tree faded out of sight but the two pairs of eyes can still be seen shining out brightly. The story contains a great level of detail but it is difficult to interpret any kind of meaning from it. Bates recorded three stories from the Southwest area about the Southern Cross but they do not seem to follow any kind of convention and display no pattern at all. One story says that the Southern Cross is a man who broke the ladder between the Earth and the sky, another says that they are mother and daughter, and a third suggests that the Southern Cross stars are men who never ate meat, only vegetables (records 467, 453 and 461 respectively). Other brief accounts have been recorded but they often have no depth and are simply just a statement of the story. One such story says that in the Wiradjuri area in central New South Wales the Southern Cross was a man who had caught three fish on a spear (record 242), and Dawson recorded that the Gunditjmarra thought that these stars were a knot or tie (record 77) (Dawson 1881; Kable-Erambie 1900). Mountford also recorded two accounts from the Flinders Ranges while he conducted fieldwork, although neither version was ever published (Mountford 1937-1942). At one stage Mountford says that the Southern Cross is thought of as an emu's foot, but he later says that it is an eagle's foot (records 517 and 524). There are several accounts from the central desert region, that say the Southern Cross is an eagle's foot, so one may justifiably assume that Mountford simply made a mistake in his notes, which he may have corrected himself had he ever published the data.

4.6.2. Central

A number of ethnographers who worked in the central desert region in Australia recorded that the Southern Cross was thought of as an eagle's foot. Strehlow was the first to publish this data (record 255) but Basedow, Maegraith, Tindale and Mountford also recorded similar myths (Basedow 1925; Maegraith 1932; Mountford 1976; Strehlow 1907; Tindale 1930, 1935a). Mountford collected further data on this point as he was told that the Pointers were the eagle's throwing stick and the Coal Sack was his nest (record 133). He was also informed that the false cross (made up of δ , ϵ , ι and κ Car) was the foot of a kite hawk and π and σ Car represented the bird's throwing stick (record 134). The hawk originally had a larger throwing stick but it was stolen by the eagle and he is now only able to catch smaller prey. Mountford says that all the other fainter stars in this region are where the birds had once killed their prey. This interpretation demonstrates how the connections were made

between the constellations; the Southern Cross, the Pointers and their false counterparts are clearly an important part of astronomy in this region. Bates recorded a similar account, where the Southern Cross was the eagle's foot and the Pointers were the bird's club when she was in Ooldea, in far southwest Southern Australia (record 473). The data Maegraith recorded was slightly different, he states that it was γ and δ Cru and γ and δ Cen that were thought of as the eagle. He says that no one particular star is thought to be a specific part of the bird; the four together represent the bird as a whole. In conjunction with this he said that α and β Cru and α Cen were a small family, mother, father and child, respectively. Maegraith suggested these two Aboriginal constellations were constructed this way because of the division of the sky by the Milky Way into Arrernte and Luritja sides. The data from the desert regions displays a strong coherence and similarity, the eagle (probably the wedge tailed eagle, *Aquila audax*) is found in most of the desert regions and an image of a footprint of an eagle shows how similar this is to a cross. Maegraith suggested that none of the stars in the sky were thought of as creatures or people, they were just the footprints or indentations made on the land, and these were reflected in the night sky. It is an interesting concept and certainly the stories about the Southern Cross from these few authors go a long way to confirming this point.



Figure 12: Images showing the configuration of the stars of the Southern Cross (a) and an emu footprint (b).

Source: http://www.artistwd.com/joyzine/australia/dreaming/first_man.php and
http://www.travelpost.com/PO/Australia/Western_Australia/Cervantes/4906622 (both websites accessed 7th April 2008)

4.6.3. North

There are only a handful of stories that have been recorded from the northern zone about the Southern Cross constellation, and it was Mountford who published the majority of them in 1956 (Mountford 1956). In Yirrkalla it is thought that the stars of the Southern Cross are a stingray, which is being chased by a shark, the Pointers (record 22).

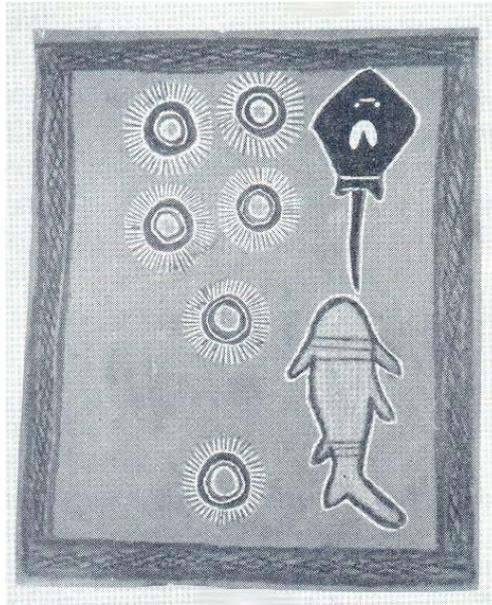


Figure 13: Bark painting showing the Southern Cross as a stingray and the Pointers as a shark.

Source: Mountford, 1956, 494.

In Groote Eylandt he was told an entirely different story that connected the four stars of the Southern Cross, the Pointers and the Coal Sack (record 9). See Figure 14a. The Coal Sack was a large fish that was dragged up onto the bank by two brothers and cooked on their fires. Mountford suggested that the difference between these two myths from communities that are less than 120 miles apart was because of their lack of social contact. Mountford also recorded two different stories while he was working in Oenpelli, one said that the stars of the Southern Cross were the eyes of two men, who had caught and eaten a large snake (record 13). See Figure 14b. Once the men had eaten the snake their eyes became so bright that even the people on Earth could see them, the fainter nearby stars are the sons of these two men. From the same community he also recorded that the Southern Cross, the Pointers and other surrounding stars were two men and their families, who live exclusively on the water lily bulbs they collect from the Milky Way (record 14). The stories are similar but significance of the snake is not explained nor why this would make the men's eyes bright. Only one other story exists from the tropical northern area of Australia, Palmer stated that

the home of the dead was amongst the stars (Palmer 1885). Spirits of the dead were thought to access this world by climbing a ladder by way of the Southern Cross (record 315). In comparison with the desert and temperate regions of Australia there are relatively few stories from the north about the Southern Cross. This is a stark contrast to the desert areas where the Southern Cross is quite a strong feature of their astronomy. This may have been due to the position of this constellation, the further north one goes in Australia, the lower down in the sky the Southern Cross would appear. Perhaps the vegetation and the low altitude of this constellation meant that it was of less importance in the tropics than in the desert and other regions further south where it is a circumpolar constellation.

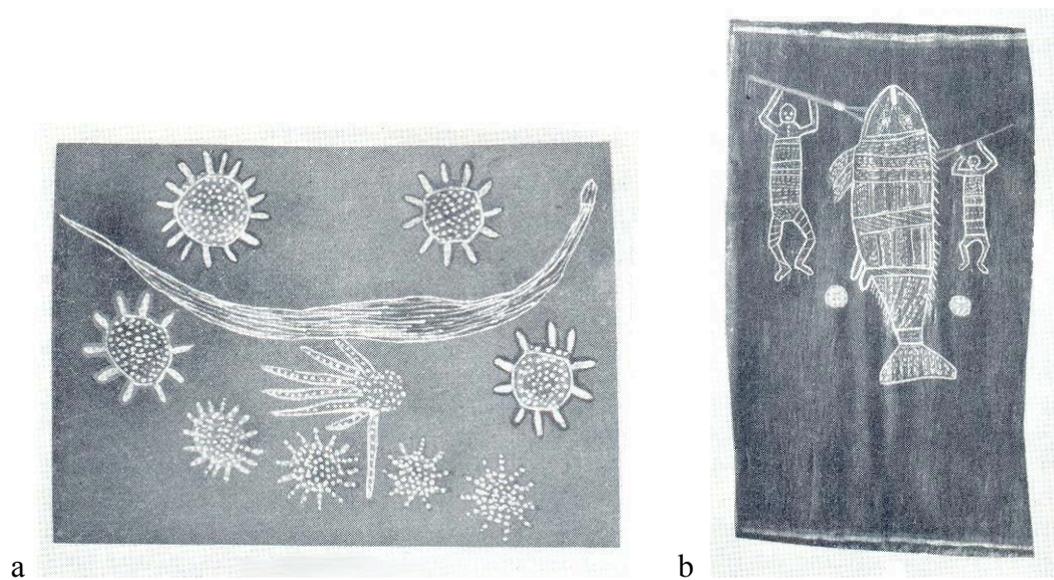


Figure 14: Bark paintings showing the Southern Cross from Oenpelli (record 13) (a) and Groote Eylandt (record 9) (b).

Source: Mountford, 1956, 486.

4.6.4. The Pointers

The southern Pointers, α and β Cen, are two very bright stars which are used as an indicator to the South Pole. Most of the myths about these two stars from Australia associate them with other neighbouring stars, most commonly with the Southern Cross and the Coal Sack. Ridley and Mathew both recorded a story from the Riverine area about the two Pointer stars (Mathew 1928; Ridley 1873a). Ridley states that the Pointers were two birds that saved a buzzard community that lived on the Murray River from an old cannibal bird. The two birds went up into the sky once they had killed the cannibal and became the Pointers (record 282). Mathew recorded that the Pointers were two brothers who were savage and killed both men

and animals. They once killed a large spider, which was as big as a bull by beating the ground to force it out of the hole it lived in (record 262). From the Flinders Ranges Mountford recorded that the Pointers were two young boys who had recently been initiated (record 515). The boys were out hunting, they caught a kangaroo and then an emu, which they were carrying with them, but the flies were a problem so they lit a fire. The fire quickly got out of the control and the boys were forced to climb up a cliff. They got to the top of the cliff but the flames still surrounded them, the only way for them to escape was to go up into the sky, where they became the Pointers. The limited data displays no real coherence and there is relatively little value to be gained by trying to obtain conclusions from such varied information.

4.6.5. The Coal Sack

The one aspect of Aboriginal astronomy that seems to be known throughout the world is that the Coal Sack was thought of as an emu or as the head of an emu. This dark nebula in an otherwise bright region of the Milky Way is an eye-catching feature and is often part of mythology in Southern hemisphere cultures. From some of the recent publications about Aboriginal astronomy it would appear as if every community throughout Australia believed that the Coal Sack was an emu but the evidence provided here does not confirm this. In fact this belief was only found in stories about the Coal Sack from the Southern and Central zones, where the majority of the data has been collected. Rather than exhibiting any kind of coherence throughout Australia the myths suggest that there were many diverse beliefs, which show a link between their environmental surroundings and their astronomy. The majority of the stories do indeed suggest that this object in the sky was thought of as an emu, or in some areas as the head of an emu. By looking closer, however, it becomes clear that in general the stories from the northern zone diverge from this pattern. There is not enough data on this point to prove it, however, but only one story from the tropical zone connects the Coal Sack and the emu. An account was published by Basedow in 1925, where he says that the Larrakia, the community from the area surrounding Darwin, thought that the Coal Sack was the head of an emu (Basedow 1925). A small star in the Southern Cross is the eye of the bird, the neck passes between the two pointers and the body extends into other dark spaces stretching down to Scorpius (record 359). Although Basedow's work provided a wealth of information about Aboriginal people in general, it is perhaps too much of a broad account to be of any use here. It is unlikely that Basedow collected all of his material himself and

certainly the far north of the country would have been out of his scope. One only places doubt on this account because it is the only one from this area which suggests that this myth extended to the north of Australia, while other myths from this location state that the Coal Sack is thought of as a giant plum tree, a crow or a spirit guide (records 11, 86 and 225). There is one other record, from the Gulf area of northern Australia, which indicates that two of the “dark spaces near to the Southern Cross” were thought to be an emu (record 321). The account is not specific, and there is no certainty that this relates to the Coal Sack, but the other evidence suggests that this is most likely.

There is only one anomaly to the Coal Sack/emu generalisation in the Southeast region. This was recorded by Dawson, who says that the Coal Sack was thought of as either a monstrous animal, a Bunyip, or as a dark waterhole (record 66). All other records from the south of the country say that the Coal Sack was an emu, and the one record from the desert areas also says that it is an emu. Perhaps this is the one aspect of Aboriginal astronomy that is more of a widespread concept than any others. There is some resemblance between the image in the sky and the bird itself, and emus are found throughout most of Australia so one can see why this might have been a straightforward connection. As with the Southern Cross stories, in the far north of the country the Coal Sack would never have risen very high in the sky and the emu is not especially common in this area, so these two reasons might account for the lack of stories connecting the Coal Sack and the emu in the northern zone.

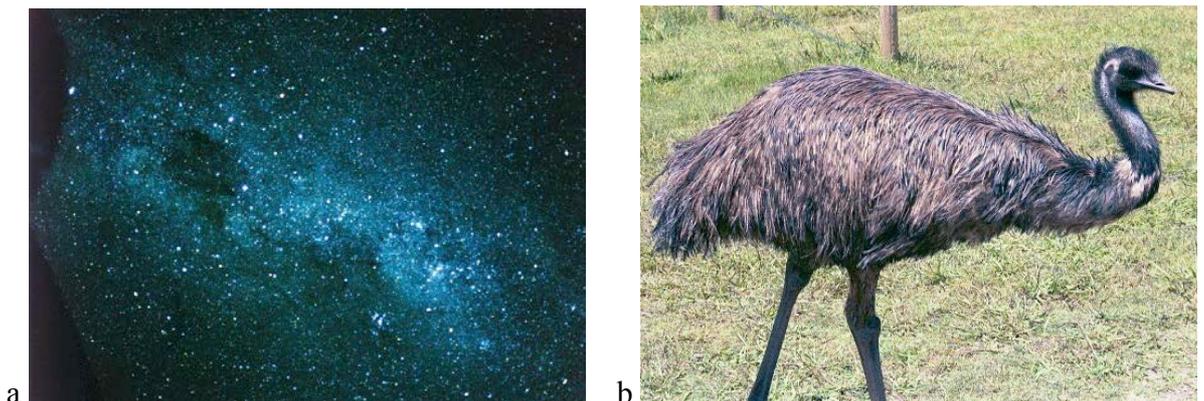


Figure 15: Images showing the Coal Sack and surrounding area (a) and a photo of an emu (b).

Source: <http://heritage.stsci.edu/2002/19/bio/photos/full/Crux+CoalSack+MilkyWay+Carinae.jpg> (website accessed 27th September 2007) and the emu photo is the authors own.

In some communities the Southern Cross, the Pointers and the Coal Sack were involved in the same mythical story. Stanbridge was the first to record an account of this group, he said

that the Coal Sack was Tchingal, the emu, which chased Bunya, the possum represented by α Cru, up a tree (records 37, 38 and 39). The emu was eventually killed by two brothers, the Pointers, who spear him, the stars on the eastern side of the Coal Sack are the spears that have killed him. Ridley says that the Kamilaroi thought that the Coal Sack was an emu sitting underneath a ti-tree shrub, the Southern Cross, and the two Pointers are cockatoos (record 160) (Ridley 1873b). In the Spencer area Mountford recorded that the Pointers were the eyes of two snakes who had eaten people, and the Coal Sack was the waterhole that belonged to the two snakes (record 518). It is interesting that Mountford states that the Coal Sack is not an emu in this area, but instead it is a waterhole, which is also what Dawson said. Bates was informed that the Pointers were an uncle and nephew, the Southern Cross was mother and daughter and the Coal Sack was a native shovel (record 453), she recorded this data somewhere in the Southwest but she has not specified the location, although it is clear that this does not follow any of the established patterns. The only other account not previously mentioned is one that was recorded by Tindale in 1930 in Alyawarre in the central desert, he says that the Southern Cross is an eagle's foot, and the eagle is a man whose son is the Coal Sack. This boy has no mother and came out of his father's armpit, but the father eventually kills the son (record 488).

4.6.6. Summary

The stories about the Southern Cross, Coal Sack and Pointers form a relatively cohesive group, especially those from the southern and central zones. Although there are discrepancies the data does appear to conform to a regular pattern in that the stories from the central zone say that the Southern Cross is a foot, and in the south the Coal Sack is an emu. There are no areas where both the Southern Cross is an eagle foot and the Coal Sack is an emu, Basedow gives the two stories in his publication but acknowledges that they are from different locations, see records 359 and 361 (Basedow 1925). In the central regions where the Southern Cross is a footprint this can be associated with the way people live in this area and how they interpret and read the landscape using footprints and markings on the ground. As with some of the other groups of data, the set of stories from the north of the country do not appear to relate to those from the central and southern regions. In this particular case it may be because the stars in these constellations are not circumpolar in the top end of Australia. For several months of the year they are below the horizon and the evidence appears to show that the stars which are not visible all year round are less important than

those which can be seen every night. In general in the south of the country the Coal Sack is an evil or malevolent feature in the sky, whereas in the north it has a much more positive image. This is perhaps a reflection on the kind of lifestyles or cultures in these two areas or it could be connected with whether or not it was a circumpolar object. Perhaps in the northern regions it signalled the end of the dry or wet season so was seen as something more positive, whereas in the south it was always in the sky, so did not ever herald something new. There are many detailed stories about these objects in the night sky and they were clearly an important part of the Aboriginal night sky.

