

# An Overview of Australian Aboriginal Ethnoastronomy

PHILIP A. CLARKE

## Abstract

This paper describes some of the commonalities and differences of Australian Aboriginal ethnoastronomical traditions recorded from a wide variety of sources in different periods and provides a sample of the available material. Although the mythology concerning the heavens is diverse, it is unified by beliefs in a Skyworld where spirits of the deceased reside with Creation Ancestors. In Aboriginal Australia the regular movement of celestial bodies was used to measure time, while sudden changes in the sky were treated as omens. It is demonstrated that the aesthetics of Aboriginal interpretations of the heavens are akin to that expressed through their art traditions. Across many diverse Australian Aboriginal cultures the Skyworld remains a "canvas" upon which cosmological traditions are traced.

## Resumen

El presente estudio describe algunos elementos en común y otros que difieren en las tradiciones etnoastronómicas de los Aborígenes australianos provenientes de una gran variedad de fuentes recopiladas en diferentes periodos, lo que constituye una muestra del material disponible. Aunque la mitología referente al cielo es diversa, es común la creencia en un Mundo Celeste en donde residen junto con los Ancestros Creadores los espíritus de los muertos. En la Australia aborígen, el movimiento regular de los cuerpos

celestes fue utilizado para medir el tiempo, mientras que los cambios bruscos en el cielo eran tomados como augurios. Se ha demostrado que la estética de las interpretaciones aborígenes del cielo tiene mucho en común con lo que se manifiesta mediante sus tradiciones artísticas. Entre las numerosas culturas de los aborígenes australianos se percibe el Mundo Celeste como un telón de fondo sobre el cual se plasman las tradiciones cosmológicas.

The aim of this paper is to draw out major themes apparent in a large corpus of ethnoastronomical records linked to a diverse range of cultures. As hunter-gatherers, the Aboriginal peoples of Australia were keen observers of changes in their environment. In southwestern Victoria early colonist James Dawson recorded:

Although the knowledge of the heavenly bodies possessed by the natives may not entitle it to be dignified by the name of astronomical science, it greatly exceeds that of most white people. Of such importance is a knowledge of the stars to the aborigines in their night journeys, and of their positions denoting the particular seasons of the year, that astronomy is considered one of their principal branches of education. Among the tribes between the rivers Leigh and Glenelg, it is taught by men selected for their intelligence and information [1881:98–99].

Philip A. Clarke has an academic background in biology, geography, and anthropology. After studying at the University of Adelaide, he started working in the Aboriginal ethnographical collections at the South Australian Museum in 1982. Clarke's initial research interest was chiefly in Aboriginal use of plants as foods, medicines, and materials. This eventually broadened to Aboriginal perception and use of the land, with a particular focus on the cultural geography of southern Australia. During 1998–2000 Clarke's major task was curating the Australian Aboriginal Cultures Gallery Project at the South Australian Museum. He has written three books on indigenous use of the environment.

The current work investigates how traditions concerning the stars are interwoven with the cultural and social aspects of Aboriginal life. It also provides examples of how the study of this “knowledge of the stars” can provide insights into particular Australian Aboriginal cultures. It continues on from the overviews of Aboriginal ethnoastronomy published by Bhathal and White (1991:8–11), Clarke (1997), Haynes (1992), Johnson (1998, 2005), Norris (2007), and Tindale (2005).

### Data Sources

An imperfect ethnographic record exists of Australian Aboriginal traditions concerning the heavens, with the largest gap being in the temperate region where British colonization commenced and has been most intense. European colonists arriving in Australia from the late eighteenth century were unfamiliar with southern night skies and therefore found it difficult to record indigenous star lore. Settlers and colonial officials, such as Peter Beveridge, David Collins, James Dawson, Peter MacPherson, Edward Palmer, William E. Stanbridge, William Wells, and William Wyatt, collected anecdotal data from Aboriginal groups under the pressure of European settlement. Missionaries, such as Nicholas Hey, Heinrich A. E. Meyer, Johann Reuther, William Ridley, Clamor W. Schürmann, A. C. Stone, George Taplin, and Christian G. Teichelmann, were more systematic in their recordings of indigenous cultures, although they still operated prior to the establishment of academic anthropology in Australia.

By the late nineteenth century there was a generation of Australian-born scholars who had grown up with close relationships to particular Aboriginal communities. Such a person was Robert H. Mathews, who was born at Narellan, New South Wales, in 1841 and died at Parramatta, New South Wales, in 1918 (McBryde 1974:225–226). During his working life as a surveyor he had traveled widely, particularly across New South Wales and Victoria. In terms of ethnoastronomy Mathews’s training was important. He claimed that “the knowledge of astronomy which my profession demanded, made it easy for me to identify with precision all the different stars and stellar groups which figure so prominently in the aboriginal folk-

lore” (Mathews 1904:204). Without the fieldwork and writings of Mathews, the total ethnographic record of southeastern Australia would be much poorer.

In the twentieth century scholars from several disciplines recorded Aboriginal cosmological data. Anthropologists with records relevant to Australian ethnoastronomy include Daisy M. Bates, Ronald M. Berndt, Catherine H. Berndt, Alfred R. Brown (later A. R. Radcliffe-Brown), Adolphus P. Elkin, Ursula H. McConnel, and myself. Examples of linguists who recorded Aboriginal Skyworld beliefs are Ameer Glass, Dorothy Hackett, John Henderson, Luise A. Hercus, and Dorothy Tunbridge. Scholars with interests in museum collections, such as Charles P. Mountford, Walter E. Roth, Peter Sutton, Luke Taylor, Norman B. Tindale, and Margie West, have used Aboriginal astronomical data as a means of interpreting Aboriginal art. An astronomer’s perspective of indigenous Australian beliefs concerning the Skyworld is provided by Brian G. Maegraith, Roslynn D. Haynes, and Raymond F. Haynes.

### Cultural Landscape

In Aboriginal Australia interpretations of the night sky must be understood in terms of indigenous perceptions of how their world was created. In Australian English and Aboriginal English the corpus of religious beliefs and Creation traditions is often referred to as the “Dreaming” (Berndt and Berndt 1989; Clarke 2003:Chapter 2; Hiatt 1975:Introduction; Kolig 1984 [1981]; Stanner 1979 [1953]; Sutton 1988a:14–19). Central to this concept is that there was a period in the past when Creator beings performed heroic deeds, molded and gave spiritual power to the landscape, and laid down customs to be followed by their descendants. These Ancestors are often manifested as animals and birds but may also be plants, atmospheric and cosmological phenomena, and even human diseases. Aboriginal traditions recognize the paths the Ancestors made across the land as Dreaming tracks, or song lines, which connect mythological sites where certain Creative events took place. The Dreaming concerns the past, present, and future, which are connected in the great cycle of time. Through their participation in ceremonies and rituals Aboriginal peoples connect directly with the power of

the Dreaming, which is the basis of customary law and remains the fundamental reality for many of them.

### Land of Spirits

It is common across Aboriginal Australia for the heavens to be seen as a landscape, connected to the Earth, upon which the spirits of the deceased exist alongside their Ancestors (Clarke 1997, 2003; Johnson 1998). European settlers making inquiries to indigenous people about their religious beliefs often received accounts of the land above, described in this paper as the Skyworld. In the Sydney area of New South Wales during the late 1780s colonist David Collins asked Aboriginal man Ben-nil-long (Bennelong) where he thought his soul or spirit came from:

His answer was . . . they came from the clouds (alluding perhaps to the aborigines of the country [but probably Skyworld]); and when they died, they returned to the clouds (Boo-row-e). He wished to make me understand that they ascended in the shape of little children, first hovering in the tops and in the branches of trees; and mentioned something about their eating, in that state, their favourite food, little fishes [1798:1:547].

Settler Edward Palmer described the concept of Yalairy as the home of the dead for the Aboriginal people who lived south of Normanton on the Gulf of Carpentaria in Queensland. He claimed:

This Yalairy is supposed to be amongst the stars. They know not its exact situation. The conception which the blacks form of it seems to be a mere embodiment of their views as to what constitutes happiness on earth. It is a great hunting ground, well stocked with all the game they are familiar with on earth—kangaroos, wallabies, emus, &c. They have their dogs there, and can enjoy the shade of the forest, or the clear water of the running stream. Both men and women go there. Whilst there, they hunt, eat, and sleep; but, as this new country is superior to that which they have left, so is their life happier—no anxiety on account of hunger; no sense of insecurity from enemies is ever experienced [Palmer 1885:172].

According to Palmer's informants, two large snakes about 60 km in length were said to reside in Yalairy. For these people, the path up to this land was reported to be either through the north or by a kind of ladder by way of the Southern Cross.

Aboriginal observers of the night sky identified particular celestial features as smoke generated by the activities of the dead. A nineteenth-century observer claimed:

In parts of Queensland and South Australia the natives believed the "Milky Way" to be a sort of celestial place for disembodied spirits. They said it was the smoke proceeding from celestial grass which had been set on fire by their departed women, the signal being intended to guide the ghosts of the deceased to the eternal camp fires of the tribe [White 1905].

In southern South Australia Encounter Bay people interpreted the Aurora Australis, as seen in the southwest above Kangaroo Island, as the campfires of spirits in the "Land of the Dead" located in the heavens (Tindale 1974a). The island would normally be clear of smoke, as it was uninhabited just prior to European settlement (Lampert 1979).

