

Aboriginal Astronomy: WA Focus

by Pat Forster

Celebrated through quilts

Supported by references from the literature

With web links to Aboriginal art



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Warning: Readers are respectfully advised that this paper contains names of people who are deceased.
Web links to images are provided- if a webpage is no longer available, search on the artist and image names.

Sun



Sun and Aboriginal Culture, by Pat Forster, 2021, 62 cm x 42 cm

Quilt statement: The depiction of the Sun refers to relevant traditional cultural beliefs from Western Australia Aboriginal peoples. Characterisations include that the Sun is: the creator; giver of life; spirit carrying lighted wood; wife of Moon; mother of Venus; sun has fire, moon has light. The; sunup (dawn) and sundown (dusk) positions of the Sun were used to establish directions; Sun was a focus of increase rituals; and eclipses were feared.

The quilted collage was inspired by a print of the acrylic-painting collage by JackieGuttusoDesigns https://www.etsy.com/au/shop/JackieGuttusoDesigns?ref=simple-shop-header-name&listing_id=558105433

Cotton fabrics; polyester-cotton, polyester, and metallic threads; cotton wadding. Machined raw- edge and turned edge applique; trapuntoed centre of the Sun, free-motion quilted text, machined straight-line quilting.

Introduction

Narratives mediated the traditional life of Aboriginal people. Narratives served to explain the creation of the heavens, earth's landscape, people and nature on earth, and natural phenomena. They functioned as oral maps of journeys, and conveyed (un)acceptable social behaviour. Many of the narratives are analogical - through metaphor or simile or other linguistic means, they draw parallels between what is familiar and what is observed but intangible. Such is the case with the Sun. As well, an element of fantasy enters some Sun narratives – to explain the unexplainable.

The account below is based on an extensive internet-based search. The references pertain to Aboriginal people from Noongar Country (south-west WA, which includes Perth, the state's capital city), Wongai (Wongatha) Country (Eastern Goldfields, south-east WA), Yamatji Country (the Murchison, mid-west WA), the Pilbara (north-west WA), the Kimberley (north WA) and Pitjantjatjara and Ngaanyatajja Lands (Central Desert

areas). The references are from peer-reviewed research papers, accepted theses, as well as from less conventional sources including storybooks.

Characterisations of the Sun

- *the creator*

Josie Boyle (c1943 - 2020), Wongai Elder, Eastern Goldfields told narratives (Boyle, 2007) handed down by her mother who followed traditional ways for much of her life (Goldsmith, 2014). Creation, in brief, was when: the creator (Jindoo the Sun) sent two spirit men down from the Milky Way to shape the Earth. They made landforms and oceans. Then Jindoo sent seven sisters, stars of the Milky Way, to beautify the Earth with flowers, trees, birds, animals and creepy things.

- *giver of life*

In 1830, Mokare, a Minang Noongar leader (south coast) shared a creation narrative with Captain Collet Barker:

... he told me that a very long time ago the only person living was an old woman named Annegar ... who had a beard as large as the garden. She was delivered of a daughter & then died. The daughter called Moerang grew up in the course of time to be a woman, when she had several children ... who were the fathers & mothers of all the black people. (Macintyre and Dobson 2017: webpage).

Macintyre and Dobson conjecture that Annegar may equate with *arnga*, meaning the beard, which according to Grey (1840) is a corruption of *nanga*. Grey does not list the meaning of *nanga*, but Moore (1842) lists *nganga*, sun. Macintyre and Dobson point out that the meaning of all the words mentioned depends on context, and that the name Annegar could mean the bearded sun woman.

Whadjuk/Balardong Noongar Professor Len Collard (1959 -), University of Western Australia, recorded the narrative 'The Walitj the Eagle, Kulbardi the Magpie, Wardong the Crow and Djidi the Willy Wagtail', told to him, in the oral tradition, by his Aunty Janet Hayden:

When darkness came over the earth, they [the birds] had no way of bringing light back, and the sun wouldn't come back. They had to send a bird and all the birds volunteered. ... They had to fly as high as they possibly could ... They found old Gnarnk ... They brought the sun back. They told her that without her the earth would die. She was the Giver, they called her the sun, the Giver of Life. (Collard, 2009: 14-15).

Perhaps the birds' dawn chorus, which starts just before dawn, brought/brings the sun back?