4.7. The Milky Way

The Milky Way is the galaxy in which we live, it can be seen as a band of light across the night sky and in the southern hemisphere it appears as a distinct feature that runs from one side of the sky to the other. Observers on Earth see the Milky Way as a hazy band of white light interspersed with dark areas: the light comes from all the stars that make up our galaxy, the darker areas are nebulae which reduce the amount of light that reaches Earth from the Milky Way and therefore make it appear dark. One of the most notable dark nebulae is the Coal Sack nebula, which lies very close to the Southern Cross and they are often found in the same myths and stories (see the section 4.6). The Milky Way itself extends over a very large region of the sky and for this reason it is rarely thought of as a character in a story. The stories about the Milky Way often fall into two categories, either the account describes the light parts of the Milky Way, which is what conventional astronomers think of when referring to this feature, or they describe the dark areas, which are often not named in Western astronomy. The most common Aboriginal interpretation of the Milky Way is that it is a river in the sky, thus emphasising the idea that what is found on Earth is also found in the sky. There are also several accounts which suggest that the dark areas were thought of as patches of dark grass or monsters that lived in the Milky Way river.



Figure 16: Composite image of the Milky Way

Source: http://www.southernskyphoto.com/milky_way/milky_way_mosaic.htm (website accessed 7th April 2008)

4.7.1. South

In the southern temperate zone Teichelmann, Ridley, Kable-Erambie, Bates, Howitt, Langloh Parker and Mountford all recorded that the Milky Way was a river (Bates 1904-1912; Cawthorne 1927; Howitt 1904; Kable-Erambie 1900; Mountford 1937-1942; Langloh Parker 1905; Ridley 1873a; Teichelmann 1841). Within each of these accounts there are further descriptions as to what each of the communities thought about the Milky Way; for example, Ridley recorded that the river was full of food, whereas Teichelmann stated that the dark spaces in the river were where monsters lived (records 159 and 312). Some of these accounts are very simple descriptions, just stating that the Milky Way had the same name as the local river, or was called night creek, indicating that it was the river that appeared at night (records 544 and 525). There are some accounts which just describe what the dark spaces were thought to be, suggesting that the emphasis was placed on the dark nebula of the Milky Way rather than the light parts. Ridley stated that one large dark area was a demon, and Radcliffe-Brown suggested that the dark areas were thought of as the Rainbow Serpent or an ancestor of the Rainbow Serpent (records 165, 154 and 155) (Radcliffe-Brown 1926; Ridley 1873a). The Rainbow Serpent is an important part of Aboriginal mythology and in some areas it was responsible for the creation and shaping of the land, it was also seen as both a benevolent protector and as a malevolent attacker of people. The Rainbow Serpent had many different roles, but it is rarely found in stories about the night sky, its association with rainbows means it was often connected with the daytime rather than the night.

Stanbridge's data does not follow this pattern as the Boorong thought the Milky Way was smoke from the fires of the ancestral beings who lived in the sky. He was also told that only part of the Milky Way was smoke and the other part of it was two snakes which made the Murray River (record 42). There are no other accounts from this area which suggest that the Milky Way is thought of as smoke and no copies have been made of this data from Stanbridge either. As one of the earliest accounts of Aboriginal astronomy the work published by Stanbridge has often been cited and copied by other authors, but this aspect of his work seems to be one that has been overlooked. This might be because of the large amount of contrasting information stating that the Milky Way was a river. There is only one other account from the southern temperate regions that says the Milky Way is anything other than a river, recorded in 1989 by Roberts, the story states that the Milky Way is a canoe

(Roberts and Roberts 1989). One of the spirit ancestors from the Ngarrindjeri area was searching for his wives on land and realised he would no longer need his canoe, which he was fond of and did not want to throw away. He saw a dark area in the sky where no stars shone, so he put the canoe up in the sky and there are now many stars in this area of the sky (record 299). In comparison to other data, this has been recorded only recently and perhaps is not quite as biased as some of the more historic accounts.

Of all of the data that has been collected as part of this research, only five original records were found to exist from Tasmania. Very little evidence was collected from this island in the early years of occupancy and within a very short amount of time all indigenous Tasmanians had been killed and their knowledge lost. The only useable data from this island was collected by G. A. Robinson, later quoted by Plomley (Robinson and Plomley 1966). Robinson collected the data between 1829 and 1834, making it one of the earliest references about Aboriginal astronomy. Robinson recorded that the dark and light streaks of the Milky Way were thought of separately, he says that the light areas were roads with someone walking along them towards the sea (record 230). He later suggests that one of the dark areas in the Milky Way is a stingaree (a type of fish) and there are men in the sky who are spearing it (record 232). Very little is known about the Tasmanian interpretation of the night sky, but these two small pieces of information suggest that there was a strong link between the sky, sea and land. As with other coastal areas in Australia, the sky may have been seen as a reflection of the sea.

4.7.2. Central

Tindale, Maegraith, Mountford, Howitt and Worms all recorded stories which stated that the Milky Way was a river or creek in the central zone (Howitt 1904; Maegraith 1932; Mountford 1976; Tindale 1930; Worms 1986). Tindale noted that the Milky Way river was not thought to divide the sky, just flow across it, whereas Maegraith and Mountford were both informed that it divided the sky in two (records 481, 114 and 129). Maegraith was told that the Milky Way divided the sky into the Arrernte and Luritja sections, the stars on either side are the camps of the two communities. The stars in the Milky Way are women from both communities. The Pitjantjatjara and Junkandjara groups informed Mountford that the Milky Way divided the sky into summer and winter sections. Although these desert communities had the same ideas about the division of the sky by the Milky Way, it was for

different reasons. One implies a cultural split between two communities while the other suggests that it was for an environmental or economic reason. Worms' account of the Walpiri interpretation of the Milky Way states that there is a connection between the Rainbow Snake and the Milky Way which is represented as the river in the sky (record 218) (Worms 1986). Worms says that this was also found in the Kimberleys, and as previously stated Radcliffe-Brown recorded a similar myth in the Riverine area, so the relationship between the Rainbow Snake and the Milky Way may exist over a wide area of Australia.

In contrast Strehlow recorded that the Arrernte did not think of the Milky Way as a river (Strehlow 1907). He was told that two bright but unidentified stars of the Milky Way were boys who were undergoing initiation, the ceremony had taken place and they had been given their ngapatjinbi (hair decorations made of wood and fur). All the women had been told to stay away but two girls betrothed to the boys appeared, picked up the two boys and carried them to the sky. The boys wanted to go back because they were afraid of the men but they could not. They remained in the Milky Way as bright stars and their ngapatjinbi are two dark areas of the Milky Way (record 252). Two further records from the central desert detail stories about the dark areas of the Milky Way, Tindale says that the line of dark areas seen along the length of the Milky Way were thought of as totem boards belonging to the Wati Kutjara, two men represented by Gemini (record 496) (Tindale 1935a). A story recorded in Papunya tells of how the emu was speared and banished to the sky, the description does not give any details as to what part of the Milky Way the emu is, but one can assume that it is the dark areas (record 289) (Ngitji 1979).

4.7.3. North

The data from the northern zone of Australia has the widest variety regarding the Milky Way, only a couple of stories suggest that our galaxy is seen as a river, the remaining stories appear to follow no pattern at all. Mountford is actually the only ethnographer who worked in this area who recorded that the Milky Way was a river (records 2, 10 and 16 and 23). The records Mountford collected from Groote Eylandt and Milingimbi the record simply states that the Milky Way is as a river filled with water lily bulbs and fish. It is the same in Oenpelli although there were no fish and the Coal Sack was a large plum tree. The plum tree provided food for all the people who lived in the sky at a particular time of year. The only record with any real detail that Mountford recorded from this area was from the Yirrkala

community. The belief here was that the Milky Way was a river upon which two brothers were fishing in a canoe (record 23). They had caught a large fish and were on their way home when they got caught in storm, their boat was capsized and they were both drowned. Their bodies were washed up on a pebbly beach and ants bit them all over trying to bring them back to life. The two brothers, their canoe and the fish are all dark areas in the Milky Way near to Scorpius, the beach, ants and the wake of the canoe are all small stars in or near the Milky Way. The detailed story offers a good description, but it is interesting that it was only one community out of the four where so much detail was found.

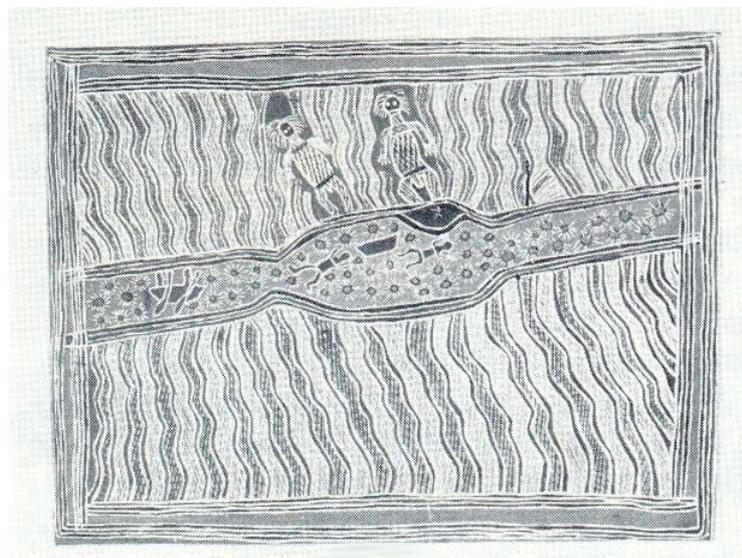


Figure 17: Bark painting of the Milky Way and the two brothers, who drowned in the storm, see record 23.

Source: Mountford 1956, 499

Several other accounts were recorded from Arnhem Land, sometimes with the detail that Mountford seems to have missed. Warner published two stories in 1937, both from the Yolngu area (which includes the Yirrkala and Milingimbi communities), but they are very different stories (Warner 1937). One version suggests that the Milky Way is a fishing net made by the native cat character as a ladder to reach the sky, the other that it is a sacred totem board that fell out of a tree causing a flood and was put back up into the sky by the crow (records 214 and 217). It is interesting that such a variety of stories can be recorded from one cultural group. In the second version it is possible that the totem board is the dark areas of the Milky Way rather than the light areas, but these two accounts are still dissimilar. Two other more recently recorded stories from the Arnhem Land area exist. Marshall does not specify the community, just saying it was from the Arnhem Land area; recorded in 1952,

it suggests that the Milky Way appeared in the sky after a famous songman was taken there by some flying foxes (Marshall and Ungunmerr 1952). The story does not indicate what the Milky Way is; it simply appeared after this man went into the sky (record 234). A story recorded by Hughes in the Arnhem Land area in 1969 gives very little detail about the Milky Way, the only interesting aspect of the story is that one of the characters is taken up into the sky against her will and is eventually successful in returning to Earth and to her family (record 292) (Hughes 1969).

One story about the night sky which Mountford recorded in the Tiwi Islands suggests that a group of caterpillar men became the Milky Way and their wives became the stars (see records 353 and 409 and Mountford 1954, 609). Each night the men travel the length of the Milky Way and visiting their wives as they go. Early in the evening the men rub their hands over their bodies to remove the dried perspiration, which falls to Earth landing on the eyelids of the people, making them heavy with sleep. Few other ethnographers worked in this area and there is a very small amount of information that exists, which makes the analysis of this information very difficult. Other stories about the Milky Way from the northern zone have been recorded from both the east and the west coasts. An early reference from the Gulf area suggests that the dark areas of the Milky Way were two very old men who were killed a long time ago at a ceremony (record 321). Howitt also recorded that on the northeast coast the Milky Way was the road along which the spirits of the dead travelled (record 543). Two stories from the Kimberley region record different descriptions of the Milky Way. Bates was informed that the dark areas of the Milky Way were a sacred totem board, which uninitiated men and women were not permitted to look at (record 448) and Hernandez suggested that the Milky Way was a group of good and bad spirits (record 272) (Bates 1904-1912; Hernandez 1961). The northern area of Australia exhibits no coherence between the stories about the Milky Way, a significant number of stories have been recorded from this area but there is no strong relationship between any of them.

4.7.4. Summary

The data from the south and central zones are at the most basic level, quite similar in that the Milky Way is a river, but the stories from the northern zone do not conform to this pattern. As with other objects of the night sky (see for example sections 4.6 and 4.8) it appears that the central and southern zones had more in common with each other than some of the

northern areas. This may be because of the recording bias or it may be due to the range of data that was available in the northern areas that was not found further south. Arnhem Land and the surrounding areas would have been able to support more people and therefore a wider range of cultures and it seems that this has been reflected in certain aspects of their astronomy. This, however, does not account for the south and central zones being so similar, one reason for this is perhaps something to do with the limited amount of early data that was recorded in these areas, but which was subsequently repeated many times. Because the stories were so commonly known it may be that later ethnographers were just recording a story that the Aboriginal people had been told about rather than one that belonged to them or it may have been a case of the Aboriginal people telling the researchers what they wanted to hear. The range of stories found in the top end of Australia is inversely proportional to the number of people working in the region, and the same is found in the south. This method of analysis makes it easy to see that the larger population density in the north of the country did support a wider range of stories about the night sky and astronomy. The one anomaly within this data set is that Mountford recorded that the Milky Way was thought of as a river in some northern areas. This may have just been one occasion where Mountford's own views influenced the data he was recorded.

4.8. The Magellanic Clouds

The Magellanic Clouds are conspicuous objects in the southern night sky looking like small sections of the Milky Way that have broken away, for this reason they are sometimes involved in the myths about the Milky Way in Aboriginal astronomy. Because they are such prominent features of the night sky many communities noted them, the majority of the accounts consider the two Magellanic Clouds together but there are a few where only one is mentioned. Often the two are related, either as husband and wife, or as brothers and sisters, or they are two birds of the same species. Their position in the sky, only a small distance away from the South Pole, means that they are not always visible from the northern areas of Australia. This may account for the lack of myths involving the Magellanic Clouds from this area. Of the 26 stories in the database over half of these are from the southern temperate regions, a few have been recorded from the central desert, but there are only two from the northern area of Australia.



Figure 18: Image of the Large and Small Magellanic Clouds

Source: http://www.southernskyphoto.com/southern_sky/lmc_smc.htm (website accessed 7th April 2008)

4.8.1. South

One common theme that seems to have been recorded by several ethnographers in the southern zone was that the Magellanic Clouds were thought of as two native companions or Brolgas (a species of sliver-grey crane now only found in north and north-east Australia, see Figure 19). The first account of this was recorded in 1857 by Stanbridge, who stated that the

larger Magellanic Cloud was a male Brolga and the smaller Magellanic Cloud was a female Brolga (record 41) (Stanbridge 1857). In various forms this was repeated, or a second original version of this was recorded, by Ridley, Dawson, Langloh Parker and Massola (Dawson 1881; Massola 1968; Langloh Parker 1905; Ridley 1873a). As previously mentioned, the areas covered by Stanbridge and Dawson were physically quite close and several of the stories have the same elements, so it is not surprising to find that the Boorong (Wergaia) and the Gunditjmarra had the same ideas about the Magellanic Clouds. What is slightly more surprising is that there are a further two accounts from an area in the northern part of New South Wales which are exactly the same. Ridley and Langloh Parker both recorded from the Kamilaroi that the Magellanic Clouds were Brolgas.



Figure 19: A Brolga

Source: authors own photo

Ridley only briefly mentions them, but Langloh Parker suggests that the Magellanic Clouds were mother and daughter (records 162 and 198). They were chased by an evil being who wanted to kill and eat the mother and keep the daughter, they managed to escape but their own people decided that if they could not have them, then no one would. They sang an incantation which changed the daughter into a bird who was allowed to wander the plains. The mother and daughter translated themselves into the sky and remain there now. These few stories form a cohesive group that all suggest the same thing about one particular aspect of Aboriginal astronomy. There is only one other account that was published from the

southeast area; Mathews noted that the large Magellanic Cloud was the short nosed bandicoot and the small Magellanic Cloud was a kangaroo rat (record 396) (Mathews 1904). This is quite different from the other stories in this area, there are very few stories from Australia in general where an animal, rather than a bird, person, or spirit, is thought to represent something in the night sky. This is also the only reference where the Magellanic Clouds are two different species, and there is no suggestion that they are related. It is possible that Mathews made a mistake in recording this myth as he has previously said in his work that another star was the short nosed bandicoot (record 395).

One other story about the Magellanic Clouds that has been repeated several times is one that was first recorded by Teichelmann in 1841 (record 312) from around the Adelaide area (Teichelmann 1841). The story states that the sky is thought to be the same as the land, so the Milky Way represents a large river and the nearby white clouds are the ashes of a species of paraquets which were brought next to the Milky Way and then roasted. This story was repeated by Gell, Cawthorne and Clarke and over time the story has developed and changed, the most recent account by Clarke in 1990 suggests that the species of bird has been identified as the Blue Mountain or Rainbow Lorikeet (record 57), but there was never any suggestion of this in the original account (Cawthorne 1927; Clarke 1990; Gell 1842). No reason for killing and roasting of the birds is given in the first recording, nor who was responsible for it other than to say they were brought to the Milky Way by “another constellation”. It seems a strange story to have been recorded (and re-told so many times) as it offers no special insight into Aboriginal astronomy.