In the written records of Aboriginal Australia there are a multitude of accounts concerning the Skyworld. It is often referred to as the "Land of the Dead" or "Land to the West," based upon beliefs that spirits of the deceased traveled west to enter the heavens (Clarke 2003:25–29; Johnson 1998:16–19; Sutton 1998:368–371). Large birds, particularly birds of prey, were seen as carriers of the deceased souls, using their flight ability to move between Earth and the Skyworld (Clarke 1999b:161–162). While it was generally believed that most living people could not visit the Skyworld, the heavenly and earthly landscapes were clearly seen as connected. Tasmanian Aboriginal people perceived that their established foot tracks through the forest continued into the Skyworld, where there was a "white streak" in the Milky Way going "all along down to the sea" (Plomley 1966:368).

The Skyworld was considered to have topography similar to that of the Earth's surface, where living people dwelt. Alfred W. Howitt recorded that the Wurunjerri (Woiworung) people around the northern

side of Melbourne in Victoria believed that they “had a sky country, which they called *Tharangalk-bek*, the gum-tree country. It was described to me as a land where there were trees. The tribal legends also tell of it as the place to which Bunjil [Supreme Male Ancestor] ascended with all his people in a whirlwind” (1904:433). The land was named after the trees, which were said to be *tharangalk*, “manna gums” (*Eucalyptus viminalis*). The Skyworld was perceived as possessing a contoured and textured surface. In southwestern Victoria the Gundidjmarra people believed that the many “smaller stars” together formed “star earth” (Dawson 1881:99).

It was believed that at certain times particular individuals, such as “doctors” (healers) performing rituals and initiates at ceremonies, would visit the Skyworld to procure special knowledge and powerful objects (Clarke 2003:25–26). The stated means for living people to reach this “land” varied, often involving the climbing of tall trees or hills and being helped up by whirlwinds, ropes, and fast-growing trees. In the Upper Clarence River area of northeastern New South Wales Aboriginal man Robin Walker recalled seeing “a doctor climb to the height of such a [large] tree by climbing hand over hand up a magic cord that he made come from his mouth” (Rose 1956:106). Mathews recorded from western Victorian Aboriginal peoples that in the Kara Kara district, which is north-east of Stawell, there was once

an immense pine [*Callitris* species] tree growing out of the earth, the topmost branches of which reached up to the sky. In the far away past, people used to climb up the tree and walk about and reside on the starry vault; and black-fellows who belonged to the sky occasionally descended by the tree to the earth to see their friends, and remained for a while. Visits were frequently made for the purposes of barter between the blacks who were located on the earth and those whose hunting grounds were away in the sky. In short, the tree was a regular highway between the earth and the upper regions, for a very long period. Old black-fellows have told me stories of similar trees which reached up into the sky in other parts of Victoria [1904:281–282].

In the Dreaming mythology of the Alawa people who live in the Top End of the Northern Territory, two of their Ancestors reached the Skyworld, where they became an asterism of the Pleiades constellation, by climbing a large stringybark tree (*Eucalyptus tetrodonta*) growing on Earth (Berndt and Berndt 1989:284). In the Lower Murray region of South Australia Ngarrindjeri people believed big trees and hilltops to be dangerous places for lightning and contact with spirits due to their proximity to the Skyworld (Clarke 1997:128, 1999b:153–154).

In southern South Australia it was Aboriginal tradition that Dreaming Ancestors Monana and Waiyungari had reached the Skyworld to become stars by throwing a spear high enough to lodge in the star earth, followed by other thrown spears that lodged in the base of each preceding spear, thereby creating a ladder (Clarke 1999a:53–56, 58; Wyatt 1879:16). Generally, it was believed that lesser spirit Ancestors and souls of the deceased required help to reach the Skyworld. In the Lower Murray region the Supreme Male Ancestor, Nurunduri (Ngurunderi), was said to have thrown out a line attached to his testicles to help guide his lost son from Earth toward the west (Meyer 1879:205–206 [1846]). Also from the Lower Murray, colonist George French Angas recorded that “after death the spirit wanders in the dark for some time, until it finds a string when . . . Oorundoo [Ngurunderi] pulls it up from the earth” (1847:97).

In Aboriginal Australia it was often recorded that people looked for signs that the spirits of their dead had reached the Skyworld. At the head of the Flinders River in northern Queensland Palmer noted that Aboriginal people “believe that the ascent [by the deceased] is made by means of a rope, and that what we call a shooting star, is merely the falling of this rope, on being let go after the ascent has been accomplished” (1885:173). Here, a shooting star was perceived as confirmation that a deceased soul had reached the Skyworld. In northeastern Arnhem Land shooting stars or meteors were seen as a “tiny canoe of light” returning “to bring word to the relatives that the one they mourn is safe in the new land” (Wells 1964:59). In other Aboriginal cultures the observation of shooting stars foretold a relative’s death (Clarke 1997:138–139; Davis 1997:32; Dawson 1881:101;

Johnson 1998:89–91; Roth 1903:8; Stanbridge 1857:140, 1861:300).

The Skyworld was the abode of many Snake Ancestors, which are common and widespread entities in the mythology of Aboriginal Australia (Berndt and Berndt 1989:Chapter 3; Brown 1930; Buchler and Maddock 1978; Clarke 2009:84–86; Elkin 1930; McConnel 1930; Mountford 1965:152–154; Piddington 1930; Tunbridge 1988:5–11; West 1995). For example, the Adelaide Plains people claimed that the Yura Serpent was vicious and would swallow people who did not hide from him (Clarke 1997:134–135; Teichelmann 1841:8). He lived in the “lagoons” of the Milky Way, which were dark spots known as Yurakauwe, which translates as “Yura-water.” When Yura appeared, an abundance of water was created in the land below. Yura was the “author” of male circumcision and first taught this practice to the Ancestors of the Adelaide people, punishing those who neglected it. The Wiradjuri people of eastern New South Wales also believed in serpentlike spirits, the Wawi (Mathews 1904:364). One of the Wawi’s Ancestors could be seen as a black streak in the Coal Sack of the Milky Way.

Aboriginal perceptions of space and their beliefs concerning the movements of spirits from the Earth into the Skyworld appear to have influenced the orientation of their burials. Aboriginal burials in some regions were linked to cardinal directions, with the Ngemba people of central New South Wales having buried their dead with the body in a sitting position, leaning back, with the head facing toward sunrise (Mathews 1904:274). Archaeological evidence suggests that in the central region of the Murray River Basin in southeastern Australia the deceased were normally buried with the head toward the southwest and less frequently toward the east-northeast (Pardoe 1989:14–18). In western Victoria the bodies of deceased Aboriginal people were buried with their heads pointing in the direction of the “spirit-home,” which is an island off the coast between Warnambool and Portland (Mathews 1904:297).

### Stars as Kin

In Aboriginal tradition many of the celestial bodies are their Ancestors and, as such, genealogically related

to each other. In 1840 Teichelmann wrote an account of the Aboriginal inhabitants of the Adelaide Plains in South Australia, commenting, “They personify the celestial bodies as having formerly lived upon earth, and the metamorphosis of which is closely connected with that of their ancestors.” Mathews stated:

The blackfellows have not mapped out the sky into constellations in the same way as Europeans have done, but there is a certain amount of method in their arrangement of the stars. For example, a man and his wives, his family, his weapons, his dogs, are not generally far apart. Brothers, uncles and other relationships are often separated by considerable distances [1904:281].

In southwestern Victoria Butt Kuee Tuukuung was a male Ancestor seen as Antares, with the stars on each side of him being his wives (Dawson 1881:99). Aboriginal man Billy Poole, from the Lake Albert area of the Lower Murray, pointed out a constellation or possibly an asterism that represented the Turkey Ancestor, who was sitting on her eggs—the Pleiades (Giles 1887).

The spatial relationships of the Ancestors perceived in the Skyworld were also determined by clan membership. In northern western Victoria Ancestors known as the Brambambult brothers “took their place in the heavens as Alpha and Beta Centauri, whilst the mother, Dok, was transformed into Alpha Crucis. The mother and her two sons belong to the clan and miyur [spirit burial place] Pattyangal, and phratry [moiety] Gamaty” (Mathews 1904:376). In Aboriginal Australia the rules governing kin relationships on the Earth also establish order in the Skyworld.

The brightness of celestial bodies that represent the Ancestors is a characteristic reflected in their kinship. In Tasmania Aboriginal Protector George Robinson gave an example of three stars, which were probably the two Pointers and one from the Southern Cross, where “No 1 was large [and] is called the mother[,] No 2 the husband is of lesser magnitude and 3 the offspring is hardly visible” (Plomley 1997:44). In southwestern Victoria the Sun was seen as a female Ancestor and called Tirng, meaning “light,” while bright stars were called Kakii Tirng, meaning

“sisters of the Sun” (Dawson 1881:99). For the planets, Jupiter was known as Burtit Tuung Tirng and was said to mean “strike the Sun,” while Venus, or Paapee neowee, was “mother of the Sun.” In the case of Jupiter and Venus, their relationship to the Sun was probably based upon the occasional appearance of these planets at dusk and dawn.

The canine companions of the Ancestors also are represented in the night sky. Palmer recorded from Aboriginal people in the Flinders and Saxby rivers district of northern Queensland that the “evening star they have named *Yumby* which is their name for dog. The morning star is known as *Yaboroo*—bitch” (1885:174). In the mythology of the Adelaide Plains in South Australia the first celestial body to leave the lower landscape was Kakirra the Moon, and he persuaded others to follow so that he might have companions (Clarke 1997:132; Teichelmann 1841:9; Teichelmann and Schürmann 1840:2:7, 38, 46). For hunting, the Moon kept a great number of dogs with two heads and no tail, which were seen as stars.