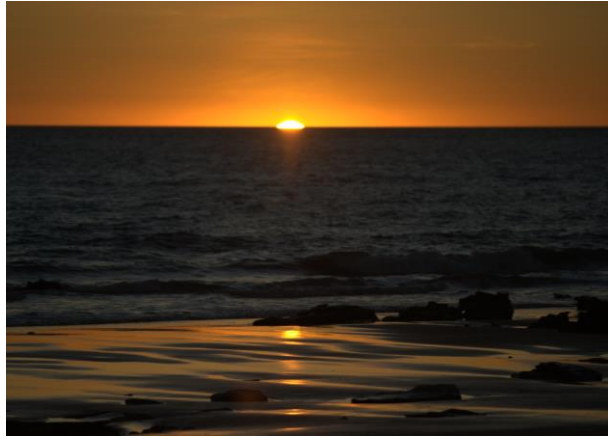
Jakayu Biljabu (1937 -) of the Martu people, east Pilbara, was born near Pitu, east of Well 25 on the Canning Stock Route and lived with her family longer than most before leaving the traditional life (Martumili Artists, n.d.). The statement for her painting Nyilangkurr Claypan n.d., a claypan which is close to Well 25, includes a brief outline of Dreamtime narrative for the area. In it, the world is dark, the Sun comes up, life forms become increasingly complex and particular features in the land are created.

- *a wife and mother*

A narrative from southern WA (Bates, n.d.a, 2), includes mention of the Sun:

Miak the Moon was a nungar (man), kura (long ago) and Ngank the Sun was his yog (wife). They had two children, Mardyet and Bootul or Bolangur. Bootul, the big star in the west (Venus) is Ngank's daughter. Maik and his daughters were juk borungur, and Ngand was wit borungur. Every evening Bootul follows her mother home, and comes up after her in the morning.

Armstrong (1836: 790), an early settler, wrote of Dales Cave, located northeast of Perth on a bank of the Avon River in Noongar country, that Perth Aboriginal people call the cave: "... 'Mountain of the Moon'. Macintyre and Dobson (2017: webpage) refer to the cave, saying: "Interestingly, the "sun cave," also called the "moon cave" was located by early 19th century explorers near York, Western Australia This cave contains ancient markings and representations of the moon and/or sun beings who in Noongar mythology are depicted as husband and wife".



Sunset, from Cape Leveque, West Kimberley, photo by Jim Forster.

In a narrative from northwestern WA (Bates, n.d.b., 66):

Meerijal, koonyooloo (the moon) was once a man, and he said, "Ngai injja" (I am going). The moon was tallor (fully initiated man).

The womba said to him, "You go with that boy". and he said, "No," and they said, "You go balellee," he said "Maaloo, they might make me minjil," and they said, "Joo nganga lean," and he said, nothing, maaloo. He wanted to take the woman away with him, and they asked him, "Do you want this one"? and they pointed to a big one and he said, "No, she might look too much for balngan joonjoon (grub)," and they said "You like this girl?" and he laughed and said, "Yes," and he took the girl away with him and they travelled westward, and when the girl stretched her arm a lot of girls came and when he stretched the other arm a lot more came and when she stretched her legs a lot more and the moon put doogul on his forehead and now this koonyooloo has got a light Kalgal that won't burn you, but Walga (the sun) has got a fire, but if Walga let her mother come up, the whole country and all the womba would be burned. So Walga keeps her mother down.

- a carrier of lighted wood

Commonly, Aboriginal people across Australia view the Sun as a female spirit who carries lighted wood from east to west across the sky (Norris 2016). Macintyre and Dobson's (2017) linguistic analysis of Noongar words fits the notion of lighted wood carried across the sky. They link Moore's (1842) Whadjuk Noongar word *biryrt*, for daylight, with the word *biryrtch*, for cone of a banksia, which women carried smouldering between campsites, under their cloaks, to act as a firelighter. Other Noongar words in Moore's vocabulary that support the Sun - fire link are: *malyar*, the ignited portion of a piece of burning wood; and *malyarak*, mid-day.

In summary, the above WA characterisations of the Sun illustrate Natale's (2012) premise that Aboriginal narratives work within an analogical framework - a female Sun who bears children, is a giver of life and carrier of burning wood (smouldering banksia cones), performs the traditional roles of Aboriginal women; and the birds bring her back each morning.

- abode of the departed

For Wheelman Noongar people, south-east coast WA (Hassell, n.d.: 281):

The sun is the far off land where the natives go and live after they die, no evil spirit can get there, and it is wonderful fertile country. When I [Hassell] remarked that it must be very hot I was told it is not so, the heat came from the sky which was below the sun and had nothing to do with it. The sun was above everything, the stars, moon and heavens, and independent of them all. It was the abode of the departed.

In a native title submission to the Federal Court (Palmer, 2016: 136), Noongar informant Lynette Knapp (south coast) stated that her father had taught her that the spirit of the dead person went "beyond the sun."