Only one other account exists from the Spencer area, which was recorded by Bates while she was at Ooldea Station in South Australia (record 474) (Bates 1904-1912). The two clouds are brothers, the larger of which is the greedy older brother who won't share his food with his younger brother. Bates recorded two further stories about the Magellanic Clouds from the southwest of Australia, which again are only of limited relevance. In the Mirning community it was thought that the dead people were taken away by the larger of the two Magellanic Clouds (record 462). In an unidentified location in the southwest, the Magellanic Clouds were thought to be a species of iguana with white stripes on its body, which are pegging out skins to dry them (record 452). Bates does not suggest whether it is the iguanas or the skins that are the clouds, but the essence of this story is a little strange. This is the second story where an animal is in the sky and representing part (or all) of this

feature in the night sky, but there is no context to the story recorded by Bates. Although many of the creation myths were played out across the night sky reptiles do not feature heavily in astronomy stories and there can only be a limited connection between creatures that spend their entire life on the ground and the night sky.

Bates recorded other myths about the Magellanic Clouds in conjunction with other stars and features of the night sky, some with a great depth of detail. The record from the Wudjari is a comprehensive account of the men who took revenge on the eagle who killed all their young boys (record 459). With the help of two brothers, one right handed and the other left handed, they were able to spear the eagle and live without fear. The two brothers are the larger and smaller Magellanic Clouds, the eagle and his wife are the Southern Cross, and their children are the Pointers (α and β Cen). The groups of stars which are involved in this story cover a large area of the sky, but the context of the story has been lost, no reason is given why the brothers are the Magellanic Clouds, or why the eagle was attacking the young boys in the community. A similar story from the Mirning community was recorded by Bates, who also believe that the Magellanic Clouds are right and left handed brothers, although this is not made explicit in the account (record 465). A further two myths from the southwest area suggest that the Magellanic Clouds were responsible for killing a whole community and taking charge of their bodies or souls, which has also been found in other accounts (record 466 and 470).

4.8.2. Central

The myths recorded in the central desert regions of Australia display a surprising similarity, in the majority of the stories from this area the Magellanic Clouds are thought of as two evil brothers. Spencer and Gillen first published their account of the Arrernte myth about the Magellanic Clouds in 1899, where they state that the clouds are thought to be endowed with an evil spirit which sometimes comes down to Earth and chokes people while they sleep (record 187). Spencer and Gillen say in their later 1927 book that there was also a belief in the southern Arrernte that the Magellanic Clouds were the camping place of two great men (record 188). The communities where these two accounts were recorded would not have been far apart, although there is quite a difference in these two versions. Mountford records that the Pitjantjatjara and Junkandjara thought that the Magellanic Clouds were two brothers who were able to reward or punish people according to how they lived while they were on

Earth (record 136). If a person has been good the older brother (larger cloud) will protect the person's spirit, if the person has been bad the younger brother will be allowed to eat it. Mountford later published a very similar account to this from the Ngalea community, see record 137, and he also stated that the Arrernte had a related story, which was recorded by Spencer and Gillen. In contrast, it is interesting to note that Maegraith says that the Arrernte and Luritja paid the Magellanic Clouds no particular attention.

One story that deviates from this pattern is one that was recorded by Tindale in 1930, in the Alyawarre area, where the Magellanic Clouds are a "poisonous" mantis and "looks like pigweed" (record 490) (Tindale 1930). This is a difficult interpretation to understand, mantis' are not poisonous and it is unclear as to whether it is the mantis that is supposed to look like the plant pigweed or the Magellanic Clouds themselves. Although the meaning is not clear, the Magellanic Clouds are thought to be insects, which again is not something that has been widely recorded. Three separate accounts about the Magellanic Clouds from diverse locations state that the clouds represent entirely unrelated creatures (animals, reptiles and insects), which is interesting as this does not conform to the pattern that most stars/constellations are birds or humans.

4.8.3. North

Both myths from the Arnhem Land area of Australia were recorded by Mountford and published in 1956, rather than the clouds representing actual characters in the story, they are the camps of the characters (records 8 and 26) (Mountford 1956). The myth that Mountford recorded from Yirrkalla says that the clouds are thought to be two sisters and how the older sister leaves the younger one in the middle of the dry season (July-August) and is only persuaded to return during the wet season so they can go out gathering yams together. Mountford notes that the larger Magellanic Cloud is not visible for part of the wet season, which would account for the older sister leaving for some of the year. In this detailed account Mountford says that the two women are near to their camps and that two nearby bright stars are their fires, possibly Canopus and Achernar (α Eri). Again in the other account Mountford recorded from Arnhem Land the clouds are thought of as the camps, this time as belonging to an old married couple, with the star Achernar as their fire.



Figure 20: Bark painting by Kulpidja, 1948 on Groote Eylandt. This image shows the Magellanic Clouds, the upper design is the Smaller Magellanic Cloud; the lower one is the Larger Magellanic Cloud. The clouds are an old couple and the oval between them is their fire, thought to be the star Achernar. The oval surrounding Achernar is a circle of stars, representing smoke from the camp fire.

Image taken at the National Museum of Australia, Canberra.

4.8.4. Summary

The data about the Magellanic Clouds is interesting; several accounts from the south and central regions have some kind of evil connection. The Magellanic Clouds are responsible for either killing people or eating their bodies, but none of the stories give a reason why they were thought of as evil. One can only imagine what it was that led people to create a connection between the Magellanic Clouds and two evil beings or reptiles, it is unfortunate that none of the ethnographers chose to record any details about this. In comparison to so much of the other data, the information about the Magellanic Clouds shows consistency and one can see the relationship between the central and southern zones. It must be taken into account, however, that there were relatively few stories and only two from the north of Australia. This cannot be considered to be a comprehensive account of the whole of the country, but it is clear that the data is linked.

4.9. Venus

Venus is the second closest planet to the Sun and is the second brightest object in the night sky after the Moon, reaching an apparent magnitude of - 4.6. Because of its position in the solar system it is never seen very far from the Sun and it is at its maximum brightness shortly after sunset or before sunrise, for this reason it is often called the Morning or Evening Star. Venus changes from Morning to Evening Star periodically and with careful observation over time it is possible to establish that the Morning and Evening Stars are the same object. It is uncertain whether this relationship was known in Aboriginal society. Some stories suggest that there is a link between the two, but there is no explicit statement in any of the myths that the two bodies are recognised to be one single object although some ethnographers have assumed this. Several accounts from the northern zone (specifically those from Arnhem Land) state that Venus has a connection with the dead, either via the island of the dead or the by taking possession of the spirits of the dead. The rest of the myths do not appear to have much coherence, and display a wide variety of beliefs throughout the country. No pattern seems to be discernable as to whether Venus was male, female, a spirit or a bird, all versions have been recorded, although there does seem to be a slight bias to believing Venus was a female.

4.9.1. South

In the southern zone several stories were recorded but there does not seem to be any connection or similarities between any of the accounts. The Stanbridge and Dawson versions, which are often similar, only bear a vague resemblance in that Stanbridge was told that Venus was the sister of the Sun and the wife of Jupiter, and Dawson states that Venus was female and the mother of the Sun (records 30 and 68) (Dawson 1881; Stanbridge 1857). Dawson also suggests that the name used for the planet Venus in the Gunditjmara area also means “twinkle”, which is an odd association to make with a planet as it is known that stars twinkle while planets do not. Ridley and Langloh Parker both recorded that the Kamilaroi thought that the planet had some connection with laughing (Langloh Parker 1905; Ridley 1873b). Ridley states that the name of Venus means “you are laughing”, and Langloh Parker’s account said that Venus was an old man who once said something rude and has been laughing at his own joke ever since (records 30 and 156). This record by Langloh Parker is at odds with one that she published 9 years earlier, where she states that the

Kamilaroi thought Venus to be an eaglehawk (record 413) (Langloh Parker 1954). In this account she says that Venus was Mullian, the eaglehawk, who lived at the top of a high tree with his wife, mother in law and another woman. He had to live apart from the rest of the community because he was a cannibal and would attack other people when they were out hunting on their own. The community decided to find out what was going on and got the woodpeckers to climb to the top of the tree and leave a smouldering stick there that would burn down the hut when Mullian returned. He duly returned and his hut burnt down, in trying to rescue the women, he burnt his arm and the women burnt their feet. Mullian and the women were not able to escape and they were burnt inside the shelter, they then went into the sky, Mullian became Mullian-ga, the Morning Star, on one side is a little star, his one arm and on the other is a larger star which is his wife. Although there is great detail in the story with respect to how the eagle was attacked and killed, no reason is given as to why the eaglehawk might have changed into Venus, or which stars are thought to be his arm and his wife. This is one of the strangest aspects of the story; Venus wanders across the sky in a slow but erratic motion so would not always have the same stars either side of it. It is strange to suggest that Venus was always associated with two other stationary stars when this cannot happen.

Only one other account from the Riverine area gives any further insight into the astronomy of the area, Beveridge published a story about Venus in 1883, where he states that Venus was sent out early in the morning by Ngondenont (a good spirit) so that people would be able to prepare for the day ahead (record 368) (Beveridge 1883). He also states that this planet is called Worka Worka in the evening and is the controlling force over unborn babies and children. The Morning and Evening Stars are given different names and have different purposes, so the indication is perhaps that it was Beveridge rather than the community that made the connection here. The only stories in the database from the Spencer area were both recorded by Mountford while he was conducting his fieldwork in the Flinders Ranges (records 516 and 520) (Mountford 1937-1942). In one version he simply states that Venus is a female, the other, however, is a detailed story about how the Morning Star is a man who took revenge on his two sons who cheated him out of some food. Mountford recorded other similar stories about an old man and his two sons or grandsons who cheated him out of food, but the old man was the Moon rather than Venus (see section 4.2). It is interesting to note that although Mountford recorded this type of myth in several areas, no other ethnographers noted anything similar, so this might be a bias that Mountford himself has created.

4.9.2. Central

In the central desert region the stories that have been recorded do not appear to exhibit any coherence or pattern, except that Venus was often thought of as evil. Strehlow published two accounts in 1907 where Venus was connected with some kind of evil, one where two brothers persecuted their grandson, and another where two brothers killed an evil being (Strehlow 1907). The Arrernte story gives great detail about the events but offers little insight into their astronomy, by simply saying at the end that the characters went up into the sky and one of them became the Morning or Evening Star (record 250). In the story, the two brothers try and cheat their grandson/nephew out of some food, they hide in a cave to frighten the youth and make him believe there is food in the cave. The boy realises what is going on and sets a fire at the entrance of the cave forcing the two men to come out, the older brother came forwards out of the cave while the younger one went further into the back, but somehow both brothers then went up into the sky. Strehlow says that it is the older brother that becomes Venus, but he could be either the Morning or Evening Star. In contrast to this the Luritja belief about Venus was that two brothers killed an evil being after hiding in a cave and then the older of the brothers became the Morning Star (record 259). One can see how the essence of the stories are the same but main themes have been reversed, one community thinks that Venus saved them from some kind of evil being whilst the other thinks that Venus is the evil being. Is it possible that the older brother was the Morning Star and the younger brother was the Evening Star and that the connection between these two objects in the sky was known? Although feasible, it seems unlikely, the Morning and Evening Star are never seen at the same time (i.e. over the course of one night) and the two brothers were probably thought to be physically close to each other in the sky. The Arrernte and Luritja communities were closely related, and this is demonstrated by their similar stories regarding the planet Venus.

The other stories that have survived from the desert regions are all very different, Spencer and Gillen said that the Evening Star was a woman associated with a big lizard totem (record 183), Tindale stated that Venus was somehow able to dry up all the surface water in a particular area (record 482), and Mathews recorded that the Morning and Evening Stars were high gods or spirits, and that they were the boss of all the other stars (record 334) (Mathews and Dixon 1975; Spencer and Gillen 1927; Tindale 1930). It is only Tindale who says unambiguously in his account that the Morning and Evening Stars were known to be the

same object, but he gives no details as to how this was established. In the version recorded by Mathews in 1974, it is hinted at that they were known to be the same object as they had the same properties, but this is not stated as fact.

4.9.3. North

In the northern zone Venus appears to have a much larger role in Aboriginal mythology than in the central and southern areas. In Arnhem Land Venus was closely associated with the spirits of the dead and the island of the dead. Warner published the earliest version from Arnhem Land in 1937, where he gives a detailed description of a man's journey from his own country to the land of the dead. In this journey the light of the Morning Star guides the man so he can find his way to the island of the dead and back again, and on the island of the dead he meets the woman who controls the Morning Star. Venus is not thought of as a person here, but is considered female because she is controlled by a female. The story itself is a little confusing as the man travels from his own country, Melville Island (one of the Tiwi Islands and technically not part of Arnhem Land), across the Gulf of Carpentaria, to the island of the dead. It is not made clear in this account whether the man went over the sea to the northern tip of Queensland or to another island in the Gulf of Carpentaria, whichever it was, this was thought of as the home of the dead and where the Sun and Morning Star both come from. This account shows what kind of distances people travelled and how detailed their stories about these journeys were, but the astronomical knowledge that is displayed is quite limited. The motion of Venus is accounted for by the fact that she was controlled by a woman who hid her away all day and only allowed her out on a long rope in the morning. This motion had been noted and explained in a way that took account of the erratic path, and it was thought to come from the east, but no connection was made with the Evening Star, and nor was any mention made of what happened to the Morning Star for the time Venus appears as the Evening Star.

The themes mentioned as part of this story are found throughout a large area of the Northern Territory but each with its own regional variation. Mountford recorded a story in Oenpelli, the full details of which cannot be reproduced here because of the access restrictions to the material. He states that the Morning Star was held on Djiraia, the place of the dead, by two women who control its motion (Mountford 1948). In 1975 Allen published what he said was a composite story of all the data he had found about Venus from Arnhem Land (record 549),

he made a strong connection with Berndt's Djanggawul story, suggesting that it was the Morning Star rather than Walu, the Sun woman, who guided the brother and sister to the new land (Allen 1975; Berndt 1952). Both Isaacs and Haynes published stories that had similar themes (records 90 and 112), but the references that they each provide are incorrect which places doubt on the validity of their stories (Haynes 1992; Isaacs 1980).



Figure 21: Barnumbir, the Morning Star, painted by Buranday at Milingimbi. The figure in the centre of this painting represents the guardian spirit, with the Morning Star shown on either side of the spirit.

Image taken at the South Australian Museum, Adelaide.

Beliefs connecting the Morning Star with the island of the dead are only found in the central northern area of Australia, around Arnhem Land and Darwin. Stories from the Gulf of Carpentaria, the Kimberleys and from the Northeast all hint that the connection between the Morning and Evening Star might have been known. A story from the Gulf of Carpentaria suggests that the Evening Star was called dog and the Morning Star was called bitch (record 319), in the Kimberleys the Evening Star is the daughter of the Morning Star (record 273), and in the Northeast there is a linguistic suggestion that they were the same object, they were called Meringim Git:a and Meringim Duju (record 333) (Winterbotham 1957). One other story that was only recently recorded from the Gulf of Carpentaria area states that the main female character (as Venus) was both the Morning and Evening Star (record 297). In this

account she was promised to the sharkman, but did not want to marry him so escaped into the sea, only to be followed by the sharkman. Desperate not to be caught by the man she flew up into the sky and became the Evening Star, the sharkman can still be seen sometimes in the waters around Mornington Island.

Two stories about Venus were recorded from the West Cape area, in north Queensland. There has been very little ethnographic research conducted in this area and only eight original stories in total have survived, representing less than 2 % of the total number of stories in the database. Roth noted that a man was out hunting for fish when he saw two women, he tried to catch them but one of them escaped by diving into the water (record 422) (Roth 1903). The man dived in after her, he was still carrying his fire stick and as it touched the water sparks flew everywhere, these sparks became the stars. The man captured the woman and took her home where she became the Evening Star although no mention is made of what happened to the man. McConnel recorded a very different story from this area, her account connects the Moon and the Morning Star with the creation of the landscape as it is today (record 394) (McConnel 1957). Two young men were travelling through the country, they were brothers and had no wives because there were no women then. They travelled for several days, changing the landscape as they went, but after a couple of days the older brother suggested that they should camp and go to sleep. He pretended to sleep but instead he cuts off his brother's genitals and makes him into a woman, in the morning the younger brother wakes up and asks what has happened to him. The older brother takes him as his wife and makes a yamstick and dilly bag for her. They travel on further with the man throwing out the boomerang, which takes the tides out with it. The man becomes the Moon and he controls the tides, his wife becomes the Morning Star and follows her husband the Moon as women are supposed to do. Again this interpretation of this story appears to be a little confused as Venus would not always be close to or following the Moon. The fact that two of the myths from this area focussed on Venus (the remaining seven stories are all about the Moon) perhaps suggests something about the astronomy in this region. Venus was an important aspect of mythology in Arnhem Land and it could be that this extended further into the West Cape area of Queensland.