While Ancestors who had a close relationship during the Creation period on the Earth are still seen together in the Skyworld, conversely, those who had an antagonistic relationship on Earth kept far apart in the heavens. For instance, in western Victoria there was a tradition that Ngindyal, who was a large, emu-like Ancestor, went to occupy the black patch in the Southern Cross, while the Crow, whom he had chased, become Alpha Argus some distance away (Mathews 1904:367). Similar sets of Ancestor kin relationships within Aboriginal cosmology have been established throughout Aboriginal Australia (Clarke 1997; Dawson 1881:98–102; MacPherson 1881:73).

Aboriginal perceptions of their Ancestors as star arrangements and planets humanized the heavens. As celestial Ancestors they were part of the same moral order that Aboriginal peoples imposed upon their entire cultural landscape. Mathews stated: “Conspicuous stars and star clusters all the way along the zodiacal belt, have well-known names and traditions. Moreover, each star figuring in the myths belongs to a phratry [moiety], section, clan or other subdivision, precisely the same as the people of the tribe among who the tale is current” (1904:279). In Central Australia “tribal” or linguistic boundaries are also

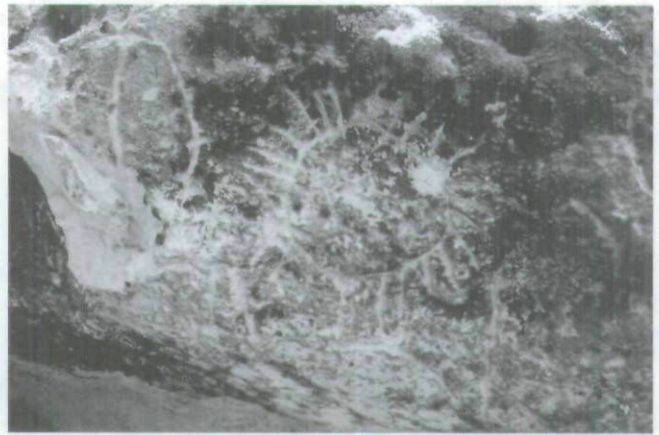


FIGURE 1. Sunlike motif in a limestone engraving. Images resembling celestial bodies, such as the Sun and star arrangements, often are depicted in ancient Aboriginal rock art sites. Photo: Philip A. Clarke, Devon Downs, Murray River, South Australia, 1994.

reflected in the cosmic landscape (Maegraith 1932:20, 26). When missionary William Ridley outlined the marriage and descent rules of the Kamilaroi people of central northern New South Wales, he claimed that these Aboriginal people “divide everything into these [kinship] classes—alligators, kangaroos, sun, moon, the constellations, trees, and plants” (Smyth 1878:1:91). In western Victoria Nyauí was the Sun clan, having both the Moon and the planet Venus among its totems of mainly animals and plants (Mathews 1904:288). Here, Wartwurt was the clan of “the heat of the sun at noon.”

### Sky Maps

Aboriginal traditions of the Skyworld are diverse, although some broad generalizations across Australia can be made. In general, the Moon and Sun Ancestors are of primary importance due to their influence over the night and day skies, respectively. Often the Moon was male and subordinate to the Sun, who is generally female. Images resembling the Sun are found in rock art sites, such as at Devon Downs in South Australia, suggesting its mythological importance (Figure 1). While there are many structural similarities in Aboriginal beliefs concerning the Milky Way, Orion, Pleiades, and Magellanic Clouds, there is considerable variation in accounts of the Southern Cross.

## Milky Way

For many Aboriginal peoples, particularly those living in regions crisscrossed by watercourses, a celestial river, the Milky Way, dominates the Skyworld. The Adelaide Plains people in southern South Australia believed that the Milky Way was a large river, possibly the continuation of the River Torrens, along the banks of which reeds are growing (Teichelmann 1841:8; Teichelmann and Schürmann 1840:2:11, 35, 38, 57, 62). They called the Milky Way Wodliparri, which means "hut-river" and is possibly a reference to the Yura, who live in its dark pools. Maegraith claimed that for Arrernte and Luritja peoples of Central Australia "the sky is portioned out into two great 'camps' separated by the Milky Way, which is supposed to be a river or creek" (1932:19). In spite of the high diversity of Aboriginal cultures across Arnhem Land in northern Australia, the peoples of this region appeared to have universally believed that the Milky Way was a watercourse (Mountford 1956:503).

For some Aboriginal peoples, the Milky Way was symbolic of a tree. The Nukunu people of the Mid North of South Australia considered that it was a huge tree, like a ceremonial pole (Hercus 1992:13–16). It was part of the Urumbula song line, which runs from the vicinity of Port Augusta in South Australia all the way via the MacDonnell Ranges in Central Australia to the Gulf of Carpentaria in Queensland. Another indigenous explanation is that the Milky Way represents a canoe that the Ancestor Ngurunderi placed in the sky after creating topographic features in the Lower Murray region (Berndt et al. 1993:224). Here, in the Yaraldi language, the Milky Way was called *Ngurunderi yuki*, transcribed as "Ngurunderi's canoe." From a Lower Murray Aboriginal perspective, this was not the only canoe in the sky, although probably the largest. In some contexts the Southern Cross was called *yuki* (canoe) and may have been seen as belonging to Ancestor Kulda the Meteor Man (Tindale 1937a:111–112, 1941:233–234). Whether or not the Milky Way was seen as a watercourse, tree, or canoe, as the arch of the heavens it was an important topographical feature.

## Routes through the Underworld

After traveling through the Skyworld and ending up in the west, the Moon and the Sun as spirit beings were

generally believed in Aboriginal Australia to return by distant routes to the east. Some Aboriginal peoples considered the path back as being through southern or northern parts of their country, while others thought it was along an underground passage. Charles P. Mountford recorded a belief among the Tiwi people at Melville and Bathurst Islands:

At one time the moon-man used to return to the east by a road just under the southern horizon. But a nest of hornets, which lived along that road, stung him so badly that he changed his path and now returns to his home by a northern route. . . . Most informants, however, said that the moon returned to the east through the same underground world as the sun-woman [1958:174].

Mountford collected Tiwi paintings on bark that show the Sun Woman during the day traveling across the Skyworld carrying a blazing bark torch, while at night resting in a hut (Figures 2 and 3). It is believed by some northeastern Arnhem Land people that as the Sun sets each evening she becomes a great fish and swims under the Earth during the night to return, as the Sun, in the east the next morning (Haynes 1992:130). Another tradition recorded from this region is that the Sun becomes a wallaby at night, hopping through an underground tunnel before emerging at dawn (Mountford 1956:502).

Aboriginal groups near Lake Eyre in Central Australia believed that the Sun first rose and then disappeared into the ground to rise in the east at a place called Ditji-mingka (Dityi-minka), reputedly meaning "Sun-Cave" (Hercus 1987; Howitt 1904:427–428). Missionary Reverend Johann Reuther stated that this cave is "where the female sun *muramura* [Ancestor] is said to have first risen. But since she made conditions too hot for her followers ('people') she wandered inside the earth towards the east and has been rising there ever since" (1981:7:29 [ca. 1900]). The cave walls, it was said, contained crystalline gypsum that caught the dying rays of the setting Sun as well as rock carvings depicting the Sun Ancestor (Hercus 1987:150–151). Wangkangurru people removed the light blue soil from the cave and kept it in their camps in "sun-bags" for the purpose of ritually



FIGURE 2. Wurriyupungala, the Sun Woman, at Wurriyupi. Sun Woman is in the center, with the black ring representing her hut and the red bars the supports. Bark painting by an unknown artist, Melville Island, Northern Territory, 1954. South Australian Museum Aboriginal Artefact Collection, A47087.



FIGURE 3. Wurriyupungala, the Sun Woman, is shown traveling across the Skyworld, carrying a blazing bark torch. Bark painting by Big Tom, Melville Island, Northern Territory, 1954. South Australian Museum Aboriginal Artefact Collection, A47107.

making hot weather (Hercus 1987:149–150). Caves feature in other Aboriginal traditions concerning the Sun. The Kulin people of western Victoria believed that when the Sun disappeared in the west, it entered a hole in the ground like that left behind by a large tree burned in a bush fire (Howitt 1904:432).

The Sun and the Moon were not the only celestial entities believed to pass through the Underworld at night. In the border country between South Australia and Queensland there was a tradition that the Pleiades women reached the Skyworld by traveling into a very large hole in the ground near a waterhole on the Mulligan River (Fraser 1901). Aboriginal hunter-gatherers avoided blowholes in the inland limestone country of the Nullarbor Plain through fear that the huge Snake Spirit Ganba would come out from its Underworld home and eat them (Bates 1921:75, 1947:132; Johnston 1941:37–38). From my field experience, Western Desert people still consider that these caves, from which wind or “breath” emerges, are entrances to the homes of *mamu*, or “devil” beings (Figure 4). Across Aboriginal Australia caves and other topographic features were believed to be portals linking the Earth and Underworld.

Tindale recorded a myth from the Mid North of South Australia that he argued was based upon Ngadjuri people observing a solar eclipse in the distant past (1937b:149–151). The myth concerned the first setting of the Sun, which had resulted from spirit Ancestors killing an elderly woman and her two dogs. To bring back the Sun, Kudnu the Jew Lizard Ancestor threw a returning boomerang to the north, but it flew around in a circle without striking the Sun. He was also unsuccessful when throwing the boomerang to the west and south. Kudnu finally managed to bring back the Sun by hurling toward the east. After the Creation period came to an end, all jew lizards on Earth carried the marks of their Ancestor’s boomerang on both sides of their jaw.