- location in relation to other sky objects

The painting *Sunrise Chasing Away the Night 1977-78*, by Mick Namarari Tjapaltjarri (c. 1926 – 1998), Western Desert WA, (National Gallery of Australia, n.d.: web page) provides a topographical view, looking from beyond the Sun down onto Earth, with stars between Sun and Earth, and a ceremonial ground, stones and campfires. The title of the painting implies a moving Sun – a view that is implied by language worldwide.

<IMAGE>

Sunrise chasing away the night by Mick Namarari Tjapaltjarri, Western Desert WA, 1977-78
[Namarari Tjapaltjarri , Mick | Sunrise chasing away the night](#)

Focus of Ritual

- *increase rituals*

In Yindjibarndi Country, the Pilbara WA, there is an increase site for the Sun, on a riverbed: actions to stop the Sun shining at a specific place, and to make the Sun shine brightly, are documented (Juluwarlu Aboriginal Corporation, 2008). Where the Sun doesn't shine, fish are attracted by localised shade, and bright sunshine lowers the water level in the river which assists fishing. As Kelly (2016: 4) observes, increase rituals are not merely superstitious acts that will increase the fortune of a hunt: "Many of the songs reinforce details of animal behaviour ... so, exactly as claimed, enhance the likely success of a hunt."

From Northwestern WA (Bates, n.d. b, 41 - 42):

In the Ymminga times of long, long ago there were three countries in Jajjala, the area that is now called Broome. There was the sky (kalbu) country, the ground (booroo), and the underground (jimin) country, and it is of jimbin country this story tells. The jimbin country was the beautiful home of babies, ngargalula, and all young animals, birds and plants. By the little streams the babies played with the tiny fishes and crabs and all along the banks the flowers opened and leaned down to touch the babies as they floated along the way to the sea ...

And there was no dark night in ngargalula land. Sun and moon and stars came and sat down with the babies and young reptiles and snakes fondled them. Jimbin was the loveliest of the three countries of the Jajjala people, for neither sorrow nor fighting nor evil nor death ever came to Jimbin land, and no grown up could visit Jimbin except in dreams. ...

Every person in Booroo land was once a little ngargalula from Jimbin land. The little ngargalula always chose its own father and always came to him in his dreams. As the man slept he dreamed he saw a little ngargalula standing close beside him, and he said, "Who is your father?" and the ngargalula replied, "Kalmera, you are my Buronga father," and then the dreamer would look around the place where the ngargalula was standing and he would see some good edible food or some young emus or turtles or porpoises and he would note every thing around and about the ngargalula, and when he had taken note of all these things, the ngargalula would go over to where his future earthly mother lay asleep, and going inside her was carried by her until by and by he was born in Booroo land, but he was still a ngargalula until the day came when he smiled at his parents, and then he was "no more ngargalula."

The living things, birds, fish edible plants, flowers, that his father saw in his dream, became his ngargalula totems, and when he grew up to manhood and dreaming time he dreamed the increase of his own totem food ... and if it were a favorite food of his Booroo land people they would ask him to "Dream more, dream more" ... and if his totem were ngargalula seeds, which came up in Booroo land for a short time only, all his Booroo land friends would see beautiful rays coming from the setting sun and they would laugh happily and say, "Yeergili seeds will be many." (Bates, n.d. b, 41 - 42)

Solar Eclipses

- *bad omens*

Traditionally, for Aboriginal people, a solar eclipse "was an omen of impending disaster, or a sign that someone was working black magic." (Norris, 2016: 10). Mandjindja people from the Western Desert WA, said they had seen a solar eclipse once only and that they were struck with fear, but were relieved when the eclipse passed and no-one was harmed (Tindale, 2005). The Yircla Meening of Eucla, Eastern Goldfields WA, believed solar eclipses were caused by "the Meenings of the moon, who were sick, and in a bad frame of mind towards those of Yircla [the Morning Star, Venus]." (Curr, 1886: 400). The people of Roebuck Bay, west Kimberley, were others who became fearful (Peggs, 1903).

- *observations and explanations of physical properties*

Pitjantjatjara people of the Central Desert, partly in WA, believed that bad spirits made the Sun dirty during a solar eclipse (Rose, 1957). Jaru Elder Jack Jugarie, east Kimberley, recalled in 1999 that, after World War II, the Sun had got dark, "*not really dark, just like a shade*", it "*stopped for a while*", and then got "*bright again ... and make you warm again*". (Goldsmith, 2014: 138). The description fits a partial eclipse, perhaps the one in December 1954 (ibid).

In south-west WA, some groups believed a solar eclipse was caused by sorcerers placing their booka (cloaks) over the Sun, while others believed sorcerers moved hills and mountains to cover the Sun (Bates, 1985). People of the Central Desert WA held that a solar eclipse was made by a man covering the Sun with his hand or body (Bates, 1904 - 1912a).