4.9.4. Other Accounts

There is a great diversity of information about Venus, as both the Morning and Evening Star from communities all over Australia. One of the most enduring aspects of the stories comes from the top end where there is a close association with the Island of the Dead, but Venus has often been associated with other objects in the night sky. In the Riverine area a story was recorded that connected the planet Venus with the Pleiades and the Moon; the Moon was an old man who looked after the girls (the Pleiades) and did tricks for them (record 301). The Moon turned into a boomerang and got stuck up in the sky and could not get back to the girls, so he decided to put them into the sky with him as well. He grabbed six of the girls and placed them up in the sky, he chased the other sister and said that because she loved him so much that she would put her next to him in the sky. This sister can now be seen as the planet Venus. The full version of this story contains some confusing aspects, there were seven sisters in the Pleiades to start with but only six of them became the cluster in the sky. And the Moon putting the one sister, represented by Venus, close to him in the sky cannot be correct, the motion of the Moon and Venus means that they will not always appear close to each other in the sky. Bates recorded that Venus was the daughter of the Sun and the Moon (record 451). Venus was the older of their two daughters and followed her mother home to the west every evening and got up before her every morning in the east. This evidence has possibly been somewhat changed as Venus does not appear in the sky as both the Morning and Evening Star in the same day, but the underlying suggestion is that the connection between the two had been made. Mountford and Tindale each recorded myths about the planet Venus from the central desert region, connecting it with Jupiter and Saturn and Orion and the Pleiades, respectively (records 130 and 493). A myth recorded by Mountford from the Arnhem Land area places another connection between Venus and Jupiter and also with the stars that make up the sting in the tail of Scorpius.

4.9.5. Summary

Venus is an important object in the sky both as the Morning and Evening Star, the stories relating to Venus make up a significant proportion of the database. In the central top end area around Darwin and Arnhem Land, the myths relating to Venus are some of their most important creation and Dreaming myths. This is in contrast to the complete lack of stories relating to the other planets in this area (see section 4.10), one can only assume that Venus is

thought to have nothing in common with the other planets and hence the dichotomy in the number of stories. A second contrasting feature of the stories about Venus is the coherence shown by the stories from the north. It has been shown that for some of the other objects the stories from the north of Australia are quite diverse and do not really relate to each other, but this is not the case here. Although some of the stories from the east and western areas of the northern zone are slightly different, those from Arnhem Land are all connected in some way. They all contain some of the most basic elements of the creation stories, telling of how the Australian landscape was created and populated. The relationship with Venus is important because it is this planet who guides the Aboriginal soul back to the land of the dead. The stories from the south and central regions also differ from those about the other objects in the night sky from these areas, there is no pattern at all that relates most of the data and in comparison to some of the other groups there are relatively few stories about Venus. It is interesting that the other planets were recorded in several stories from these regions whilst the most obvious of the planets was practically ignored whilst the situation is completely reversed in the north of Australia.

4.10. The Planets

There is only a very small amount of information that has been recorded about the Aboriginal interpretation of the planets other than Venus. Aboriginal people were limited to their naked eye vision and therefore would only ever have been able to see the five planets that can be seen without the aid of a telescope; Mercury, Venus, Mars, Jupiter and Saturn. For this analysis Venus has been considered separately as it holds a different position both physically and culturally within Aboriginal astronomy (see section 4.9). There is no mention of the planet Mercury in any of the sources, apart from one very brief mention suggesting that along with Venus, Mars and Jupiter it was thought to be the wife of the Moon (record 408). This is not surprising, because of its position in the solar system it always appears close to the Sun, rising or setting shortly before or after the Sun. It can be quite difficult to observe and perhaps would not have captured the attention of people watching the sky because of its erratic motion. Nearly all of the stories about the planets have been recorded from the southeast of the country, only one story remains from the central zone, and there are none from the northern zone (excluding the Venus myths). For objects that would have been so clearly visible in the night sky this is strange, there is no obvious reason for them to be so neglected. One reason for this might be their motion; planets do not follow the same path for long periods of time and can be a little more difficult to observe consistently than stars. Their motion can be followed, but without a reliable way of recording the position of the planets they might have been perceived as something more transient in the sky. The stories themselves do not suggest this, but it could be inferred due to the intrinsic lack of information that has survived.

4.10.1. Mars

Several stories have been recorded about the planet Mars from the Riverine area but the data is slightly unclear, and there are relatively few details about what this planet was thought to be. Two of the stories give no facts about the planet other than to say that it was either male or fat (records 78 and 178); two other stories both suggest that Mars was an eagle (records 228 and 538). Brough-Smyth suggests that Mars was thought of as an eagle because he was warlike and always fighting (Brough-Smyth 1878). It is possible that some of the Western ideas about stars and planets have influenced Brough-Smyth here, in Greek mythology Mars was the god of war. It is interesting to note the similarities between the Aboriginal and

European versions of this story, but one should take into account the biases and influences that existed at the time this story was recorded.

Meyer originally recorded a story about Mars in 1846 that has since been taken out of context (record 405); the following text is an exact copy of what Meyer published.

“The stars were formerly men, and leave their huts in the evening, to go through the same employments which they did while on Earth. Some are remarkable amongst them, as Pungngane, Waijungngari, and their Ningarope. The first was born naturally, and the others were made as follows:- Ningarope having retired upon a natural occasion, was highly pleased with the red colour of her excrement, which she began to mould into the form of a man, and tickling it, it showed signs of life and began to laugh. He was thus a Kainjani at once from his colour, and his mother took him into the bush and remained with him. Pungngane, his brother, had two wives, and lived near the sea. Once when he remained out a long time, his two wives left the hut and went and found Waijungngari. As they approached he was asleep, and the two women placing themselves on each side of the hut, began making the noise of an emu. The noise awoke him, and he took his spear to kill them; but as soon as he ran out, the two women embraced him, and requested him to be their husband. His mother, enraged at the conduct of the two women, went to Pungngane, and told him what had happened. Very much enraged, he left the hut to seek that of his brother, which he soon found; but there was no one there, as his wives and his brother were out seeking food. Very much vexed, he put some fire upon the hut, saying “kundajan”, meaning - let it remain but not burn immediately. Waijungngari and the two women arrived in the evening, and lying down to sleep, the fire began to burn, and presently to fall upon the skins with which they were covered. Awaking with fright, they threw away the skins and ran into the sea. Out of danger, and recovered a little from his fright, Waijungngari began to think how he could escape the wrath of his brother, and drew a spear up into the sky, which touched it and came down again. He then took a barbed spear, and throwing it upwards with all his force, it remained sticking in the sky. By this he climbed up, and the two women after him. Pungngane seeing his brother and his wives in the sky, followed, with his mother, where they have remained ever since. To Pungngane and Waijungngari the natives attribute the abundance of kangaroo and the fish called ponde. Pungngane caught a ponde and dividing it into small pieces and throwing them into the sea, each became a ponde. Waijungngari multiplied kangaroos in the same manner. They have many similar histories of the stars. The Milky Way, they say, is a row of huts, amongst which they point out the heaps of ashes and the smoke ascending.” (Meyer 1846, 12)

It has been assumed by several other authors who have used this early data that Meyer was referring to the planet Mars. Meyer, however, does not state in any part of this account that Waijungngari is the planet Mars, he implies that they are stars rather than planets, and only says that all the characters went up into the sky and have remained there ever since. This story, that has so much value in its original context, has been copied so much that the later

accounts bear no resemblance to the data that was first recorded by Meyer over 150 years ago. Angas, Taplin, Squire, Laurie, Tindale, Berndt and Bell copied the original account, but it was only Tindale who recorded a second version of this myth (Angas 1847; Bell 1998; Berndt 1993; Laurie 1917; Squire 1896; Taplin 1879; Tindale 1935b).

The Tindale account is very similar to the version that Meyer noted almost 100 years previously; the only notable difference is how Waijungari (the spelling is slightly different from the Meyer version) became red (record 431). Tindale was told that he was red because he was newly initiated and covered in red ochre; Tindale also states that as he was trying to escape with the two women, he dropped several kangaroo skins which made dents in the ground which later became the lakes in this area. Tindale says if the story is taken out of its landscape context it loses a lot of its meaning, when it is told without reference to the landscape, the significance of the red ochre, kangaroo skins, and fire is lost. The red ochre is an important part of the story because it gives the location of the mineral source, and the fires in this story give a reason for the many bush fires that start on the shores of the lakes and sweep through this area. Tindale says that several Aboriginal people confirmed that Waijungari was the planet Mars, and further that the two women were the planets Jupiter and Venus (Tindale later corrected this and said that it was more likely that the two women were Jupiter and Saturn (Tindale 2005)). In his version of this story, Tindale says that the three went up into the sky, where they are still, and that Waijungari is the central one. If what he recorded was accurate, it is difficult to see how they can be Mars, Jupiter and Saturn, because although these planets sometimes appear close together in the sky, they are not always in the same configuration and Mars would not always be in the middle.

Duncan Laurie published a different version of this story in 1917, the names and actions of the characters are similar enough to assume this relates to the Meyer and Tindale stories (Wyangaure, Nurundie etc), but he suggested that the three who went into the sky became the three stars of Orion's Belt (Laurie 1917). With respect to their appearance in the sky, that the three characters became the belt of Orion makes more sense as they would always be seen in the sky together, but none of these stars is red. Laurie does not actually mention the red ochre part of the story in his account, so perhaps the focus of this story had changed over time. Although this seems like it might be a copy of one of the Meyer version of this story, Laurie names his informant, which suggests that it was not. These three versions of the same story by Meyer, Laurie and Tindale were all recorded in the same area and give a

detailed insight into a certain aspect of Aboriginal astronomy, showing how important the landscape was with respect to the story. Recorded from essentially the same community but almost 100 years apart, the three accounts show a strong indication of how Aboriginal myths endured and developed over time and remained in existence until well into the 20th century.

4.10.2. Jupiter and Saturn

Relatively few accounts were recorded about Jupiter, the ones that exist do not contain much detail, and there does not appear to be much consistency between the accounts. As with the records about Mars, most of the stories contain no details about what Jupiter is thought to be, simply stating its gender (records 69, 31 and 176). There is only one account where Jupiter is thought to be female; Dawson recorded this in 1881. He also states that the name of Jupiter means “strike the Sun” because it can often be seen near to the Sun at midday, which is perhaps a mistake on Dawson’s part. The majority of the southeast stories suggest that Jupiter is a chief or great man, which could be a result of the Western influence where Jupiter was principal god of Roman mythology. The evidence suggests that the myths relating to Jupiter from the southeast of Australia are not reliable and some may have been over influenced by the Western bias.

Bates recorded some data about the planet Jupiter from the area around Ooldea station in the Spencer area of Australia (records 471 and 475) (Bates 1904-1912). Her informants told her that Jupiter (and Venus) were thought of as two men travelling along their Dreaming tracks (possibly the ecliptic), and that they were men with only heads and no body. One version of this myth suggests that the two men were changed into grey and red kangaroos, it is unclear, however, if these animals went into the sky or if they remained on Earth. It would be unusual for the animals to be up in the sky as this is uncommon in Aboriginal astronomy. The other myth recorded by Bates from this area says that the planet Jupiter was a man with just a head who helped two young men who fed him after they were attacked by a mob, Bates states simply that he went up into the sky and the two boys are close by, but does not discuss how they got there or which planets or stars the two boys are. As with the rest of the Bates material there are questions regarding the reliability, and the fact that this data bears no resemblance to any of the other myths recorded is not encouraging.

The only story that has been recorded from the central region of Australia is about the planet Jupiter, collected by Fraser in 1901 from the Wangkamana people (Fraser 1901). The story is strange, it suggests that a boy and his mother were travelling through the country when they became separated and were both translated into the sky (record 379). The young boy became the planet Jupiter and the mother became another star. The people of another area have a great desire to kill the son, but so far their efforts have failed. The people in this area are very afraid that this should happen because it would mean that they would be unable to collect food and they would die. No reason is given as to why this young boy became the planet Jupiter, or indeed why his disappearance would have meant that the people of this area would not have any food. This story is important because it is the only one from this area about the planets that records any detail about the beliefs, however, it is so far removed from the other accounts of Jupiter that comparisons are pointless. In general, there is not enough data about the planet Jupiter to suggest any kind of connection between the stories or areas where they were collected from.

There is very little information about Saturn. It is only involved in stories as a small character in a story about some of the other planets. Ridley states that Saturn was thought to be a small bird by the Kamilaroi and Wailwan people and Mountford records briefly that Saturn was the brother of Venus, who owned the dog Jupiter, in the central desert region. There are no other accounts of what was thought about this planet and any story that did exist has long since been lost.

4.10.3. Summary

The stories about the planets, excluding Venus, make up less than 3% of the total number of records in the database. It was originally assumed that there would have been many more stories relating to the other planets because of the significance of Venus in Aboriginal astronomy, but the other planets are clearly not an important part of their night sky. The only significant stories here relate to Mars and seem to demonstrate some kind of connection but there is so little data regarding this point that it is difficult to analyse. It does seem clear, however, that most, if not all, of the groups in Australia paid very little attention to the planets and it can be assumed that this was because of their erratic and difficult motion. Because of the lack of any reliable recording method for the planets motion, they would only have been seen as transient objects in the sky that bared no relation to the more permanent

backdrop of the fixed stars, which in general were accorded more attention than those that only appeared periodically. One thing which is interesting to note, in conjunction with all the other data, is the absence of any stories relating to the planets from the northern zone. This again shows some significant differences between the astronomy in the north and south of Australia.

4.11. The Aurora Australis, Comets, Meteors and Eclipses

4.11.1. Aurora Australis

The Aurora Australis is the Southern Hemisphere equivalent of the Aurora Borealis, the visual representation of the solar wind flowing past the Earth. As with the Northern Lights the Aurora can only be seen at latitudes close to the pole, hence only in the most southerly regions of Australia is this phenomenon visible. When aurorae are visible they cover a large area of the sky creating a spectacle that would be noticed by even the most casual observer. Because of their irregular appearance the Southern Lights do not seem to have been accorded much attention within Aboriginal astronomy. Dawson and Howitt both recorded that very little was thought about the Aurora, Dawson simply states that they were “ashes” and Howitt says that most people took no notice of them (records 82 and 339) (Dawson 1881; Howitt and Stahle 1881). In the Riverine area Howitt and Worms both recorded that the appearance of the Aurora was thought to indicate that a massacre had taken place somewhere, Howitt suggested that the Aurora was the blood of the dead rising up into the sky (records 224 and 541) (Howitt 1904; Worms 1986). Clarke has recently suggested that the Aurora was thought to bring disease to the area around Adelaide (record 62) (Clarke 1990). There are no records of regarding the Aurora Australis from anywhere further north than Adelaide, which would be consistent with the locations where the phenomena is visible. It would have been interesting to have data regarding this phenomenon from Tasmania as one can imagine that it would have been quite a sight at such a southerly location.



Figure 22: Image of the Aurora Australis.

Source: http://www.southernskyphoto.com/aurora/nov_2001.htm (website accessed 7th April 2008)

4.11.2. Comets

A comet is a celestial body which can be seen on Earth only when its orbit passes sufficiently close to the Sun. A comet is made up of a solid nucleus followed by a tail, which is created as the body is gravitationally pulled towards the Sun. The resultant image on Earth has an appearance of a star followed by a tail. Comets are feared in many cultures as they are considered to be a bad omen, and the situation is no different in Australia. The majority of accounts suggest that the comet was perceived as something bad or evil, and something that was going to bring a great disaster to the country. Langloh Parker recorded that a comet was thought to cause a drought in the land by drinking all the rainwater, the tails of the comets are large families who are all thirsty and they come and drink the water (record 207) (Langloh Parker 1905). If a comet was seen and then a catastrophe befell the community or a large number of people died, it would be said that the comet had warned them. Other stories also suggested that a comet was an indicator of death and that most people were frightened and would hide from them if possible (records 388 and 61)⁴.

Spencer and Gillen recorded an interesting account that connected comets and meteors (Spencer and Gillen 1899). Comets and meteors were thought to be giant spears, the physical form of an evil spirit power, which were used to punish a man who had stolen another man's wife. Comets are seen as indicating the death of a member of a neighbouring community, often because of infidelity; the direction of the comet points to the location in which the person has died (record 178). They go on to say that meteors are the physical form of the evil spirit used to punish the women who cheat on their husbands. The purpose of the evil spirit is to dry up all the woman's fat causing her to die, the meteor is the woman's spirit (record 179). Strehlow recorded a similar myth from the Arrernte, in this myth a man caused his wife to die by performing a ceremony, throwing spears at an image of his wife and then throwing them up into the sky (Strehlow 1907). The image of the wife then appeared in the sky as the comet, the spears being the tail, and this caused the woman to lose all her fat and shrivel up and die. The man took pity on his wife and rubbed fat into her body and revived her, this happened as the comet gradually disappeared from the sky (record 253). Although there are several stories recording the appearance in the sky of a comet, it seems that this is the only one where there is a reason given for the gradual

⁴ See also the work by Barker, held at the AIATSIS library (Barker n.d.). The item is held under restricted access and cannot be copied or quoted, but he includes details of the evil nature of comets.

disappearance of the comet. This is an important aspect of the motion of a comet as they are often visible over several days, but it seems to be something that has been overlooked by Aboriginal observers (or the Western ethnographers). A relatively recent account about a comet recorded in the desert regions, says that comets are a representation of a man called Wurluru (Anon 1986). He lives in the sky and has many spears which can be seen beside him when he appears in the sky; he is a nasty man but will often provide meat for men with large families (record 298). Only two stories were recorded from the northern zone of Australia, both suggesting that comets are viewed with great fear and bring death to a community (records 269 and 323).



Figure 23: Image of Halley's Comet taken in 1986.