### Aesthetics of the Heavens

Aboriginal perceptions of their Skyworld existed in the absence of written systems to objectively measure space, time, or quantity. In noticing the differences in the ways Europeans and Australian indigenous peoples see the heavens, scholars have investigated





FIGURE 4. A limestone blowhole, which Aboriginal people believe is an entrance to the Underworld. It is Aboriginal tradition that Ganba the Snake Ancestor dwells here when he is not in the Skyworld. Photo: Philip A. Clarke, Nullarbor Plain, Western Australia, 2006.

the rules governing which celestial bodies, among the many hundreds that are visible to the naked eye, are most likely to feature in Aboriginal visions of the Skyworld. Robert H. Mathews claimed:

Legends are more numerous concerning stars situated in the neighbourhood of the moon's path through the heavens, and in this way a zodiac may be said to exist. The stars near the ecliptic and the zenith change their positions in the sky more rapidly than those toward the poles, and therefore more readily arrest attention. Besides constellations at these high altitudes can be seen easily when the people are camped in thickly wooded country, whereas stars near the horizon would not be visible [1904:278].

In some parts of Australia mountain ranges would also have limited the scope of Aboriginal observations of the sky.

While it is tempting to use the broad range of ethnographic records to statistically investigate what celestial features indigenous observers tend to see, it is likely that such an approach would only reproduce what early European recorders, many of them

with poor knowledge of southern skies, were able to understand. While for most Aboriginal cultures the available data concerning the heavens are insufficient for detailed analysis, Peter MacPherson focused on the mythological and astronomical data William E. Stanbridge had published for western Victoria and then made the following general observations:

1. A systematic grouping on the basis of linear arrangement.
2. Four linear groupings are tolerably parallel to each other.
3. All are tolerably parallel to the horizon as they make their appearance in the evening sky in their several seasons, in south latitude, about 36, which is that of the Mallee Scrub about Lake Tyrill, in Victoria [1881:74].

In support of these generalizations MacPherson provided the example of the three stars that are roughly in a line in Orion's Belt. Then on a larger scale Orion's Belt, Aldebaran, and the Pleiades form a much longer line across the night sky. Brian G. Maegraith stated that the Aboriginal observer "has not generally adopted the idea of tracing out a figure amongst the stars [as modern Europeans do], a single star usually representing a whole animal or its track" (1932:19). In Aboriginal Australia the groups of stars are generally identified on the basis of Dreaming relationships.

### Orientation and Space

Aboriginal orientation is based upon the observed movements of celestial bodies and the prevailing directions of the seasonal weather. For instance, in many Aboriginal languages the terms for "west" referred to the "direction to which the Sun travels," whereas the "east" was often associated with "dawn" or "Moon," and in some cases the term for "south" is related to "cold" (Nash 1992:293–295; Tindale 1974b:44–49). In Central Australia desert dwellers used a variety of techniques to orientate themselves, including wind temperature and star position (Lewis 1976:274–276). Stone's published vocabulary from the Lake Boga district of central northern Victoria supports this observation. Here, north was "*barrewill* (where the hot winds come from)," south was "*boiecalling darn* (where the frost winds come

from),” east was “*worwalling gnowie* (where sun rises),” and west was known as “*purculling gnowie* (where sun sets)” (Stone 1911:451). Apart from the obvious Skyworld paths of the Moon and Sun, the tracks of the many other spirit Ancestors cross each other. Bates, in her account of the astronomy of the Bibbulmun people in southwestern Western Australia, remarked: “There is no aboriginal generic term for ‘Zodiac,’ other than the dialectic equivalents for ‘road’ or ‘track,’ and as all native and animal tracks are winding ones throughout Australia, the aboriginal zodiac winds here and there amongst the myriads of heavenly bodies” (1992:170 [1924]).

In the art of Aboriginal Australia the Skyworld and Underworld are sometimes drawn as extensions to the terrestrial Earth landscape, with the size and orientation of elements such as hills, animals, and humans generally relative to their cultural importance and not to scale (Clarke 2003:89–94; Morphy 1998:Chapter 4; Sutton 1988b, 1998). While superficially maplike, most early Aboriginal artworks are primarily directed at charting the significance of the Dreaming rather than at illustrating topographic relationships. For Aboriginal artists working within these traditions, there is nothing problematic about the depiction of a celestial body such as the Sun or Moon passing through an earthly landscape or traveling underground.

### **Illumination and Color**

In terms of illumination strength Aboriginal observers recognized not only first- and second-order stars but also other groups that were far less conspicuous (Haynes et al. 1996:8; Haynes 1992:127). When considering named star arrangements in the Aboriginal vision of the night sky, Haynes claimed that orientation was more relevant than the brightness of the individual bodies. She gives the example of Groote Eylandt people in the Gulf of Carpentaria recognizing a set of relatively faint stars as Unwala the Crab Ancestor while apparently ignoring the nearby bright stars of Procyon and Regulus (Haynes 1992:128). MacPherson made a similar point for Aboriginal astronomical traditions in western Victoria, stating that “such bright stars as Procyon, Spica Virginis, Regulus, and Fomalhaut are not mentioned: they are isolated stars, though bright—they

do not readily fall in with any mechanical grouping of stars” (1881:74).

To account for apparent differences between the strength of sunlight during the year, some Aboriginal groups believed that it was produced by two different beings. Walter Roth claimed that at Cape Bedford in northern Queensland Aboriginal people “can, of course, see the sun starting, but at night she always circles round by the south. There are really two suns, two sisters: in the cold season it is the elder one who visits them, and in the hot season it is the younger” (1903:7). Another explanation existed in the inland river systems of southeastern Australia, where the Sun was considered to be a fire created by Supreme Ancestor Baiame (Beveridge 1883:60–61; Haynes 1992:130). Here, the warmth of the day was equated with the strength of his fire and how much fuel was left to burn.

In Aboriginal Australia color is of fundamental importance when determining the significance of individual celestial bodies. The traditions of the Arrernte people in Central Australia give prominence to stars that are reddish or whitish while largely ignoring those that are predominately yellow or blue (Haynes et al. 1996:8; Haynes 1992:128; Maegraith 1932:25). This is consistent in Aboriginal Australia with the high value generally placed upon red ochres and white clays in decorative art, with the qualities of brightness and shininess associated with the power of the Ancestors (Clarke 2003:92–93; Sagona 1994). In an Aboriginal perspective celestial bodies that are not bright red or shiny white objects in the night sky are more likely to be seen as part of the background (i.e., star earth) than as elements with individual identities.

In the traditions of many Aboriginal cultures the physical appearance of heavenly bodies is explained in terms of the actions of Ancestors during the Creation period. Mathews claimed that among the Clarence River people in coastal New South Wales there was a tradition:

Alpha Tauri was a young man named Karambal, of the Womboang division, who absconded with another man’s wife. He was pursued by the injured husband, and took refuge in a tall tree. His pursuer piled wood around the bole of the tree,

which he then set on fire, and Karambal was carried up by the fierce flames into the sky, where he still retains the colour of fire [1904:280].

The Ramindjeri people of Encounter Bay in South Australia had an explanation of why the Sun is red in the morning. Missionary Heinrich A. E. Meyer recorded:

The Sun they consider to be female, who, when she sets, passes the dwelling-places of the dead. As she approaches, the men assemble, and divide into two bodies, leaving a road for her to pass between them; they invite her to stay with them, which she can only do for a short time, as she must be ready for her journey for the next day. For favours granted to some one among them she receives a present of a red kangaroo skin; and, therefore, in the morning, when she rises, appears in a red dress [1879:200 (1846)].

In the Darling River area it was believed that "the planet Jupiter was a great Kilpungurra [a moiety] man of the olden days, called Wurnda-wurnda-yarroa, who lived on roasted yams, and got his reddish colour by being so much about the fire cooking his food" (Mathews 1904:283). Given the color description it is possible that Mathews confused Jupiter with a bright red star.

Many Aboriginal traditions concerning the Moon involve this Ancestor being male and having suffered from a fight during which he was burnt. At Lake Boga in central northern Victoria it was a tradition that the Moon Ancestor was once a man who, during an argument with his wife, had hot coals from the fire thrown over his face (Stone 1911:462–463). He was ordered to go to the Skyworld, where the dark smudges on his ashen gray face can be seen. In the Saxby River district of northern Queensland Palmer recorded that it was Aboriginal belief that the Moon "is a black-fellow, who at one time killed a lot of their people, and whom they afterwards burnt, and still point to the shadows on the moon's surface as being the scars which resulted from this execution" (1885:174). In a similar account from the Endeavour River area in

northern Queensland Warigan the Moon had climbed a tree using a climbing cane, only to be burnt when Ngalan the Sun set the bark ablaze (Tindale 1938).

The shading of the illuminated Moon has been explained as a strategy for concealment. Aboriginal people in Pennefather River area in northern Queensland believed that the Moon Ancestor was once beaten up and thrown into the sea by his children, the Bats (Roth 1903:7). From then on the Moon hid from the Bats, who wanted to spear him, by having his body covered with charcoal, with only his face painted with white clay. From nearby Batavia River Nicholas Hey recorded that white clay was known as *roa*, the same word as for "Moon, whose face is supposed to be rendered visible by his face being painted with this clay" (1903:10). In the Warrego River district of northern central New South Wales Aboriginal people believed that the large ring or halo seen around the Moon on a moist night represents the bark shelter of the Moon Ancestor, Giwa (Mathews 1904:358, 361). Here it is said that during the new moon phase Giwa is walking with a pronounced stoop due to a severe fall from a large rock. Aboriginal observations of the changes in the celestial phenomena were often explained in terms of their mythological actions as Ancestors either on the Earth or in the Skyworld.