Source: <http://hyperphysics.phy-astr.gsu.edu/hbase/solar/halley.html> (website accessed 7th April 2008)

4.11.3. Meteors

A meteor is the visible path of a small body as it enters the Earth's atmosphere. Meteors are often referred to as falling or shooting stars because they only appear fleetingly as they burn up when they are pushed through the atmosphere. Most communities thought that they were indicating the death of someone or that they were a bad omen, so they were thought of in much the same way as comets. The stories from the southeast area of Australia all maintain this notion (records 81, 206 and 337); although Stanbridge noted that shooting stars are different to normal stars (record 53). In his brief account of the beliefs held by the Boorong Stanbridge said that most stars were represented by a spirit being or ancestral hero, but he

simply says that a shooting star threatens evil to someone who has lost a front tooth (i.e. initiated men). It is understood that these objects are not stars at all, which perhaps indicates that their understanding of the night sky was more advanced than that of just a casual observer. Some communities in the desert held the belief that meteors were indicators of a death or a bad omen, but there are also some other contrasting stories. Piddington recorded three different stories from the Karajarri in the far western area of the central zone (the community is on the coast although it is designated as being part of the desert region), one version suggested that all stars were nautilus shells with fish inside them, when the fish dies this causes the shell to drop and this is seen as the falling star (record 149) (Piddington 1932). In the same area shooting stars were thought to be fragments of the body of an ancestral hero falling from the tree in which he was buried, or they indicated that an important man had died, the direction of the star indicating where the death has taken place (records 150 and 151). Spencer recorded in one of his fieldwork notebooks that meteors were very evil and could cause people a lot of harm, if anyone wants to do harm to someone else they can chant a spell over a bone or stick and then throw it away as far as possible (Spencer 1901). When they later see a falling star, it is thought to be the spirit of the person they have killed by their magic (record 348). Strehlow recorded the only myth about meteors that does not conform to this pattern in the Arrernte and Luritja communities. Meteors are poisonous snakes with large fiery eyes, they fly through the sky and drop into deep waterholes (record 254). This is in contrast to the story about meteors recorded by Spencer and Gillen from the same communities about ten years earlier, which stated that meteors were evidence that a woman had died after all her fat had been taken out of her.

The largest and most diverse group of stories about meteors was recorded from the northern regions of Australia, all accounts have great detail but do not appear to be connected. An account recorded by Roth in the East Cape district of far north Queensland is probably one of the most comprehensive descriptions as to why meteors are associated with death (record 423) (Roth 1903). Meteors represent falling fire-sticks thrown by a bird called Gi-we; if a man falls sick while he is far away from his home, his friends will throw a fire-stick into the sky in the direction of his home. They tell Gi-we to take the fire-stick to the man's family and when his relatives see the falling star in the sky they know that the man is ill. Roth recorded a further account about meteors from a community a little further south in the Rainforest area, again meteors were thought to be fire-sticks that were carried around by spirits in the sky (record 424). It is one of these fire-sticks that start bush fires. An account

recorded 60 years later from the same area, suggests that a falling star is an evil man who has turned into a spirit which flies in the air (record 329). Further west a falling star is the result of someone being dropped as part of a game (record 322) (Palmer 1885). In the Tiwi Islands Mountford was informed that meteors were the single eye of a group of evil spirits streaking across the sky (record 92). These spirits crave blood and dead bodies, when these spirits find a sick person they will suck out all their blood, killing them but leaving no wound. A story from the Kimberleys suggests that there is some connection between a monster that kills people and meteors. Sawtell recorded that a monster was terrorising a community which was only saved when one old man defended them by attacking the monster (record 425) (Sawtell 1955). The man tried to spear the monster but he could not be killed, the man held on even when the monster flew into the sky and meteors are a representation of this monster and the man. Sawtell does not make it clear as to how this connection works, whether it is the monster, the man or their fire-sticks that is the meteor, he simply states that people are afraid of them but also know that they will never be attacked by the monster again.

From the central and southern zones there is consistency between the stories, in that meteors are associated with death or are an indicator of death. The northern zone exhibits less regularity, with a broader range of stories not all associated with death. Most of the stories suggest that meteors are a bad omen, which is interesting as it may suggest that there is something inherent in Aboriginal culture that associates meteors with evil. Although there are several stories about meteors from a wide area of the country none of them say anything about the frequency of the meteors. Observation during the course of a few years would quickly establish that there are some periods of increased meteor activity, known as meteor showers, when one can observe many more meteors than normal. To any observer this would be a special event and it is interesting that no stories have any explanation as to why this would happen.

4.11.4. Eclipses

An eclipse of the Sun is a significant event, causing the Sun to temporarily disappear from the sky and an eclipse of the Moon causes it to turn a red colour. When they occur solar eclipses can only be seen over a very small strip of the Earth whereas lunar eclipses can be seen from all the dark (night time) side of the Earth (Espenak 2004). For this reason solar eclipses are much less common than lunar eclipses, however most of the stories that have

been recorded are about solar eclipses. In most cultures, as with comets and meteors, they are thought to be bad omens and many people are frightened of them. Various myths account for the reason the Sun disappears, mostly it is thought that either the Sun is taken over by or is attacking the Moon, but it is recognised that the Moon is responsible for causing the eclipse, i.e. that the Moon passes in front of the Sun and causes it to disappear. Langloh Parker recorded two myths from the Kamilaroi in New South Wales, both suggesting reasons as to how and why eclipses occur (Langloh Parker 1905). Both stories state that the Sun is a woman who chases the Moon across the sky after he refuses her advances and the eclipse is caused by the Sun overtaking the Moon (records 203 and 204). In fact Langloh Parker does not make it clear whether this is a solar or lunar eclipse she is referring to, one has to assume that it is a solar eclipse, as she says that the Sun overtakes the Moon, which can only occur during a solar eclipse. It is interesting to note that no other ethnographers recorded any accounts of solar or lunar eclipses in this area, although the general data from this location is comprehensive. One can assume that there were no records of solar eclipses because they are uncommon, but it is hard to understand why there would be no stories about lunar eclipses, which are seen more frequently. Perhaps it is the irregularity with which they were observed that meant they were not rewarded with any kind of mythological story.

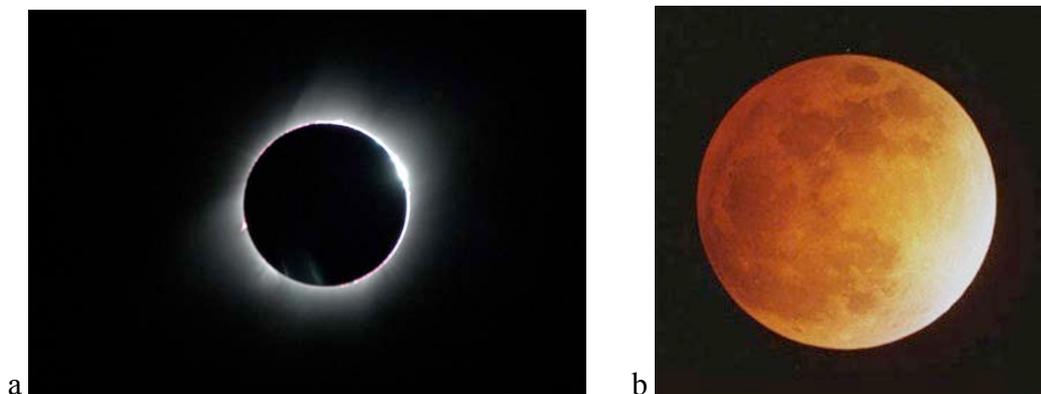


Figure 24: Images of a solar eclipse (a) and a lunar eclipse (b).

Source: <http://www.astronomy.com/asy/default.aspx?c=a&id=4059> and <http://www.skyandtelescope.com/observing/objects/eclipses/3304036.html?page=2&c=y> (both websites accessed 7th April 2008)

An account of a solar eclipse published posthumously in 2005 was collected by Tindale while he was working in southern South Australia (Tindale 2005). A woman with two dogs was somehow associated with the Sun, and when she was killed by two brothers the Sun disappeared out of the sky for a time (record 509). When one of the brothers awoke in the

darkness he realised his mistake and tried to get the Sun back by throwing boomerangs into the sky. The first three failed but the fourth, thrown to the east, brought the Sun back. It can be assumed that the other three boomerangs were thrown to the north, south and west, and it was only the one thrown to the east that could bring the Sun back. This data is a little contradictory in that the Sun will not reappear in the east again once it has disappeared during a solar eclipse. Rather than being a story about an eclipse this sounds more like a muddled creation story as to how the Sun got into the sky. Bates suggests that an eclipse was caused by a man covering the Sun with his hand or body and Clarke says that all eclipses were thought to cause death and destruction (records 477 and 63) (Bates 1904-1912; Clarke 1990). From the same area Tindale noted that people were not afraid of lunar eclipses and says that they were observed without any fear (record 494) (Tindale 1934). Only one account has been recorded from the southwest of the country, in this description the Sun is covered by a large number of people who are looking at a neighbouring group of people (record 383).

There are only a limited number of stories about eclipses from the central zone, two of which were recorded by Strehlow from the Arrernte and Luritja (Strehlow 1907). The Arrernte thought that a large black bird flying in front of the Sun caused a solar eclipse, and a lunar eclipse occurred when the Moon covered his face with the fur of a possum (record 247). Similarly the Luritja thought that a solar eclipse occurred because the Sun was covered by possum hair. In this community it was thought that the Moon sometimes goes into the graves of the recently dead and eats the entrails of the bodies (record 258). He emerges into the sky a blood red colour and everyone can see what he has done. Strehlow says that this last account has nothing to do with lunar eclipses and rather that this is something to do with the new Moon. From this description however, it implies that this is an account of a lunar eclipse when it turns a red colour. It may also be suggested that the version of a lunar eclipse recorded from the Arrernte community is not accurate, there is nothing in the description that links it with the appearance of a lunar eclipse, and it seems more like an explanation of the new Moon. Strehlow may have got his data a little confused here but the evidence is valid if considered vice versa. Spencer and Gillen recorded an account of a solar eclipse several years earlier than the Strehlow material, while they were working with the Arrernte (Spencer and Gillen 1899). It was thought that an evil spirit wanting to take up residence in the Sun caused an eclipse, which it is able to do only for a short while. The

spirit does not survive here long and is dragged out by the medicine men and the Sun returns to normal (record 186).

In the northern zone there is very little information regarding the interpretation of eclipses, Warner noted in Arnhem Land that a solar eclipse was seen when the Sun was covered by the Moon and they were copulating (record 216) (Warner 1937). Morrill described how an eclipse was caused by a member of the community covering the Sun or Moon with a great sheet of bark to frighten the rest of the group in far northeast Queensland (record 270). The stories about eclipses differ widely from account to account, especially with respect to lunar eclipses. This may be due to the variety of changes that can occur during a lunar eclipse; in some cases the Moon can change to a dark disc which is barely visible whilst in other cases it becomes a dark red colour. A description of an eclipse would vary each time it was observed, and it is easy to see why there are so many variations with respect to the stories about lunar eclipses. This makes the data difficult to analyse as there is no consistency between one account and the next. During a solar eclipse, however, the Sun effectively disappears and it can easily be understood why some groups assumed that someone or something was covering the Sun.

4.11.5. Summary

The phenomena discussed here are varied and create several different images and patterns in the night sky, yet they are all considered to be a negative influence or a bad omen. None of the phenomena occur with any obvious regularity and which may account for the reason why so many communities perceived them as indicators for difficult times. It is interesting to note that very few stories about eclipses were recorded in the north of the country, there is no reason for this as they would have been seen in this area with the same frequency as in the south. For legitimate reasons there are no stories from the north about the Aurora Australis. Where there is data from the north, however, it again demonstrates a much wider variability than those in the south and central zones. There is not enough data for each of the objects discussed to be able to form a conclusion as to the relationship between the stories and regions as in total only 45 stories were recorded about these phenomena.

4.12. The Other Stars

The stories contained in this section are those which are valuable but do not fit into any of the previous groupings. A large number of stories that were recorded refer to individual stars, or stars that were not involved in any of the major Western constellations. As such they cannot be discussed as a cohesive group; it was felt that the best method for analysing these stories would be to follow the previous convention and focus on each environmental zone independently. One may assume that each ethnographer only worked with certain groups or communities and that the stories recorded form a coherent account of the night sky. In some cases (for example the Stanbridge stories), the material is inter-related and dependent on other stories for a complete understanding. There are many stories which were recorded individually, but analysis of all of these is unfortunately beyond the scope of this research.

4.12.1. South

4.12.1.1. Stanbridge and the Boorong (Wergaia)

The data recorded by Stanbridge has been repeated many times in other work on Aboriginal astronomy and the depth of his evidence has made his work invaluable (Stanbridge 1857). Aside from the data he recorded about the major features of the night sky, which have been discussed above, Stanbridge also noted stories about some of the smaller and less identifiable stars. Without data like this one might assume that some of these stars were not noted by any of the Aboriginal observers, but Stanbridge has made it clear that this was not the case, and that there was detailed knowledge about all areas of the night sky.

Most indigenous communities throughout the world are aware of the yearly and seasonal changes that occur, from this knowledge they can develop a calendar that is suitable for their culture and environment (Fabian 2001; Turton 1978; Urton 1981). The Boorong noted two different stars or groups of stars they used as seasonal indicators as to when a certain type of food became available. Arcturus (α Boö) and Vega (α Lyr) are identified as the discoverers of Bittur (larvae of wood ants) and Loan eggs (Mallee Fowl, *Leipoa Ocellata*) respectively, the specified star found the food source and told the people on Earth about it (see records 33 and 34); people know that when these stars are in a particular position in the sky the food is ready. Although this is found in some other areas in Australia, this is probably one of the

clearest accounts of this type, where it is specified which month this takes place and the exact position of the star when this happens. Another example, where Stanbridge notes that the stars are used to divide the year is found from Yurree and Wanjel, Castor (α Gem) and Pollux (β Gem) respectively, which appeared at the start of the “great heat” and when the smoke from their fire (represented by Coonartoorung – an unidentified star referred to as “Mirage”) is gone, that it is the start of Autumn (record 50). The Boorong were able to identify the start of summer and the start of autumn. Aboriginal communities would have altered their habits and camps accordingly so as to benefit from the different foods that were available during the course of the year. The foundations for forming a calendar are evident but no data exists that demonstrates any further development.

The star Vega, already identified as the one who discovered the Loan eggs, is also the mother of Altair, who is murdered while he is bathing by the Bunyips. Algiedi (α Cap) is the uncle of Altair and he rescues his remains from the Bunyips. Algiedi is a double star which can be resolved without optical help and it is thought that this represents his fingers feeling on the bank for his nephew’s remains. The position of this star would suggest that he was feeling along the banks of the Milky Way river, but this is contradicted by the evidence as the Milky Way is not a river in this area. The small group of stars making up the constellation Corona Borealis (the Northern Crown) are a boomerang thrown by Altair. Achernar (α Eri) is the mother of Altair’s wives. As with the normal daily practice in Aboriginal culture the mother-in-law and son-in-law exercise an avoidance relationship, the mother never allowing her son-in-law to see her. The positions of these stars in the sky (Altair at RA 19h 50m and Achernar at RA 1h 37m) means that they are essentially opposite to each other, so that what happens on Earth is reflected in the relationships that are formed in the sky.

Stanbridge also noted that there were three pairs of birds in the sky, Sirius and Rigel were the male and female eagle, Canopus and “Rober Carol” (an unidentified star) represent the male and female crow, and τ and υ Sco were a male and female falcon (records 36, 44 and 46). Sirius and Canopus are brothers; Sirius (Warepil) is the chief of the ancestral spirits and his brother Canopus (War) is recognised as the spirit who brought fire down to the Earth (see also the account by Clow, which is possibly a narrative copy of the work by Stanbridge, record 374 (Clow 1903)). The significance of Sirius and Canopus as the two brightest stars in the sky is clearly recognised by this community as the eagle and crow myths in this area

are very important (Johanna Blows has written a detailed account of the importance of the eagle and crow myths in Southwest Australia, Blows 1995). Dawson also noted that Sirius was a male eagle and Canopus was a male crow called Waa (record 70) (Dawson 1881).

4.12.1.2. Ridley and the Kamilaroi

Ridley published a series of articles about the Aboriginal people from the Kamilaroi area containing a small amount of data about their astronomy (Ridley 1873a, 1873b, 1875, 1878). Although most of this is simple accounts of what the individual stars are it does provide a good indication of the range of objects that were observed and noted. One of the most interesting stories Ridley recorded suggests that there was a kangaroo in the sky (record 168). There are very few stories in Australia which place a kangaroo in the sky, if a kangaroo is involved in a story it is mostly seen as an object of a hunt, and is certainly never a Dreaming or Spirit Ancestor. As a wide generalisation there are a large number of birds that are represented by stars, and in contrast there are very few land based animals in the sky. This is a straightforward connection: birds fly and therefore are able to access the sacred night sky, whereas animals stay on land all day and are more profane, hence the dichotomy in the stories. The emu complicates this division, however. The emu, as a bird, is able to connect with the sky; but the emu cannot fly and can therefore never reach the sky. So technically to confirm this generalisation the emu should never appear in the night sky, but it has already been shown that the emu is a common feature of the night sky (section 4.6.5).

There are several other examples of birds being represented by stars in the sky, some larger birds, and others much smaller but one particular species that is conspicuous in its absence is the owl. There is only one record where an owl is represented in the sky, Ridley recorded that ζ and η UMa represented the eyes of an owl as they peered out through trees and shrubs (record 175). There are so many other birds in the night sky, it seems strange that these nocturnal birds have not been placed there, especially considering other nocturnal birds are represented as stars (see, for example, record 472). Dawson suggests this is because people were afraid of them, as they were thought of as an evil omen (Dawson 1881, 49). The issue of which birds are represented in the sky is a complex one; similarly it is difficult to say what types of animals appear in the sky. In general it is not any of the bigger land animals, even when they are some of the biggest food sources and have a significant economic value. A kangaroo provides a lot of meat, but also the fat, skin, bones and sinew of the animal are all put to good use, so a kangaroo was an important animal in Aboriginal life. In contrast an

emu does not have such a high economic value, only providing meat, feathers and fat. The economic value of the animal was of little significance as to whether it was represented in the sky or not.

Ridley recorded that the stars of the Northern Crown (Corona Borealis), Vega and Altair were an eagle's nest, the male eagle and female eagle respectively (record 174). He suggests that the name used for Altair means "eagle in action", the implication being that the parents appear in the sky shortly after the nest to protect their young (as happens when this group is observed). In classical Greek mythology the constellation Aquila (which contains Altair) represents an eagle and it is interesting that there is more than one Aboriginal story which associates this group of stars with an eagle or another bird (see for example 135 and 497). Bates recorded a very different myth about Altair and Vega from the Bibblemun area (record 445). She states that Vega is a man standing up holding out his beard to his two sons (unspecified stars), and Altair is his wife who was speared through the heart by her husband because she didn't look after the two children properly (stars on either side of Altair represent the spear). The children died after their uncle neglected them, and the myth is used as a warning that men should not be lazy and neglect their duties. Bates recorded another myth involving the constellation of Aquila from Ooldea. In this area Aquila represents the crow mother, and Delphinus represents her group of children who follow her (record 472). Delphinus is a small group of stars which appear directly following the constellation of Aquila.

4.12.1.3. Robinson and Tasmania

The data collected by G. A. Robinson from Tasmania during the 1830's is one of only two sources for this area (data re-published in Robinson and Plomley 1966). He recorded that Sirius and Betelgeuse were two brothers, although Plomley suggests that an error was made and it was actually Sirius and Canopus who were brothers (record 231). The only other note Robinson made about stars was that he was shown how a line of three particular stars could be used to predict the weather (record 233). Although he does not identify the stars, the largest was the mother, the second largest was the father and the smallest one, only just visible, was the child. Plomley suggests that the two brighter stars may have been α and β Cen, but he does not identify the third star. It is interesting that the small amount of data that Robinson collected from the communities in Tasmania was associated with the prediction of the weather; especially considering there are no similar accounts from the mainland. The

very limited amount of information from Tasmania does not make it easy to analyse or form any conclusions about the astronomy on the island, but one may assume that it bore little or no resemblance to what is found in the mainland of Australia.

4.12.1.4. Hassell and the Wiilman

Ethel Hassell published a set of stories from the Wiilman, a community located just east of Perth in the south of Western Australia (records 382 to 387) (Hassell 1934). Although Bates worked in this area, it is one of the most neglected parts of the country with respect to the availability of astronomical data. Hassell was not a trained ethnographer, which in some ways is demonstrated by the un-academic presentation of the work. Because so little other data has been obtained from this region there are no other stories to compare her work with, but the information she published is nothing like any of the other data from Australia. One story in particular is about the emu in the sky and how it was blown up there by a strong gust of wind and how there was no place for it in the sky and so it became responsible for holding up the Earth (record 386). Another describes how the stars of Orion and the Pleiades were put up in the sky (also by a great gust of wind) after they fought on Earth (record 385). Other stories describe what the Sun, Moon, planets and stars are, what happens during a solar eclipse, how the Moon got into the sky and a story about the stars of the Southern Cross. Some of these stories are quite long but only relate to the night sky in the smallest way at the end when the characters are translated into the sky. The data from Hassell is special because there is no other information from this region, but the length and detail of the stories perhaps suggests that she altered some of the evidence to make it more appealing to a wider audience.

4.12.2. Central

4.12.2.1. Maegraith, the Arrernte and Luritja

Several authors recorded data from the central desert region including Mountford and Tindale, but some of the most valuable data comes from Maegraith and Piddington (Maegraith 1932; Piddington 1930). Maegraith recorded a vast amount of detail in the short amount of time he spent with the Arrernte and Luritja communities, the data he collected covered a large area of the night sky, the areas he missed were simply those which were not visible to him at the time (Maegraith 1932). Maegraith was told the night sky was divided into two by the Milky Way, one half representing the Luritja community and the other half

the Arrernte community, the idea being that what was seen on Earth (the division of the communities) was also seen in the sky. He stated that many of the stars were the tracks of the characters in the stories rather than the images of the actual characters. Other stars represented campfires but it was rarely thought that stars were the actual characters in the story, it was only the tracks or imprints of a journey that were seen (see for example records 118, 124 and 126). Although other ethnographers recorded this in other areas, it is only Maegraith who discusses this in any detail and gives a reason for it. He suggests that the stars are only seen as tracks, imprints or campfires because the sky was simply a reflection of the land. People are not seen on the land; it is only their tracks or imprints that are seen, so the sky can only be a true reflection of the land if this is how it is perceived. By recording this insight, Maegraith has allowed us a unique view of this particular aspect of Aboriginal astronomy.

One particular aspect of astronomy that Maegraith mentions is demonstrated in a story which repeats itself year after year. The stars α and β Aql are the tracks of two men who are out hunting an emu (an unspecified star); all the surrounding stars are tracks of other hunters. The men catch the emu and kill it, carrying it back to their campsite to cook and eat it. Once the animal is placed on the fire a spirit (mamu) smells it and frightens the hunters away so it can steal the meat. The hunters go out again to catch another emu, which again is stolen by the spirit. This story is played out every year as the characters travel across the sky in pursuit of the emu (record 124 and 125). This simple story shows that the movement of the stars during the year was observed and it was understood how this motion was repeated. Although there are other records of communities using the stars to indicate when certain food types are available, the data recorded by Maegraith here is the only account where it is shown how the story is repeated every year.

Several stories recorded by Maegraith described how certain characters were placed in a particular location in the sky so as to conform to the division of the sky by the Milky Way (see records 117, 118 and 123). He noted three separate, but intertwined, stories about the stars in the western constellation of Scorpius, the significance of these stars probably arising because of their location in the sky on the Milky Way. The three stars at the head of the scorpion, β , δ and π Sco, are three sisters who are returning to the creek (i.e. the Milky Way) from a campsite in the west. They meet Antares (α Sco) who is going west and are persuaded to return with her, hence their position in the sky to the west of the Milky Way

(record 123). Antares is a woman who is accompanied by two other women, τ and σ Sco (the two stars which lie on either side of Antares) and is trying to escape the advances of some men (not identified as specific stars). She is described as being a “red ochre woman”, presumably due to the red colour of Antares (record 122). The stars in the tail of the scorpion represent two men (ι and κ Sco) chasing a third man (λ Sco) who has run off with one of their wives (ν Sco). One of the attacking men holds a spear, and the two smaller stars ζ and η Sco are where the escaping couple were overtaken and killed. The two men returned to their camp and buried the bodies in the creek bed of the Milky Way (record 121). This set of stories about the stars in such a small area of sky demonstrates not only what data Maegraith was able to collect, but also the depth of knowledge that was held. If all the stars in the sky had such stories about them one could easily imagine how their understanding of astronomy would surpass that of any other naked eye observer in any point in history.

4.12.2.2. Piddington and the Karajarri

Piddington worked with the Karajarri people in the far northwest of Australia, an area completely neglected by most ethnographers. Although this community lives along the coast and borders the Kimberley region, the area is classed as a desert region. Piddington recorded a significant amount of information from this area, but as with most other regions along the Western coast of Australia, no other work was carried out there, so no comparisons or confirmation of the information can be made. The stories are a little confused, however. For example, one story tells how Sirius and Canopus were two women out gathering food and were frightened by a snake, the snake being the line of stars between Sirius and Canopus, but there is no obvious line of stars between Sirius and Canopus (record 326). Piddington specifies that this snake, found in several of his stories, is a Bulain, a mythical water snake, but not associated in any way with the Rainbow Serpent found in other Dreaming stories. In one story the Bulain is responsible for drowning two small birds and in another looked after a small child before eating and spitting out the child’s mother (records 325 and 327). The Bulain is represented in these two records as the stars at the head of the Scorpius constellation, and as bright but unspecified stars in the sky, respectively. The data recorded by Piddington indicates that the astronomy in this area was similar to that recorded by Maegraith. He states that some of the stars were the footprints, or tracks of characters in the stories as they made their way across the sky (records 148 and 325). This may be used to confirm the boundaries that have been created to divide the country into the three areas and that their astronomies verify these physical and cultural links.

4.12.2.3. Tindale, the Alyawarre and Ngaanyatjarra

Tindale spent time with many communities throughout Australia. Some of the data he collected during his lifetime has remained unpublished, a lot of which is from the central desert region, where he lived with the desert communities of Alyawarre and Ngaanyatjarra (Tindale 1930, 1935a). The data collected by Tindale is different to what Maegraith recorded, even though they were working within the same region at about the same time. The stars in the stories recorded by Tindale are not necessarily the brightest or most obvious in the sky, or even the brightest ones in a certain constellation. He suggests that the stars ϵ and η Sgr are two young men who are hunting a kangaroo (record 487). The kangaroo is not represented by specific stars; he says only that it is a bright patch in the Milky Way, the brighter star of the two is the older brother who is sneaking up on the animal from behind, the other brother is spearing the animal from the front. This data corroborates the idea suggested above that kangaroos are not found in the sky unless they are being hunted. Tindale also recorded that α Aql represented Kainga, the crow, β and γ Aql represent the bird's outstretched wings (record 497). The configuration of the stars in Aquila lends itself to the representation of a bird with its wings outstretched, and the data shows that there were several communities who made this association (see records 135, 174 and 472).

4.12.2.4. Mountford, the Pitjantjatjara and Junkandjara

The data Mountford collected from the Pitjantjatjara and Junkandjara communities in the central desert was amassed over a long period of time and published in various articles and books. As with Tindale, Mountford noted that stars of Aquila were thought to be a crow, whose parents were Vega and the "whole constellation of Delphinus" (record 135). These stars lie close to each other in the sky which is why they would be considered as a family. Mountford also notes that the two smaller stars on either side of Altair are the feather decorations of the birds, which, again, is similar to what was recorded by Tindale in neighbouring communities. Two further stories Mountford recorded from this area describe the actions of some young men as they passed through the process of initiation, both stories suggest that the tracks of these initiates can be seen as stars as they travel across the Milky Way, either as they escape their pursuers or as they try to rescue some of their sacred objects which have been stolen (records 111 and 144). Again this is similar to some of the other data recorded in this area; and it is possible to conclude that the method of seeing the stars in

the sky as tracks rather than as characters or parts of characters in the story is found in most desert communities. This may be due to the environmental conditions in this region, which lend themselves towards this kind of interpretation. The ability of a hunter to provide for his family often depended on his skill as a tracker, and these skills were vital for many of the people living in some of the harsh desert conditions found in central Australia. The emphasis was placed on the land, and what could be seen on the land as a result of people and animals passing through and using the land. Tracks of animals were followed, the location of waterholes and previous campsites was known and the land was understood by a series of intricate stories and myths about the landscape. The communities in the desert areas, perhaps more than any other region in Australia, were dependent on their intimate understanding of the land and their environment for survival and their detailed knowledge of the night sky is simply an extension of this knowledge system.

4.12.3. North

4.12.3.1. Mountford, Arnhem Land, the North and the Tiwi Islands

Mountford published a substantial amount of ethnographic data from Arnhem Land and the surrounding areas, the result being that he recorded approximately half of the stories from this area. Analysing all of the data Mountford collected from Arnhem Land, the North and the Tiwi Islands together, an image is produced where the intimate connection with the environment is seen through their astronomy. In contrast to the desert areas, the focus was not on the land, but on the water and their dependence on it to find and provide their food. Many of the stories from this region have some association with the water, tides or fish, their close connection with their environment naturally being displayed in their interpretation of the night sky and understanding of astronomy. One animal whose natural habitat is the coast and floodplains in this area is the crocodile. The crocodile is an integral part of life in this area, the threat of attack is constant and people are wary of rivers and water sources where they are found, because of the annual flooding, however, the crocodile can be found in almost any location. Due to this, one would imagine the crocodile would be a main character in many of the stories about astronomy, but the opposite is true. Out of almost 520 stories in the database there are only four which mention crocodiles, one of these was from the Riverine area in southern Australia (where crocodiles are not found) (record 193), and in another the crocodile is only a minor character (record 381). The other two actually place a crocodile in the sky and include it in the fabric of the story, both were recorded in Arnhem

Land (records 27 and 429) (Maymuru 1991; Mountford 1956). One would assume, however, that by having the Milky Way as a river in the sky it would follow that a crocodile would be found in the river (as there are few, if any, rivers in Arnhem Land where crocodiles are not found). There could be many reasons the crocodile is not placed in the sky, it could be the same reason there are no kangaroos in the sky or it could be because of the danger they pose that meant that were not visualised in the sky with all the other creatures and people.

Mountford noted when he was working in this area that it was not always the brightest stars that captured the imagination, the focus was often placed on a group of stars rather than one or two individual ones. He suggests that the stars at the head of the Western constellation of Hydra were singled out and made the focus of a constellation thought to represent a crab (record 1). Some unidentified stars in Lynx were two scorpions, a married childless couple who search for food along the length of the Milky Way (record 4). In both these cases the stars that are the focus of the story are unremarkable and surrounded by stars which are much brighter or more significant. Mountford states that he found this to be the case in more than one location in this area although Maegraith found that the emphasis was placed on the colour of the stars rather than their luminosity in the desert areas (Maegraith 1932, 25). No ethnographer made any comparable association in the south of Australia although the data does tend to focus on some of the brightest stars and constellations. This, however, could be the Western influence on the data and the astronomical knowledge of the recorder rather than the bias of the Aboriginal stories.



Figure 25: Bark painting of the crab constellation, see record 1.

Source: Mountford 1956, 480.

4.12.3.2. Haddon and the Torres Strait Islands

The islands of the Torres Strait are located beyond the northern tip of Cape York in Queensland and are subject to influences from both Australia and Melanesia. Linguistically the islands are linked with Australia, but culturally they are closer to Melanesia (Beckett 1975). The principles of agriculture were known, although its importance varied and it was used less on the islands closer to Australia. Most of the anthropological data about the islands was recorded during the Cambridge Anthropological Expedition of 1898 (Haddon 1890, 1904-1935). William H. R. Rivers, who accompanied Haddon on his expeditions, collected nearly all the stories about astronomy from these islands. Rivers recorded a great amount of detail about their astronomy, which shows how the influence of both Australia and Papua New Guinea affected their interpretation of the night sky (see records 550-559) (Rivers 1906, 1912). One story about a man, Tagai, covers a large area of the sky, including stars from the constellations of Scorpius, the Southern Cross, Corvus, Centaurus and Lupus (record 552). The detail Rivers was able to collect about this constellation surpasses any other story from the mainland, and from the data one is able to construct an image of how the man Tagai, his canoe, and the other characters in the story were represented in the sky.

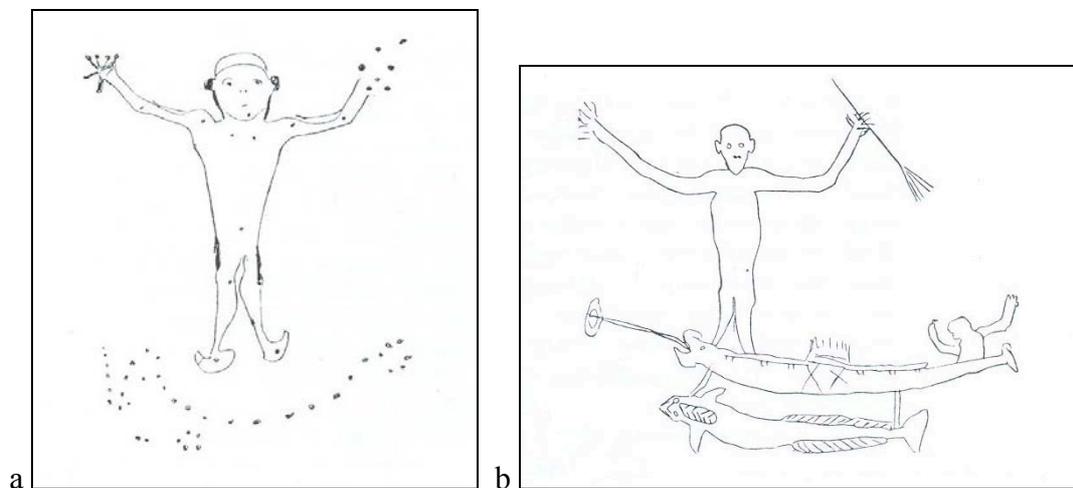


Figure 26: The images above are the diagrams Haddon collected whilst he was in the Torres Strait Islands.