Aboriginal traditions accounted for the light rays emanating from celestial bodies. In the Pennefather River area "the sun is a woman manufactured by thunder, who gave her two legs like other mortals, but plenty of hands: the latter can be seen (sun's rays) when she rises and when she sets" (Roth 1903:8). The Morning Star (Venus) mythology contains analogies between string and light. In northeastern Arnhem Land Yolngu people perceive the Morning Star, or Barnumbir (Bainambirr), as a shining light that is held in a mesh bag (Haynes 1992:133–134; Johnson 1998:124; Mountford 1976:93–96; Wells 1964:94). She is tied to Baralku, the island of the dead beyond where the Sun rises, by Jari, her string of light. It is believed that the souls of the dead will travel along these "strings" early in the morning. Dawson described southwestern Victorian Aboriginal concepts of twilight:

The crepuscular arch in the west in the morning is called "Kullat," "peep-of-day." The upper

arch in the east at sunset is called "Kuurokehear puuron," "white cockatoo twilight." The upper arch, "Kappihear puuron," "black cockatoo twilight." The natives say this arch comes from the constellation Orion. The crepuscular rays in the west after sunset are called "rushes of the sun." The Aurora Australis, "Puae buae," "ashes" [1881:101].

## Measuring Time

In common with many of the world's cultures, Australian Aboriginal people marked daytime by the position of the Sun, while the numbers of days and Moons accounted for longer periods (Clarke 2009:93–94). In the southern Coorong district of South Australia the number of full Moons was sometimes used to record the age of infants when less than a year old (Wells 1995:102 [1852–1855]). Mathews explained how Aboriginal people in the Upper Lachlan River area of eastern New South Wales measured time when, after a man is newly initiated, it is necessary to send a message to the future wife's clan:

The graduate will be taken to a certain place at such a state of the moon. If it is any time between the new and full moon, the messenger stands before his audience and holds up his boomerang horizontally or nearly so, with the convex edge towards the west. The time between the full and new moon is indicated by holding the convex edge of the weapon towards the east. As both these positions of the moon occupy a fortnight, lesser periods would be explained verbally by the messenger [1904:266].

Sorcerers of the Tharumba people of the Jervis Bay area in New South Wales used lunar cycles to measure time when threatening a victim, "muttering incantations and pointing at him, and tell[ing] him he has only so many moons to live" (Mathews 1904:277). Walter Roth claimed that "beyond a few months' duration, Time-when cannot be accurately expressed: reference is made to some event of more than passing importance—such as a big flood, or drought, or some special initiation ceremony, or a tribal fight, perhaps" (1897:27–28).

Aboriginal mythology accounts for the lunar phases. In central Arnhem Land Aboriginal people

believe that in the Creation period the Moon Ancestor argued with the Spotted Quoll Ancestor over the issue of mortality and the renewal of the spirit (Taylor 1995:26). To demonstrate his point, the Moon flew up into the heavens, where he has waxed and waned every since. Many coastal Aboriginal peoples recognized that there was a link between the position of the Moon in the sky and the relative height of tides. Haynes recorded that in coastal Arnhem Land and Groote Eylandt Aboriginal people

believe that the high tides, running into the Moon as it sets into the sea, make it fat and round. (Although the new Moon may appear thin, they deduce from the faint outline of the full circle that it too is round and full of water.) Conversely, when the tides are low, the water pours from the full Moon into the sea below and the Moon consequently becomes thin [1992:130].

The phases of the Moon are important when associated with ceremonial activities, which are generally made to fit within both lunar and seasonal cycles. A common aim when holding a ceremony over many days is to have it end with a full moon as well as during a season when there is plenty of food to nourish participants (Morphy 1999:265).

## Seasons

During the year Aboriginal hunter-gatherers made correlations between the weather events on the earthly landscape and the perceived activities of Ancestors in the Skyworld (Clarke 2003, 2009; Davis 1989, 1997). When Western Desert people see the Moon at night with a ring halo around it, they say that he is sitting inside his shelter because rain is coming (Glass and Hackett 2003:517). Observations concerning changes in the structure of the night sky also were incorporated into Aboriginal seasonal calendars. Mathews noted that in Aboriginal Australia it was generally recognized that "the stars which occupy the northern sky in the cold winter evenings travel on, and are succeeded by others in the following season; and that these are again displaced by different constellations during the warm evenings of summer" (1904:279). Stanbridge made similar observations in western Victoria and

described that when Marpeankurk (Arcturus) "is in the north at evening, the Bittur [termite larvae] are coming into season, when she sets with the sun the Bittur are gone and (Cotchi) summer begins" (1857:138). In Aboriginal Australia the movements of stars and animals, weather changes, and the flowering of certain plants together indicate the onset of each season (Clarke 2003:Chapters 7–10).

Mathews gave the example of the Pleiades to demonstrate the cultural importance of star movements in signaling the changes in season for the Aboriginal people of the Clarence River area of northeastern New South Wales:

The Pleiades, when they set with the sun, go away to bring the winter; and . . . when these stars reappear early in the evening in the eastern sky, they are ushering in the warm weather. They are supposed to be a family of young women, [the name of which] was War-ring-garai, and who belonged to the section Wirrakan [1904:279–280].

When the Pleiades are only in the sky for a few hours before dawn, they were associated with cold periods (Johnson 1998:25). Mathews recorded:

Among the Ngeumba [Ngemba] blacks, in the cold weather of mid-winter, when the Pleiades rise about three or four o'clock in the morning, the old men take some glowing coals on bark shovels, and cast them towards this constellation as soon as it is visible. This is done to prevent the spirit-women, whom these stars represent, from making the morning too cold. The women in the camp are not permitted to look at all at the Pleiades in winter nights, because such conduct would increase the severity of the frost. If a woman transgresses this law, her eyes will become bleary, and she will suffer from uterine troubles [1904:280–281].

In the Mulligan River area of the border country in Central Australia between South Australia and Queensland it was Aboriginal belief that the Pleiades women had the power to bring on the cold season and then later cause the warm weather to return (Fraser 1901).

In most ethnographic accounts of the Pleiades constellation (or an asterism of it, since it is unclear which observers recognized all seven stars) the stars are a group of young women, sometimes accompanied by a young boy (Clarke 1997:136; Johnson 2000). The element most versions share is that a group of young women/girls are fleeing from either a single man or a group of men. In parts of the Kimberley Aboriginal people consider that an "old man," the planet Venus, chases the youngest of the Pleiades sisters across the night sky (Andrews 2004:1–5). In the MacDonnell Ranges area of Central Australia it is Arrernte tradition that this star arrangement is a group of female cousins, with their Dreaming track coming from the northeast (Henderson and Dobson 1994:233). In Nukunu mythology of the Mid North of South Australia the "Seven Sisters" were reportedly chased into the sky by three brothers (Hercus 1992:7, 16, 27). Similar in structure is a myth recorded in south-western Victoria, where the Pleiades were seen as a flock of female Cockatoo Ancestors being chased by a male "Crow" (Raven) Ancestor, which was Canopus (Dawson 1881:100).

Tindale surveyed fifty different versions of the Pleiades mythology from across Australia and commented that "most of the stories recovered from west of a line drawn across Australia from just north of Cape Jervis in South Australia to the Leichhardt River on the shores of the Gulf of Carpentaria in Queensland link these women also with dingo dogs" (ca. 1980). In Western Desert accounts they are often accompanied by dingo dogs and are being chased by a male Ancestor such as the Moon (Isaacs 1980:152–153; Robinson 1966:91–93; Tindale 1959). The widespread similarities in beliefs concerning the Pleiades, both across Australia and between Aboriginal and European cultures, has led to an abundance of popular literature concerning the Seven Sisters (e.g., Isaacs 1980:152–153; Mountford 1970:56; Parker 1953:105–109 [1896]; Smith 1930:70, 345–350).

Among the large variety of myths concerning the Pleiades there are several mechanisms for their ascension into the Skyworld. By one tradition, the Pleiades Women Ancestors at Point Upright along the coast south of Sydney in New South Wales escaped a mythical hunter, Thowra the Moon, by

climbing a fishing line that they had cast up into the sky (Brothers 1897). In the central northern region of New South Wales the Kamilaroi people believed that female Ancestors became the Pleiades stars when the two trees they were cutting bark from started growing higher and higher, pushing them into the sky (Greenway 1901). Aboriginal groups along the Darling River in western New South Wales believed that the "Pleiades were a lot of young women who went out on a plain searching for yams and a whirlwind came along and carried them up into the sky, depositing them where they are now seen" (Mathews 1904:283). In the Flinders Ranges of South Australia the Pleiades were a group of women the Akurra Serpent Ancestor ate in western New South Wales (Mountford 1939:103–104, 1976:33–35; Tunbridge 1988:16). These women were later released into the Skyworld when he drowned.

Asterisms of the constellation that Western Europeans know as Orion the Hunter feature in much Aboriginal mythology. The Yolngu people of northeastern Arnhem Land recognize the three stars of Orion's Belt as the men Birrupirru, Djandurrngala, and Ngurruwilpil, who are seen sitting in their bark canoe and paddling across the sky (Davis 1989:53–67, 1997:32). Together these hunters are known as the star arrangement Djulpun, which is visible on the western horizon during the early night sky of Dharratharramirri—the beginning of the dry season. It is the time of the year (from about May to July) for hunting goannas, wallabies, and bandicoots and is noted for its storms from the southeast that knock over the grass. Across Australia the identities of the Pleiades as women and Orion's Belt as men appear to have been reinforced by their seasonal movements, including the timing of their appearance and the direction they travel during the night (Clarke 2009:88).

### **Collapse and Rebirth of the Cosmos**

The arrival of British settlers in 1778 at Sydney in New South Wales heralded the transformation of the landscape, news of which passed through Aboriginal communities beyond the frontier. The catastrophic effects of European settlement greatly influenced Aboriginal views of their cosmos (Clarke 2003:Chapter 12; Johnson 1998:Chapter 8; Swain

1993). In southeastern Australia it was widely believed that in the farthest reaches of their known landscape there were wooden props that held up the Skyworld (Howitt 1904:427; Massola 1968:105–106; Morgan 1980:64–65 [1852]). A widespread Aboriginal tradition was that the eastern prop, where British expansion was gaining, had rotted, and unless gifts of possum skins and stone hatchet heads were sent straight away to the old man who looked after it, everyone would be crushed by the falling vault of the heavens. As historian Keith Willey put it, when this was believed to have happened, it would be as if "the ghosts or reincarnations of all the blackfellows who ever lived had broken through from the spirit world to swarm over the land" (1985:55). There was fear that the divide between the lands of the living and the dead would be permanently ruptured. Beyond the settlement frontier an often-recorded Aboriginal response to seeing European explorers was to treat them as deceased relatives who had come back from the Land of the Dead (Blackburn 1979:33–34, 181–183; Clarke 2003:188–192, 2007:143–144).

The Tangani people of the Coorong in South Australia had a death fear song concerning the arrival of a smallpox epidemic (Clarke 1997:137, 2003:194–195; Tindale 1937a:111–112, 1941:233–234). Smallpox is thought to have been first introduced to Australia by Indonesian fishermen in the north, although later waves may have spread from European settlement on the east coast (Campbell 2002). In the mythology for the death fear song Ancestor Kulda the Meteor Man came down to Earth from the Southern Cross to foretell the coming of death and with his "pointing bone" (sorcery object) took the spirits of the dead with him back into the sky. When Tindale was conducting fieldwork along the Coorong in the 1930s, Aboriginal people he interviewed could still remember accounts from their grandparents' generation concerning the devastation the disease caused among the local Aboriginal population:

The natives saw a man (meteor) come out of Yuuki, the Southern Cross; they heard a noise and looked up (*meinyanga nampi*). They saw him move his hands and said "*Ha! peika bakki*" ("Ah! death coming"; "*peik*" = "die").

The natives could not stand the *murki* [smallpox] and a great many died. The meteor was a *maldawuli* man [spirit man] whose name was Kuldalai [Kulda], he travelled westward through the sky and beckoned to indicate that all the people should follow him. Then the smallpox came and many people followed him (literally went west) across to Kangaroo Island and beyond [1931–1934].

Kulda was said to have appeared “like a bright flash, too bright to look [at].” The method he used to attract people was first by smoke signals, then by waving his hands. Tindale’s informants believed that many of the human bones in the sand hills of the Lower Murray belonged to people whom Kulda had beckoned to follow him to the Land in the West.

Unusual celestial events were taken as warnings of future misfortune and grief (Johnson 1998:86–89). In particular, the Aboriginal view of comets was generally that their appearance was an ill omen. In March 1843 a comet visible to Aboriginal peoples along the Murray River in South Australia was taken as a “harbinger of all kinds of calamities, and more especially to the white people. It was considered that the comet would overthrow Adelaide, destroying all Europeans and their houses, and then to take a course up the Murray and past the Rufus River causing havoc in its path” (Eyre 1845:2:358–359). For Aboriginal peoples in the southwest of Western Australia, the same comet was seen as a flame on the western horizon and was said to be a portent of death and “no good to blackfellow” (Wollaston 1841–1856). Here, after looking at the comet, Aboriginal observers would fall to the ground, coughing and spitting to rid themselves of harmful spirits. As with other changes noticed in the cosmos, in Aboriginal Australia the arrival of comets was often interpreted according to Dreaming beliefs. The Aboriginal residents of Mapoon in northern Queensland considered that a comet observed during May 1901 had been caused by two elderly women Ancestors lighting a fire (Roth 1903:8).

Aboriginal people at the Point McLeay Mission in the Lower Murray region of South Australia were reportedly fearful of the lunar eclipse and the Aurora Australis, both of which were believed to have been made by “wild blackfellows,” an early Aboriginal

English term for distant groups who were feared sorcerers (Taplin 1859–1879: June 4–7, 1859, September 2, 1859). In the case of the Aurora Australis it foretold the arrival of these dangerous human/spirit beings.

## Discussion

Indigenous astronomical traditions cannot be understood without consideration of the totality of the cultural landscape. While the available sources of information used in this paper are limited, it has been demonstrated that in Aboriginal Australia the identification of Ancestors as celestial bodies was perceived as tangible evidence of the existence of the Dreaming and the continuation of its influence over earthly affairs. Particular large trees and prominent hills were believed to be portals for moving between Earth and the Skyworld, and caves were often treated as passages connecting to the Underworld. While living people were considered to be restricted to Earth under normal circumstances, spirits were believed to travel freely across the entire landscape. To some extent the actions of Ancestors in the Skyworld were reflections of Aboriginal life on Earth. The Aboriginal cosmic landscape is a “canvas” upon which Aboriginal Creation mythology is displayed.

Since British settlement Aboriginal peoples have continued to derive meaning from the sky as their participation in the wider world has grown. In Central Australia an early twentieth-century Aboriginal view of the Milky Way was that it was dust kicked up from Jesus galloping on his horse (Walker ca. 1920). During my fieldwork in the Lower Murray region in the 1980s I observed Ngarrindjeri people speculating whether a change in the color of the Evening Star (Venus) would tell them if an outbreak of armed conflict between nations was about to occur (Clarke 1994:124). They believed that if a war was to be declared, and if this was to involve their own community, then the Evening Star would glow red when it rose shortly after sunset.

Aboriginal artists, particular in the Top End of the Northern Territory, often paint astronomical themes (Mountford 1956; West 1995). While much of this artwork is based upon Dreaming traditions concerning the heavens that predate European settlement, there is some evidence of non-Aboriginal influences,

including from the discipline of astronomy itself. At Billiluna in northern Western Australia Aboriginal artists have enriched their own traditions concerning the Wolfe Creek Crater by blending elements derived from a scientific perspective of its origin as the result of a large meteoroid strike many millions of years ago with their own traditions relating to the Rainbow Serpent and other spirit Ancestors (Sanday 2007). From the artist's point of view, the inclusion of such elements derived from information gained from sources external to their culture would have strengthened the power of the painting. Such willingness to embrace and incorporate "new" knowledge, whether from other parts of Aboriginal Australia or from beyond, demonstrates the dynamism of the cultures that have produced the astronomical traditions described in this paper.

Aboriginal astronomical traditions have interested a broad range of people outside of the Aboriginal community. European Australians have published popular accounts of the heavens as folklore (Cairns and Harney 2004; Isaacs 1980; Wells 1964, 1973). Interpretations of southern Aboriginal folklore concerning the Rainbow Serpent (Churches 1992; Fielder 1989) and the Pleiades (Sutton 1996; Tonkinson 1997; Weiner 1999) played major roles in the course of particular heritage disputes in the late twentieth century arising from the development of purported cultural sites. For the indigenous communities based in the southern "settled" regions, the widespread connections that these particular traditions have with those of communities based in remote regions make them attractive for use when rebuilding cultural identities (Clarke 2007:149). There are similarities in beliefs about the Pleiades from around the world (Andrews 2004; Clarke 2001:137).

In Australia Western Desert women visiting capital cities for public ceremonies, like those held in Adelaide at the Tandanya National Aboriginal Cultural Institute, will publicly perform the "Seven Sisters inma [dance]." In northwestern South Australia Anangu Pitjantjatjara people take tourists to rock painting sites connected with this Dreaming and tell open versions of the myth (*Desert Tracks* ca. 2000). From my experience with such ecotourism ventures, certain aspects of the Seven Sisters mythol-

ogy remain culturally sensitive to Aboriginal people, with deep knowledge said to be restricted to senior community members widely regarded as authorities in cultural matters. The Anangu Pitjantjatjara community is keenly aware of its resonance with the mythologies of other parts of Australia and has often chosen this mythology as a means for establishing links with other indigenous cultures. For contemporary indigenous peoples, explanations of the night sky remain as a vehicle for explaining their cosmos and exploring cultural identity.

## Acknowledgments

Peter Sutton and two anonymous reviewers provided important comments upon a draft of this paper.

## References Cited

- Andrews, Munya  
2004 *The Seven Sisters of the Pleiades. Stories from Around the World*. Spinifex, Melbourne.
- Angas, George French  
1847 *Savage Life and Scenes in Australia*. Smith, Elder & Co., London.
- Bates, Daisy M.  
1921 Ooldea Water. *Proceedings of the Royal Geographical Society of Australasia, South Australian Branch* 21:73-78.  
1992 [1924] Aboriginal Astronomy. In *Aboriginal Perth. Bibbulmun Biographies and Legends*, edited by Peter J. Bridge, pp. 170-173. Hesperian Press, Perth.
- 1947 *The Passing of the Aborigines*. Australian edition. John Murray, London.
- Berndt, Ronald M., and Catherine H. Berndt  
1989 *The Speaking Land. Myth and Story in Aboriginal Australia*. Penguin, Melbourne.
- Berndt, Ronald M., Catherine H. Berndt, with John E. Stanton  
1993 *A World That Was. The Yaraldi of the Murray River and the Lakes, South Australia*. Melbourne University Press at the Miegunyah Press, Melbourne.
- Beveridge, Peter  
1883 Of the Aborigines Inhabiting the Great Lacustrine and Riverine Depression of the Lower Murray, Lower Murrumbidgee, Lower Lachlan, and Lower Darling. *Journal & Proceedings of the Royal Society of New South Wales* 17:19-74.
- Bhathal, Ragbir, and Graeme White  
1991 *Under the Southern Cross: A Brief History of Astronomy in Australia*. Macmillan, Melbourne.
- Blackburn, Julia  
1979 *The White Men*. Times, London.