Both images, a and b, show the constellation of Tagai.

Source: Rivers, 1912.

This is an interesting contrast to many of the other stories from mainland Australia, which rarely include a description of something that could be identified as a constellation as it is understood in the Western sense of the word. Rivers noted that the appearance of this constellation and its position in the sky was used as a seasonal indicator and also used for

navigational purposes. Again this is in contrast to most of the astronomy in Australia, where stars were rarely used for navigation. The fact that the Torres Strait Islanders created a constellation in the sky and used it for navigation demonstrates that their astronomy was perhaps more closely connected with the cultural astronomy of Papua New Guinea, Melanesia and Indonesia.⁵ On one of the islands, Mer (also known as Murray Island), Rivers was informed that the Moon was male and married to the Evening Star, but on Mabuiag he was told that the Moon was a female who became pregnant once a month (records 550 and 559). This difference of opinion within one localised cultural group occurs in some other places in Australia but Rivers also noted that some of the constellation names changed when they “belonged” to different communities (record 554). Only one other original story from the islands has been recorded since the work by Rivers, Eseli recorded a story from Mabuiag about two brothers who resembled men but also controlled the elements (record 237) (Eseli, Shnukal et al. 1998). The basic elements of this story are very similar to the Tagai story Rivers recorded on Mer, although different names are used. The similarities demonstrate that there was a close relationship between the islands despite their physical separation (Mer and Mabuiag are approximately 200km apart), but this also shows how the stories were developed independently of one another. The data from the Torres Strait Islands is important because it represents the link between Australia and Melanesia and how the two distinct cultures have been blended together, with elements of both cultures being used to form the unique astronomy on the islands. Other stories from the Torres Strait Islands include a detailed description of a shark in the sky that was found on both Mer and Mabuiag, the constellation was made up of stars from Ursa Major. The difference between the stories on the two islands is that on the two stars that are the sharks eyes on Mer become two pilot fish on Mabuiag. There are several more examples given by Rivers in his account of Torres Strait Island astronomy, see records 550-558.

⁵ Very little research has been conducted into the astronomy of Papua New Guinea and the neighbouring islands, Kotz mentions these islands briefly but there are few further references to be found for this area (Kotz 1911).

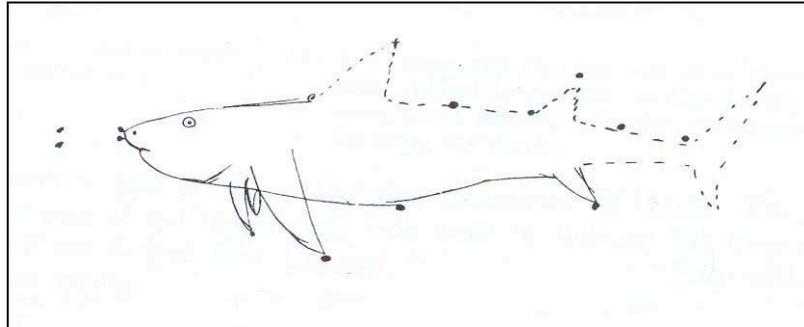


Figure 27: Drawing of the shark constellation by Naii on Mabuiag.

Source: Rivers, 1912.

4.12.4. Summary

There are a number of stories in this group which have not been discussed here, either because they do not include enough detail, or because they do not contribute a significant amount to the understanding of Aboriginal astronomy. This section shows the greatest diversity of myths and stories with respect to Aboriginal astronomy, but it also offers the greatest opportunity to gain a detailed understanding of the creation and development of the astronomy. It demonstrates the wide variety of objects in the night sky that were observed and the range of the myths with which they were associated. It can be seen that individual communities placed an emphasis on different aspects of the night sky and that this was often related to their environment or to the external cultural influences they were subject to.

4.13. Summary

A great deal of material has been collected as part of this research; the accompanying database includes stories from all over Australia and about a large number of objects in the night sky. The analysis has shown that a good many birds are represented in the sky, but that there are very few other animals. Emphasis was placed on the objects in the sky that appeared regularly, although the focus was not necessarily on the brightest stars or objects. The majority of the stories originate from the southeast of the country but this is also the group which has shown the least diversity in the records. This is probably due to the early Western impact in this area in that this has led to some of the data being re-published over time. At first it appears that there is a lot of material from the south, and specifically the southeast, but this analysis has shown that despite the quantity of data there is little of quality. The repetition of a number of the stories and the strong Western bias has meant that the original context and meaning is not always clear. In contrast the data from the central and northern zones has exhibited greater variability and a clear link to the environment from which it originated. The central desert stories have revealed how the sky was thought of as reflection of the land; the relationships that are so important on Earth have been given a place in the sky. In the north of Australia the emphasis is different, the focus being placed on the relationship between the land, sea and sky. The analysis of this material has demonstrated the depth of knowledge about astronomy within Aboriginal Australia and how this knowledge is intimately connected with the environment and culture.

5. Conclusion

Examination of the data has shown that there is great diversity within Aboriginal astronomy, but also that there are common themes in some of the accounts. This section brings together the themes that have been identified in the analysis and, where appropriate, makes some generalisations that apply right across Australia. Some of the broader themes relating to Aboriginal astronomy and its impact on Aboriginal culture are also discussed.

5.1. Images in the sky

One of the most prevalent aspects of Aboriginal astronomy is the considerable number of birds represented in the sky. It is not only the largest birds that become Aboriginal constellations, such as the emu and brolga, but also some of the smallest parrots, pigeons and doves. One can suggest that the reason there are so many birds in the sky is because through flight they are able to access the sky, although this idea breaks down with respect to the emu. The Coal Sack/emu connection is one of the most widespread myths in Australia, but the emu is flightless. The reason the emu was so commonly placed in the sky is not clear: it was not of huge economic significance nor was it particularly common in many areas. The popularity of the emu story may originate in one particular region, with one particular ethnographer working with a community making this story appear to be an integral part of general Aboriginal mythology. Stanbridge made the first recording of the Coal Sack/emu story in 1857, and since then there has been plenty of opportunity for this story to spread to other areas. If this is true, however, it seems surprising that other stories by Stanbridge have not also become just as widespread.

Overall the data shows that there are very few mammals represented in the sky. Aside from kangaroos and wallabies there are few other animals of a significant size in Australia, which may account for their absence in the sky. The animals that are included in the stories are often those which are of most economic importance to the community, such as kangaroos and dingoes in the inland areas and fish and turtles in the coastal areas. None of these animals, however, are actual characters in the stories and are given the same status that they have on Earth; the kangaroos, fish and turtles provide food and dingoes are hunting

companions. There are few accounts of reptiles being present in the night sky, which might be due to the predominance of the Rainbow Serpent myth cycle in so many areas of Australia (see for example Radcliffe-Brown 1926). It is well known that Australia is home to several species of the most deadly spiders, but none of these has been immortalised in a night sky story, except one myth collected by Bates (record 446) which involves a redback spider. There are no other insects in the sky at all; it must be presumed that their small physical size made them too insignificant to be included in any stories. Also noticeably absent from any stories are bats, which are a very common sight in some areas of Australia, especially at dusk, and it has also been mentioned that there are no significant stories of owls in the sky. As a generalisation, the evidence shows that very few nocturnal animals or birds are part of any story in Australia.

A concept that has been discussed at length in some of the other historic literature (see for example Elkin 1964; Worms 1986) is that of the “Supreme Being”, known under a variety of names throughout Australia. Worms suggested that the Supreme Being was found in every Aboriginal culture, but other studies have shown that it was mostly restricted to the southeast of the country (Swain and Trompf 1995; Worms 1986). In this area the influence of the Christian missionaries would have been strongest and Swain discusses the notion that the Supreme Being was simply an Aboriginal interpretation of the Christian God (Swain 1985). It is easy to identify the similarities between these two deities and it is interesting to note that although the Aboriginal Supreme Being was sometimes involved in the stories of the night sky, it was never given a physical form or represented by a particular set of stars, which again reflects the omnipotent but physically invisible Christian God. If the concept of the Supreme Being was as important as some authors have suggested one would assume that it would naturally follow that there was some kind of physical incarnation of this being, as the majority of other spirits in the Aboriginal culture were represented in the night sky. Perhaps this is further confirmation of the idea that the Supreme Being was an imported concept which only arrived in Australia in the last 200 years.

5.2. Journey across the sky

In many of the stories there is a description of the character’s journey across the land and into the sky and in some cases from the sky back to the earth. One of the features of this is

the method of reaching the sky. The following methods are all used: a tall tree (or one which extends into the sky), a rope, a ladder, a gust of wind, and spears or fish bones joined end to end. The majority of stories relate to the use of a tree, specifically a pine tree (records 99, 309, 347, 371, 400 and 513). Several stories say that the seven sisters of the Pleiades use a pine tree to escape their pursuer, suggesting that the pine tree is the girls' totem (see records 194, 380 and 414). Although there are other varieties of tree used in some of the stories, the pine tree is the one which is most commonly associated with the sky. Trees are commonly used in the stories as a connection between the sky and the world on earth. Worms (1986) suggests that this is a universal theme of the cosmic tree or tree of life, a tree that has its roots on earth and stretches its branches into the sky and is able to connect the two worlds. Other interesting aspects of these stories are how the ladders or ropes are created; fish bones and barbed spears are connected end to end to make a ladder and hair is also made into a rope. In the north of Australia several stories use fish bones or a fishing net as a method of translation into the sky, as one would expect owing to their relationship with the sea (records 17, 214 and 351). The stories from the north show the greatest diversity of methods used, although most of the stories originate from the southern areas of Australia. There are only two stories from the central regions, both of which involve a tree. Some stories suggest that the elders of a community were free to travel between the earth and sky worlds whenever they chose.

An Aboriginal concept associated with the idea of travelling through the landscape and translation into the sky is that of the Songlines. The Songlines are the Dreaming tracks and paths followed by the Ancestral Beings during the creation period. Although they are not discussed in any of the stories recorded here they are a central part of traditional Aboriginal culture and are used as part of a complex division of time and space (Clarke 2003). In some places in Australia they are used as the conceptual boundaries between communities, rather than physical ones, and it has been suggested that the paths followed by one ancestor were known by several neighbouring communities (Chatwin 1998). Some stories mention that some of the Dreaming Ancestors followed paths on land which then continued as tracks across the night sky, but nothing further that could prove that the tracks connect the earth and sky in the Aboriginal world. There is very little mention in any of the material of a direct connection between the earth-based Songlines and any of the tracks in the sky (Cairns and Harney 2003 being the only exception). It is interesting to note that a concept such as the Songlines, which was found throughout Australia, was apparently restricted to the

ground, and that no association was ever made with how the Dreaming characters completed their journeys into the sky. This is in contrast to other evidence which indicates that the land, sea and sky were visualised together to form a complete cosmoscape.

5.3. Transmission of knowledge

It is impossible to determine how the Aboriginal knowledge of the night skies was transferred between communities or how it first arrived in Australia. The first people to arrive in Australia would likely have had a detailed knowledge of the night sky, since this would have been a considerable help in successfully navigating their way to and from Indonesia and Papua New Guinea. The manner in which Australia was populated is the subject of current academic debate, and it is unclear whether communities developed independently of each other, or are of one common heritage; several methods have been suggested (see for example Lourandos 1997; Mulvaney and Kamminga 1999; Thorne 2005). Similarly this discussion can be applied to astronomy. The cultural associations between neighbouring communities would have been sufficient to maintain some of the common beliefs about the night sky in the densely populated areas. In the desert regions however, Aboriginal people occupied much greater areas and the communities were physically (and also culturally) more distant from each other (Clarke 2003, 55). Even if one assumes that the Aboriginal groups in the central desert were all originally descended from the same group, it is possible that over time these groups established a more independent identity, and hence independent astronomy, than those in the more densely populated regions. In the northern zone a great diversity of culture is found within a relatively small area, and this is reflected in their astronomy. The mythology from this area exhibits a close connection with the environment whilst demonstrating that each community had its own unique astronomy. Different strands of Aboriginal astronomy appear to have developed as a result of a shared heritage being changed over time to accommodate the appropriate cultural and environmental conditions.

5.4. Conclusion and Future Research

The study of Aboriginal astronomy brings together several different disciplines and can offer a unique insight into the Aboriginal culture and its relationship with the environment. The night sky is a fundamental part of the environment and this is reflected in the role it plays in Aboriginal society and Dreaming stories throughout Australia. Although it is understood that Aboriginal Australia is not one single unified country, this study has included data from every region in the country in order to form a more complete picture. The nature of the data has meant that this study has concentrated on the historical ethnographic reports about the night sky. Inherent problems with the historical data and the size of the country being studied have produced a diverse range of results. By classifying the data by location and object, these complications have been minimised and a comparison of related material has been possible. Through analysis of the data it has been possible to identify some common themes. Aboriginal people have a profound and intimate connection with their landscape and surroundings and this study has shown how this relationship may extend into the sky. A significant proportion of the data exhibits some kind of association with the land or the sea, and the sky is often considered to be a simple reflection of these environments. It has been shown that many communities perceived birds in the night sky, but few other animals. There are many more accounts relating to the fixed stars and regular features of the night sky than to the planets and other irregular occurrences such as eclipses and the appearance of comets. Initially it appeared that the astronomy from the southern zone of Australia, specifically in the southeast regions, would provide the most information, but this is not the case. Most of the data from this area has been influenced by Western astronomy and overall it demonstrates less of an intimate connection with the environment so clearly defined in the central and northern zones. The data from the central and northern zones has been exposed to fewer external influences and the ethnographic recording methods were perhaps more reliable, the result being that this data is a more accurate reflection of the Aboriginal interpretation of the night sky in these areas.

It is, perhaps, naïve to try and study the astronomy of a country so diverse, especially when in so many cases it is impossible to separate the astronomy from the intimate landscape-based culture and way of life. The ideal way to study any indigenous astronomy is to learn about it within the culture that has created it, where one can be informed directly about the interpretations rather than relying on material that was recorded decades ago. Unfortunately

in Australia, this is now possible in only a very small number of communities and locations, and ones which have decided to actively restrict access to their knowledge. There are some communities that have held on to their traditions and disallowed people access to what so many other Aboriginal groups were forced to give up. Perhaps in the future members of these communities and academics will find a way to study these traditions together without taking them away from the people who own them. It may also be possible to share this knowledge without prejudice whilst demonstrating that the term “Aboriginal astronomy” refers to more than what has been recorded here, representing some of the most cognisant and intimate astronomy in the world. It is hoped that this research has shown that Aboriginal astronomy is about far more than just seeing an emu in the sky, and that the depth of knowledge demonstrated by these incredible people is something that cannot be exhibited by a simple written report. Aboriginal astronomy has infinitely more meaning to the people who can understand it in terms of the landscape it relates to and the culture from which it was developed.

6. Appendices

6.1. Appendix A: Astronomy Database

The CD accompanying this work contains the astronomy database. The database is in a Microsoft Access file, containing the following elements:

- Astronomy Table: this includes the full details relating to all 559 stories.
- Queries: breakdown of the results either according to environmental zone or object containing only limited records about each of the stories shown in a datasheet view.
- Forms: accessible view of both the complete database of stories and of limited records relating to either the environmental zone or object.

The data can be filtered in all of these formats to provide a set of results defined by the limiting conditions.

Abbreviations used in the database are shown in the tables below.