- Brothers, R.  
1897 Myth of Australia—Thowra and the Seven Myells. *Australasian Anthropological Journal* 1(2):10–11.
- Brown, Alfred R.  
1930 The Rainbow-Serpent Myth in South-East Australia. *Oceania* 1(3):342–347.
- Buchler, Ira R., and Kenneth Maddock (editors)  
1978 *The Rainbow Serpent. A Chromatic Piece*. Mouton Publishers, The Hague.
- Cairns, Hugh C., and Bill Yidumduma Harney  
2004 *Dark Sparklers. Yidumduma's Wardaman Aboriginal Astronomy Night Skies Northern Australia*. H. C. Cairns, Merimbula, New South Wales.
- Campbell, Judith A.  
2002 *Invisible Invaders. Smallpox and Other Diseases in Aboriginal Australia 1780–1880*. Melbourne University Press, Melbourne.
- Churches, Steven  
1992 Aboriginal Heritage in the Wild West: Robert Bropho and the Swan Brewery Site. *Aboriginal Law Bulletin* 2(56):9–13.
- Clarke, Philip A.  
1994 Contact, Conflict and Regeneration. Aboriginal Cultural Geography of the Lower Murray, South Australia. Unpublished Ph.D. dissertation, Departments of Geography and Anthropology, University of Adelaide, Adelaide.  
1997 The Aboriginal Cosmic Landscape of Southern South Australia. *Records of the South Australian Museum* 29(2):125–145.  
1999a Waiyungari and His Role in the Mythology of the Lower Murray, South Australia. *Records of the South Australian Museum* 32(1):51–67.  
1999b Spirit Beings of the Lower Murray, South Australia. *Records of the South Australian Museum* 31(2):149–163.  
2001 Review of *Warrabarna Kurna! Reclaiming an Australian Language* by Rob Amery. *Records of the South Australian Museum* 34(2):135–138.  
2003 *Where the Ancestors Walked. Australia as an Aboriginal Landscape*. Allen & Unwin, Sydney.  
2007 Indigenous Spirit and Ghost Folklore of “Settled” Australia. *Folklore* 118(2):141–161.  
2009 Australian Aboriginal Ethnometeorology and Seasonal Calendars. *History & Anthropology* 20(2):79–106.
- Collins, David  
1798 *An Account of the English Colony in New South Wales: With Remarks on the Dispositions, Customs, Manners, &c. of the Native Inhabitants of that Country*. T. Cadell & W. Davies, London.
- Davis, Stephen  
1989 *Man of All Seasons. An Aboriginal Perspective of the Natural Environment*. Angus & Robertson, Sydney.
- 1997 Documenting an Aboriginal Seasonal Calendar. In *Windows on Meteorology. Australian Perspective*, edited by Eric K. Webb, pp. 29–33. CSIRO Publishing, Melbourne.
- Dawson, James  
1881 *Australian Aborigines*. Robertson, Melbourne.  
*Desert Tracks*  
ca. 2000 Yulara, Northern Territory. Electronic document, [http://www.deserttracks.com.au/pdf/DT\\_schools.pdf](http://www.deserttracks.com.au/pdf/DT_schools.pdf).
- Elkin, Adolphus P.  
1930 The Rainbow-Serpent Mythology in North-West Australia. *Oceania* 1(3):349–352.
- Eyre, Edward J.  
1845 *Journals of Expeditions of Discovery*. 2 vols. Boone, London.
- Fielder, John  
1989 The Waugal and the Brewery. *Australian Studies* 12:58–64.
- Fraser, A.  
1901 Hot and Cold Weather, and Who Caused It. *Science of Man* 4(2):29.
- Giles, Thomas  
1887 *Register* 5 October. Adelaide, South Australia.
- Glass, Ameer, and Dorothy Hackett  
2003 *Ngaanyatjarra and Ngaatjatjarra to English Dictionary*. Institute of Aboriginal Development Press, Alice Springs.
- Greenway, Charles C.  
1901 The Constellation Pleiades—Mei-mei. *Science of Man* 4(11):190–191.
- Haynes, Raymond F., Roslynn D. Haynes, David Malin, and Richard McGee  
1996 *Explorers of the Southern Sky. A History of Australian Astronomy*. Cambridge University Press, Cambridge.
- Haynes, Roslynn D.  
1992 Aboriginal Astronomy. *Australian Journal of Astronomy* 4(3):127–140.
- Henderson, John, and Veronica Dobson  
1994 *Eastern and Central Arrernte to English Dictionary*. Arandic Languages Dictionaries Program, Language Centre, Institute for Aboriginal Development, Alice Springs.
- Hercus, Luise A.  
1987 Looking for Ditji-mingka. *Records of the South Australian Museum* 21(2):149–156.  
1992 *A Nukunu Dictionary*. Australian Institute of Aboriginal & Torres Strait Islander Studies, Canberra.
- Hey, Nicholas  
1903 *An Elementary Grammar of the Ngerikudi Language*. Revised and edited by W. E. Roth. North Queensland Ethnography Bulletin No. 6. Department of Public Lands, Brisbane.

- Hiatt, Lester R. (editor)  
 1975 *Australian Aboriginal Mythology. Essays in Honour of W. E. H. Stanner*. Australian Institute of Aboriginal Studies, Canberra.
- Howitt, Alfred W.  
 1904 *Native Tribes of South-East Australia*. Macmillan, London.
- Isaacs, Jennifer  
 1980 *Australian Dreaming: 40,000 Years of Aboriginal History*. Lansdowne Press, Sydney.
- Johnson, Dianne  
 1998 *Night Skies of Aboriginal Australia. A Noctuary*. Oceania Monograph No. 47. University of Sydney, Sydney.  
 2000 The Pleiades in Aboriginal and Torres Strait Islander Astronomies. In *The Oxford Companion to Aboriginal Art and Culture*, edited by Sylvia Kleinert and Margo Neale, pp. 24–28. Oxford University Press, Melbourne.  
 2005 The Southern Night Sky. In *Macquarie Atlas of Indigenous Australia. Culture and Society Through Space and Time*, edited by Bill Arthur and Frances Morphy, pp. 108–113. Macquarie Library, Macquarie University, New South Wales.
- Johnston, T. Harvey  
 1941 Some Aboriginal Routes in the Western Portion of South Australia. *Proceedings of the Royal Geographical Society, South Australian Branch* 42:33–65.
- Kolig, Erich  
 1984 [1981] The Mobility of Aboriginal Religion. In *Religion in Aboriginal Australia: An Anthology*, edited by Max Charlesworth, Howard Morphy, Diane Bell, and Kenneth Maddock, pp. 391–416. University of Queensland Press, St. Lucia.
- Lampert, Ron J.  
 1979 Aborigines. In *Natural History of Kangaroo Island*, edited by Michael J. Tyler, Rowl (C. R.) Twidale, and John K. Ling, pp. 81–89. Royal Society of South Australia, Adelaide.
- Lewis, David  
 1976 Observations on Route Finding and Spatial Orientation among the Aboriginal People of the Western Desert Region of Central Australia. *Oceania* 46(4):249–282.
- MacPherson, Peter  
 1881 Astronomy of the Australian Aborigines. *Journal and Proceedings of the Royal Society of New South Wales* 15:71–80.
- Maegraith, Brian G.  
 1932 The Astronomy of the Aranda and Luritja Tribes. *Transactions of the Royal Society of South Australia* 56:19–26.
- Massola, Aldo  
 1968 *Bunjil's Cave. Myths, Legends and Superstitions of the Aborigines of South-East Australia*. Lansdowne Press, Melbourne.
- Mathews, Robert H.  
 1904 Ethnological Notes on the Aboriginal Tribes of New South Wales and Victoria. *Journal of the Royal Society of New South Wales* 38:203–381.
- McBryde, Isabel  
 1974 Mathews, Robert Hamilton (1841–1918). In *Australian Dictionary of Biography*. Vol. 5: 1851–1890 K–Q, edited by Douglas Pike, pp. 225–226. Melbourne University Press, Melbourne.
- McConnel, Ursula H.  
 1930 The Rainbow-Serpent in North Queensland. *Oceania* 1(3):347–349.
- Meyer, Heinrich A. E.  
 1879 [1846] *Manners and Customs of the Aborigines of the Encounter Bay Tribe, South Australia*. Reprinted and edited by James D. Woods, pp. 183–206. The Native Tribes of South Australia. E. S. Wiggs, Adelaide.
- Morgan, John  
 1980 [1852] *The Life and Adventures of William Buckley: Thirty-two Years a Wanderer Amongst the Aborigines of the Unexplored Country Round Port Phillip*. Australian National University Press, Canberra.
- Morphy, Howard  
 1998 *Aboriginal Art*. Phaidon Press, London.  
 1999 Australian Aboriginal Concepts of Time. In *The Story of Time*, edited by Kristen Lippincott, pp. 264–267. Merrell Holberton Publishers, London.
- Mountford, Charles P.  
 1939 An Anyamatana Legend of the Pleiades. *Victorian Naturalist* 56:103–104.  
 1956 *Arnhem Land: Art, Myth and Symbolism*. Vol. 1 of *Records of the American-Australian Scientific Expedition to Arnhem Land*. Melbourne University Press, Melbourne.  
 1958 *The Tiwi, Their Art, Myth and Ceremony*. Phoenix House, London.  
 1965 *Ayers Rock. Its People, Their Beliefs and Their Art*. Angus & Robertson, Sydney.  
 1970 *The Dreamtime. Australian Aboriginal Myths*. Rigby, Adelaide.  
 1976 *Before Time Began. Legends of the Dreamtime*. Thomas Nelson, Melbourne.
- Nash, David  
 1992 Hot and Cold over Clockwise. In *The Language Game. Papers in Memory of Donald C. Laycock*, edited by Thomas E. Dutton, Malcolm D. Ross, and Darrell T. Tryon, pp. 291–297. Pacific Linguistics Series C-110. Australian National University, Canberra.
- Norris, Ray P.  
 2007 Searching for the Astronomy of Aboriginal Australians. *Conference Proceedings from the VIIIth Oxford International Conference on Archaeoastronomy and Astronomy in Culture*. Elec-