Object	Object Code
Moon	M
Sun	S
Sun and Moon	SM
Orion and the Pleiades	OP
The Southern Cross, the Pointers and the Coal Sack	SC
The Milky Way	MW
The Magellanic Clouds	MC
Venus	V
The Planets	P
The Aurora Australis, Comets, Meteors and Eclipses	PH
The Other Stars	OS
Mixture	MX

Table 4: Object code abbreviations used in the database

Source	Source Code
Ahern	AH
Allen	AL
Anon	AN
Banbuy	BN
Barker	BA
Basedow	BS
Bates	B
Berndt	BB
Beveridge	BV
Blows	BL
Bradley	BR
Brothers	BT
Bulmer	BU
Butler and Austin	BUA
Capell	CA
Cawthorne	CW
Clarke	C
Clow	CL
Dawson	D
Dixon	DX
Enright	EN
Eseli	ES
Flanagan	FL
Fraser, A	FR
Fraser, J.	FRJ
Greenway	GR
Harney	HY
Hassell	HS
Haynes	HA
Heathcock	HC
Hernandez	HZ
Holmes	HO
Howitt	HW
Hudson	HD
Hughes	HU
Ingram	IN
Isaacs	IA
Kable-Erambie	KE
Kite	KI
Koch	KO
Kunike	KU
Laurie	LA
Laves	LV

Maegraith	MA
Manning	MN
Marshall	MS
Massola	ML
Mathews, Janet	MAJ
Mathews, John	MJ
Mathews, R	MR
Maymuru	MU
McConnel	MCC
McDougall	MC
Meyer	MY
Minyalk	MI
Morgan	MG
Morrill	MO
Mountford	M
Mowaljarlai	MM
Ngakyunkwokka	NK
Ngitji	NG
Nordlinger	NO
Palmer	PL
Langloh Parker	P
Piddington	PI
Purcell	PU
Puruntatameri	PUR
Radcliffe-Brown	RB
Rankine	RK
Ridley	R
Rivers	RV
Roberts	RT
Robinson	RO
Roe	RE
Roth	RH
Sawtell	SW
Schurmann	SC
Scott	SO
Semple	SP
Sharp	SH
Sims	SI
Brough-Smyth	SM
Spencer and Gillen	SG
Squire	SQ
Stanbridge	S
Strehlow, C.	ST
Teichelmann	TE

Thomas	TH
Tindale	T
Uniapon	U
Warner	WA
Wells	WL
Winterbotham	WI
Worms	WO

Table 5: Source code abbreviations used in the database

Zone	Zone Code
Tropical North	N
Central Desert	C
Temperate South	S

Table 6: Zone code abbreviations used in the database

Region	Region Code
Southwest	SW
Spencer	SP
Riverine	R
Southeast	SE
Tasmania	T
Northwest	NW
Desert	D
Eyre	E
Kimberley	K
Fitzmaurice	F
North	N
Arnhem Land	A
Gulf	G
East Cape	EC
West Cape	WC
Torres Strait	TS
Rainforest	RA
Northeast	NE
Not Specified	NS

Table 7: Region code abbreviations used in the database

6.2. Appendix B: Aboriginal Australian Map and Landscapes

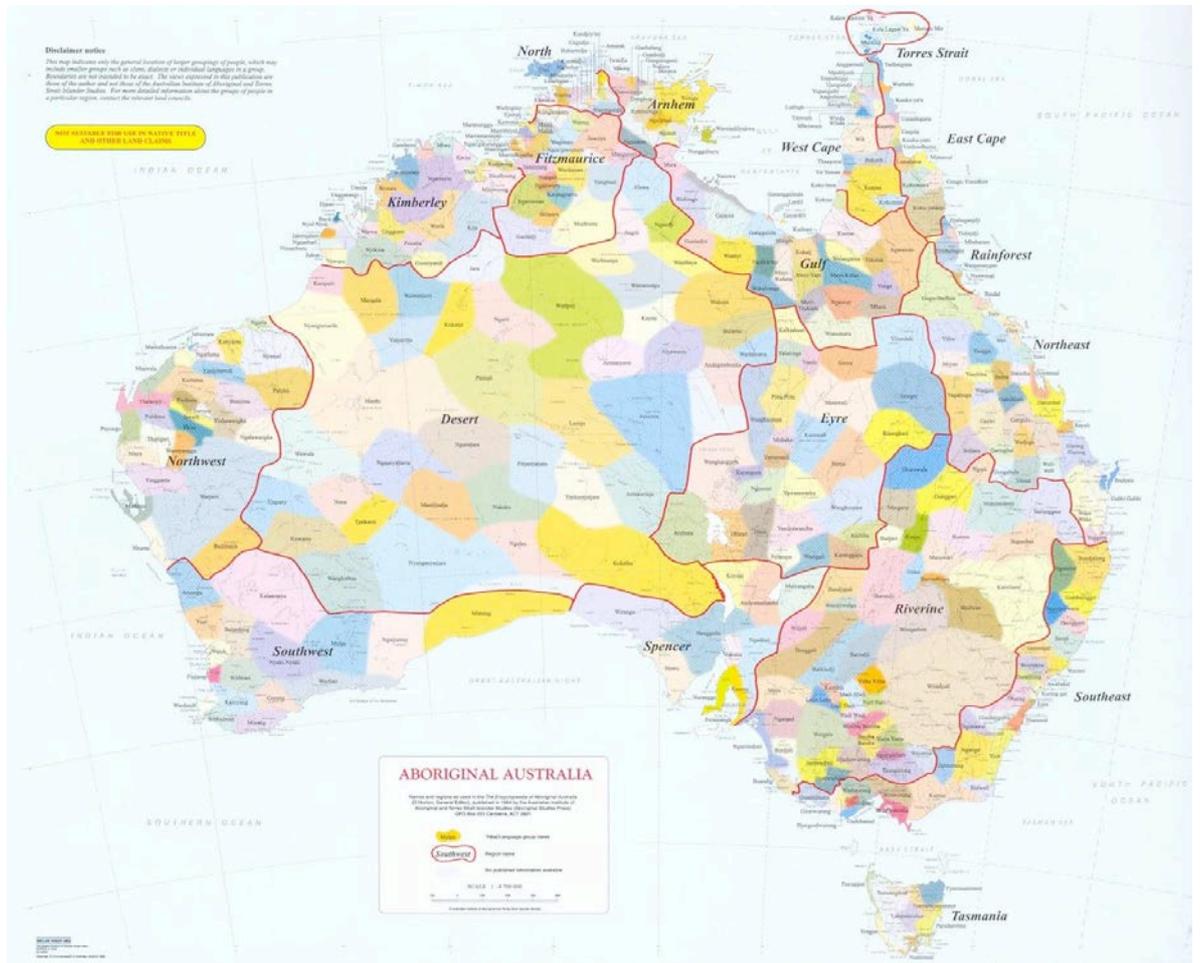


Figure 28: Copy of the Horton map of Australia showing all the outlines of the Aboriginal communities.

An original high quality version of this map is available at:

http://www.aiatsis.gov.au/aboriginal_studies_press/aboriginal_wall_map/map_page

Source: Horton 2000

The following photographs are images of typical landscapes in some of the 18 regional groups used in this research.



Figure 29: Arnhem Land. Image taken from Ubirr in the Northern Territory of the Arnhem Land plateau.

Authors own photograph.



Figure 30: North. Yellow Waters in Kakadu National Park, some of the typical wetlands in this area.

Authors own photograph.



Figure 31: North. Typical vegetation in the north area during the wet season.

Authors own photograph.



Figure 32: Rainforest. A typical rainforest environment.

Authors own photograph.



Figure 33: Rainforest. An example of the landscape in the Rainforest area.

Authors own photograph.



Figure 34: Desert. Image of the desert landscape taken from the air.

Authors own photograph.



Figure 35: Desert. Image of the typical desert landscape around Alice Springs.

Authors own photograph.



Figure 36: Spencer. Flinders Ranges.

Authors own photograph.



Figure 37: Spencer. Image of the typical environment in the northern parts of the Spencer area.

Authors own photograph.



Figure 38: Southeast. The forests in this region a few months after a bush fire.

Authors own photograph.



Figure 39: Southeast. The southern coast of Australia.

Authors own photograph.

6.3. Appendix C: Further analysis of the results

The following figures and tables show a further breakdown of the results, demonstrating how much data was collected within each region, and what night sky object it related to. Table 8 and Figure 40 show how many stories were recorded from each of the 18 environmental regions. Table 9 and Figures 41 and 42 show these results in more detail by categorising the results by both object classification and regional group. Although the database includes 559 stories, only the 526 original accounts have been included in this further analysis. Table 9 and Figures 41 and 42 show only the 510 original stories where the location has been specified.

Regions	Total	Percentage
Southwest	41	8%
Spencer	37	7%
Riverine	120	23%
Southeast	43	8%
Tasmania	5	1%
Northwest	5	1%
Desert	107	20%
Eyre	11	2%
Kimberley	14	3%
Fitzmaurice	1	0%
North	24	5%
Arnhem Land	47	9%
Gulf	15	3%
East Cape	6	1%
West Cape	8	2%
Torres Strait	12	2%
Rainforest	3	1%
Northeast	12	2%
Not Specified	15	3%
	526	100%

Table 8: Breakdown of the results by regional location (original stories only)

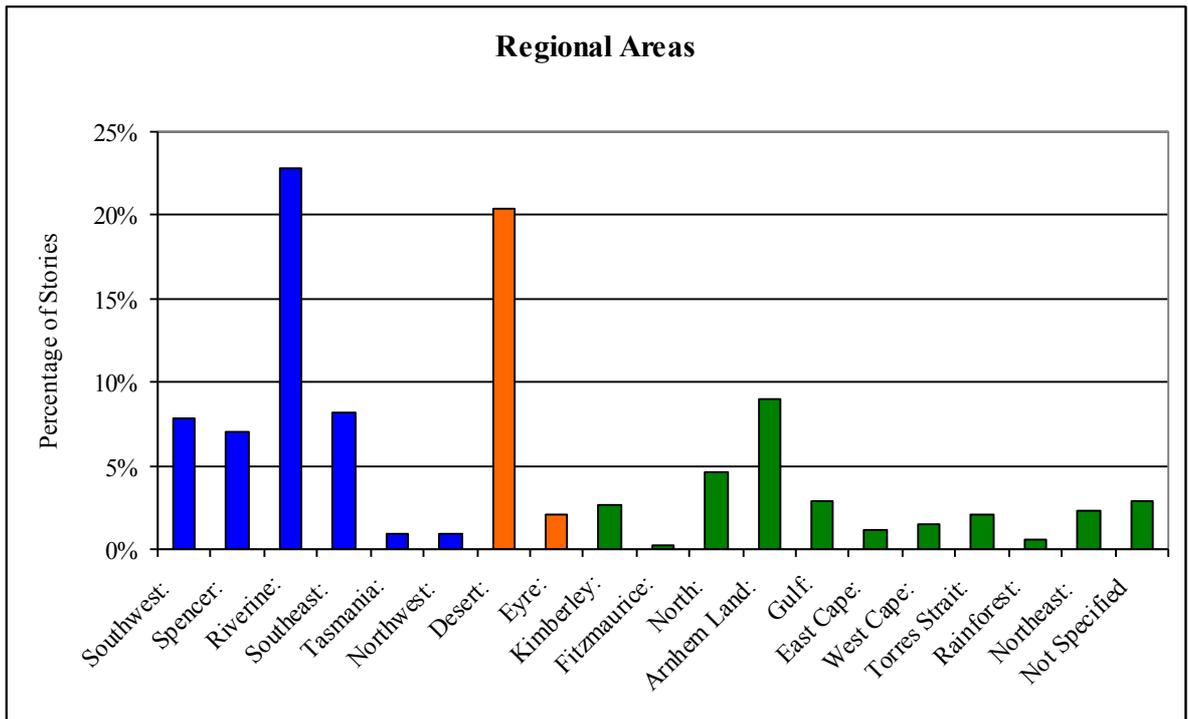


Figure 40: Chart showing the percentage of the stories from each of the regional locations.

Regional Zones	South	Central	North	Totals
Moon	34	16	34	84
Sun	15	5	13	33
Sun and Moon	7	1	7	15
Orion and the Pleiades	28	15	11	54
Southern Cross	24	10	11	45
Milky Way	18	9	17	44
Magellanic Clouds	7	7	2	16
Venus	9	5	9	23
Planets	15	1	0	16
Other Phenomenon	22	12	10	44
Other Stars	50	31	19	100
Mixture	22	6	8	36
Totals	251	118	141	510

Table 9: Number of stories by object classification and regional zones.

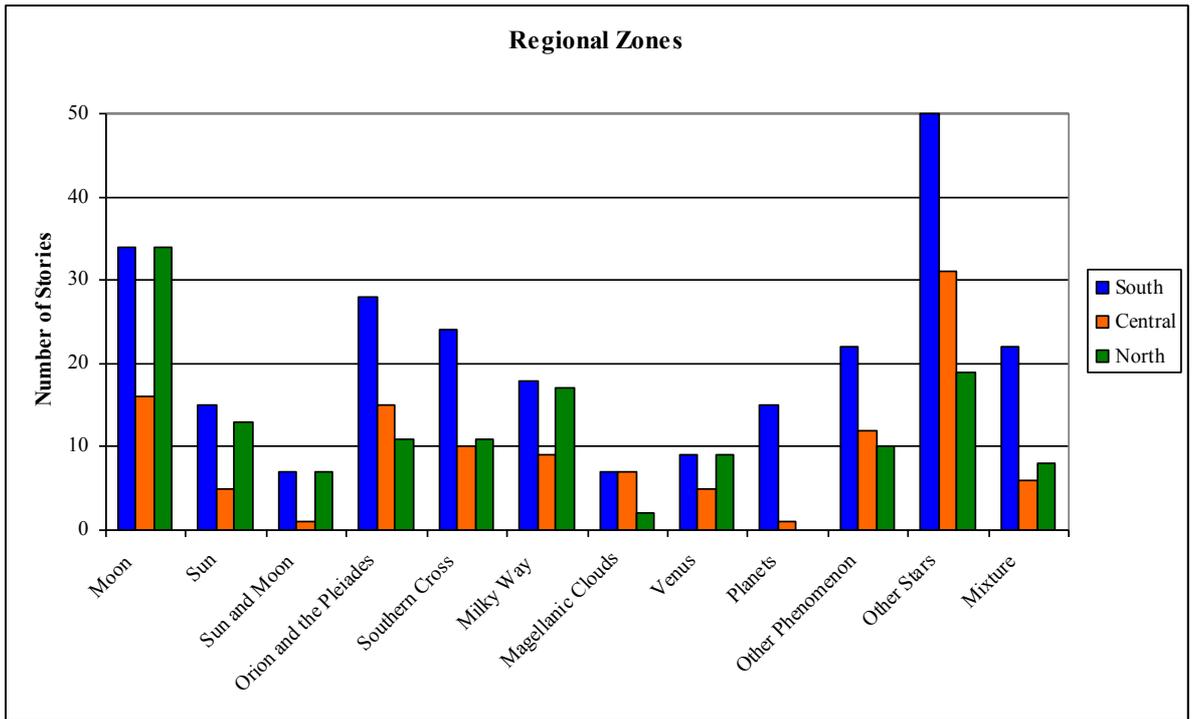


Figure 41: Chart showing the number of stories by object classification and regional zone

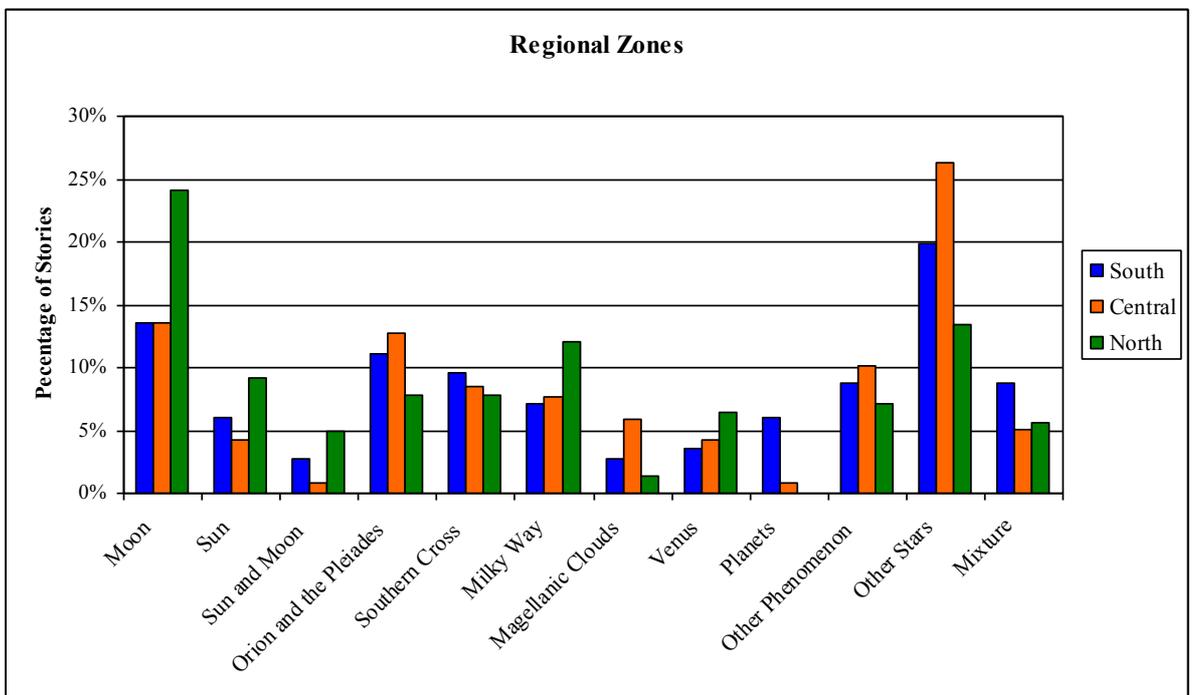


Figure 42: Chart showing the percentage of stories by object classification and regional zone.

Figures 41 and 42 essentially show the same results, Figure 42 shows percentage distribution of the results rather than just the numbers within each region (which is shown in Figure 41).

These two figures show that the stories are approximately equally distributed within each of the three regional zones. In Figure 42 there is a high proportion of Moon stories from the North, although this is not so clear in Figure 41. The only other anomaly in Figure 42 is the high percentage of stories in the other stars group, especially in the central zone. It is thought that this discrepancy is only due to the recording bias in this area rather than any significant difference in their astronomy.

6.4. Appendix D: Constellation abbreviations

The following table lists the constellation abbreviations used in the text.

Abbreviation	Constellation
Aql	Aquila
Boö	Boötes
CMa	Canis Major
Cap	Capricornus
Car	Carina
Cen	Centaurus
CrB	Corona Borealis
Crv	Corvus
Cru	Crux (Southern Cross)
Del	Delphinus
Eri	Eridanus
Gem	Gemini
Hya	Hydra
Lup	Lupus
Lyn	Lynx
Ori	Orion
Sgr	Sagittarius
Sco	Scorpius
Tau	Taurus
UMa	Ursa Major

Table 10: Constellation Abbreviations

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