- tronic document, <http://www.atnf.csiro.au/people/morris/papers/n214.pdf>.
- Palmer, Edward  
1885 Concerning Some Superstitions of North Queensland Aborigines. *Proceedings of the Royal Society of Queensland* 2:163–175.
- Pardoe, Colin  
1989 *Archaeology of the Western Lindsay Island Meander Scroll. Report on a Survey of Burials, Artefacts, and Sites in North-West Victoria*. Victorian Archaeological Survey.
- Parker, Katie Langloh  
1953 [1896] *Australian Legendary Tales*. Angus & Robertson, Sydney.
- Piddington, Ralph  
1930 The Water-Serpent in Karadjeri Mythology. *Oceania* 1(3):352–355.
- Plomley, Norman J. B. (Brian)  
1966 *Friendly Mission. The Tasmanian Journals and Papers of George Augustus Robinson. 1829–1834*. Tasmanian Historical Research Association, Hobart.  
1997 Contacts with the Tasmanian Aborigines. In *Windows on Meteorology. Australian Perspective*, edited by Eric K. Webb, pp. 42–45. CSIRO Publishing, Melbourne.
- Reuther, Johann G.  
1981 [ca. 1900] *The Diari*, translated by Philipp A. Scherer. Australian Institute of Aboriginal Studies, Canberra.
- Robinson, Roland E.  
1966 *Aboriginal Myths and Legends*. Sun Books, Melbourne.
- Rose, Ronald  
1956 *Living Magic. The Realities Underlying the Psychological Practices and Beliefs of Australian Aborigines*. Rand McNally & Co., New York.
- Roth, Walter E.  
1897 *Ethnological Studies among the North-West-Central Queensland Aborigines*. Government Printer, Brisbane.  
1903 *Superstition, Magic, and Medicine*. North Queensland Ethnography Bulletin No. 5. Department of Public Lands, Brisbane.
- Sagona, Antonio  
1994 The Quest for Red Gold. In *Bruising the Red Earth. Ochre Mining and Ritual in Aboriginal Tasmania*, edited by Antonio Sagona, pp. 8–38. Melbourne University Press, Melbourne.
- Sanday, Peggy Reeves  
2007 *Aboriginal Paintings of the Wolfe Creek Crater. Track of the Rainbow Serpent*. University of Pennsylvania Museum of Archaeology and Anthropology, Philadelphia.
- Smith, William Ramsay  
1930 *Myths and Legends of the Australian Aborigines*. Harrap, Sydney.
- Smyth, Robert Brough  
1878 *The Aborigines of Victoria*. Government Printer, Melbourne.
- Stanbridge, William E.  
1857 On the Astronomy and Mythology of the Aborigines of Victoria. *Philosophical Institute of Victoria, Transactions* 2:137–140.  
1861 Some Particulars on the General Characteristics, Astronomy, and Mythology of the Tribes in the Central Part of Victoria, Southern Australia. *Transactions of the Ethnological Society of London* 1:286–304.
- Stanner, William E. H.  
1979 [1953] The Dreaming. In *White Man Got No Dreaming*, pp. 23–40. Australian National University Press, Canberra.
- Stone, A. C.  
1911 Aborigines of Lake Boga. *Proceedings of the Royal Society of Victoria* 23(2):433–468.
- Sutton, Peter  
1988a Dreamings. In *Dreamings: The Art of Aboriginal Australia*, edited by Peter Sutton, pp. 13–32. Penguin Books, Melbourne.  
1988b The Morphology of Feeling. In *Dreamings: The Art of Aboriginal Australia*, edited by Peter Sutton, pp. 59–88. Penguin Books, Melbourne.  
1996 The Seven Sisters, Women's Fertility, and the Hindmarsh Island Area. Unpublished report commissioned for the Federal Inquiry by Justice Jane Mathews, 3 May 1996. P. Sutton collection (AA653), South Australian Museum Archives, Adelaide.  
1998 Icons of Country: Topographic Representations in Classical Aboriginal Traditions. In *The History of Cartography*, Vol. 2.3: *Cartography in the Traditional African, American, Arctic, Australian, and Pacific Societies*, edited by David Woodward and C. Malcolm Lewis, pp. 351–386. University of Chicago Press, Chicago.
- Swain, Tony  
1993 *A Place for Strangers. Towards a History of Australian Aboriginal Being*. Cambridge University Press, Cambridge.
- Taplin, George  
1859–1879 Journals. Mortlock Library, Adelaide.
- Taylor, Luke  
1995 The Place of Bardayal and Kubarkku in the Western Arnhem Land Bark Painting Tradition. In *Rainbow, Sugarbag and Moon. Two Artists of the Stone Country: Bardayal Nadjamerrek and Mick Kubarkku*, edited by Margie West, pp. 20–29. Museum & Art Gallery of the Northern Territory, Darwin.

- Teichelmann, Christian G.  
 1840 The Natives of South Australia. *South Australian Colonist* 1(18):277.
- 1841 *Aborigines of South Australia*. Committee of the South Australian Wesleyan Methodist Auxiliary Society, Adelaide.
- Teichelmann, Christian G., and Clamor W. Schürmann  
 1840 *Outlines of a Grammar . . . of the Aboriginal Language of South Australia*. 2 parts. Thomas, Adelaide.
- Tindale, Norman B.  
 1931–1934 *Journal of Researches in the South East of South Australia*. Vol. 1. South Australian Museum Archives, Adelaide.
- 1937a Native Songs of the South East of South Australia. *Transactions of the Royal Society of South Australia* 61:107–120.
- 1937b Two Legends of the Ngadjuri Tribe from the Middle North of South Australia. *Transactions of the Royal Society of South Australia* 61:149–153.
- 1938 Notes on Kokoimudji Astronomy in the “Pleiades” file (AA338/14/319), South Australian Museum Archives, Adelaide.
- 1941 Native Songs of the South East of South Australia. Part 2. *Transactions of the Royal Society of South Australia* 65(2):233–243.
- 1959 Totemic Beliefs in the Western Desert of Australia—Part 1: Women Who Became the Pleiades. *Records of the South Australian Museum* 13(3):305–332.
- 1974a Journal entry for 2 July 1974. In *Canberra and California Journal*, Vol. 1, 1974–1975. South Australian Museum Archives, Adelaide.
- 1974b *Aboriginal Tribes of Australia. Their Terrain, Environmental Controls, Distribution, Limits, and Proper Names*. Australian National University Press, Canberra.
- ca. 1980 “Pleiades” file (AA338/14/319), South Australian Museum Archives, Adelaide.
- 2005 Celestial Lore of Some Aboriginal Tribes. In *Songs from the Sky: Indigenous Astronomical and Cosmological Traditions of the World*, edited by Von Del Chamberlain, John B. Carlson, and M. Jane Young, pp. 358–379. Ocarina Books, West Sussex, United Kingdom. [*Archaeoastronomy* 12–13: 358–379.]
- Tonkinson, Robert  
 1997 Anthropology and Aboriginal Tradition: The Hindmarsh Island Bridge Affair and the Politics of Interpretation. *Oceania* 68(1):1–26.
- Tunbridge, Dorothy  
 1988 *Flinders Ranges Dreaming*. Aboriginal Studies Press, Canberra.
- Walker, William D.  
 ca. 1920 Captions for Series B—Lantern slides, p. 4. South Australian Museum Archives, Adelaide.
- Weiner, James  
 1999 Culture in a Sealed Envelope: The Concealment of Australian Aboriginal Heritage and Tradition in the Hindmarsh Island Bridge Affair. *Journal of the Royal Anthropological Institute* 5(2):193–210.
- Wells, Ann E.  
 1964 *Skies of Arnhem Land*. Angus and Robertson, Sydney.
- 1973 *Stars in the Sky: Legends of Arnhem Land*. Rigby, Adelaide.
- Wells, William  
 1995 [1852–1855] *Journals*. Edited by Robert K. G. Foster. South Australian Museum, Adelaide.
- West, Margie (editor)  
 1995 *Rainbow, Sugarbag and Moon. Two Artists of the Stone Country: Bardayal Nadjamerrek and Mick Kubarkku*. Museum & Art Gallery of the Northern Territory, Darwin.
- White, Charles  
 1905 The Story of the Blacks. *Adelaide Observer* 14 January.
- Willey, Keith  
 1985 *When the Sky Fell Down. The Destruction of the Tribes of the Sydney Region 1788–1850s*. 2nd ed. William Collins, Sydney.
- Wollaston, John R.  
 1841–1856 Journals and diaries. National Library of Australia, Canberra.
- Wyatt, William  
 1879 Some Account of the Manners and Superstitions of the Adelaide and Encounter Bay Tribes, with a Vocabulary of Their Languages, Names of Persons and Places, &c. In *The Native Tribes of South Australia*, edited by James D. Woods, pp. 157–181. E. S. Wiggs, Adelaide.

Copyright of Archaeoastronomy is the property of University of Texas Press and its content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use.