Hassell (n.d.: 146-147) relates a 'covering the Sun' explanation of a solar eclipse, from Wheelman Noongar people, south-east coast WA. In summary: Long ago, the Zhi (Sun) shone all day, and all night the Maak (Moon) was bright. The men hunted in the daytime, but then they went to sleep and did not hunt, and the women scolded them. There was a big noise, and the Zhi and Maak came down and split the earth in half. The men that slept and the women that scolded were on one side. Those who had hunted remained on the other side. It is never cold, because the Zhi shines all day and the Maak all night. But now and then the Nunghars on the other side of the Sun want to know what is going on here, so they crowd together and they tip the Sun over one side as they peer down. There are a lot of them so they cover the Zhi and make it dark, then it is very cold down here. They take the warmth away for themselves. But they don't stay long, they only stop long enough for each one to look down.

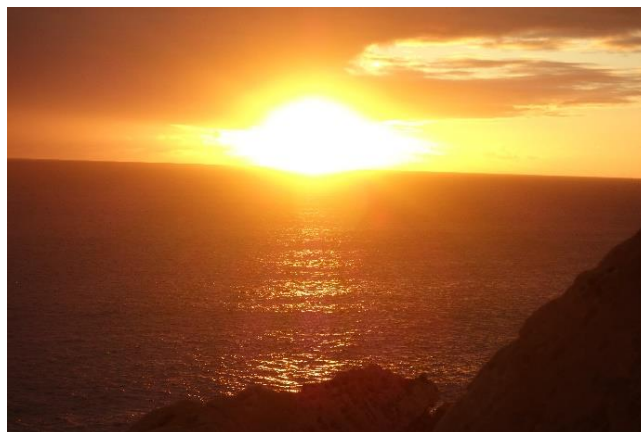
Hassell (n.d.: 183) also recorded a story about Waitch (Emu) in the sky among the Gindies (stars), told by Tupin, of the Wheelman Noongar people, who learnt Aboriginal law from her mother and elderly father. When thunder was heard, Tupin said "Waitch far away, there she move again, as the thunder rumbled again." In brief: Waitch was blown into the sky in smoke from a fire. She went to the moon to rest, but the moon got fat and squeezed her out. She went to the Sun but the Nunghars there did not want her as she talked too much. She went to the Gindies who were keeping the earth up and they allowed Waitch to camp with them if she would help take the load. But little by little, they put all the load on Waitch's back. She spreads out her wings to keep the load in place. ... If she makes too much fuss the Nunghars in the Sun get angry and make it dark, and send out flashes of light to frighten her and make her quiet...

Direction

- *sun-up/sun-down country*

A reference to direction from Wongai Elder Josie Boyle (Eastern Goldfields), when speaking of the traditional life, has no ambiguity:

... simple ways the people had of lovely ways of describing the land, you know. Sunup and sundown. ... Sun down country, see, the sun sets here and the other mob, up there, Sun up, but I was really born in sun up country. (Goldsmith, 2014: 517).



Sundown from Kalbarri, photo by Pat Forster

- cardinal directions

Many Aboriginal groups were familiar with cardinal directions (north, south, east, west), sometimes loosely defined (Norris, 2016). The Noongar vocabulary by Moore (1842) has words for north, south, east (kakur), west, and "... kangal the east or, more properly, the spot of sun-rising, as it varies throughout the year." (Moore: 55). Linguistically, kangal is linked to one of the Noongar words for sun (nganga), as Norris (2016) notes for east in other Aboriginal languages. Moore does not describe how Noongar people identified kakur (east) or how they distinguished it from kangal.

- winds

Winds in the Noongar vocabularies are named according to direction: south, south-east, south-west, west; and Nandat "... the east wind; the land wind." (Moore, 1842: 82). Grey (1840) lists Nangergoon, the east wind. which like the word for east, is built from the word for Sun, ngangar.

- direction for burial

Moore (1884: 346) recorded directions in relation to burials for Noongar people:

Then they placed the body carefully in the grave on its right side with the head to the South, the face directed to the East, in which they seemed to be particular. When I remarked this, they said that the people to whom the deceased belonged always buried the bodies North and South, the face looking to the sunrise, but that others buried the bodies East and West, with the face looking to the midday sun.

Hassell (n.d.) observed similar care with the direction that the head faced and the alignment of the bodies: north-south and east-west alignments distinguished burial for Noongar hill people and plains people respectively.

Timekeeping

- time of day

For Australia in general:

Other than ... using the position of the Sun during the day as guide to the time of day ... there are few recorded instances of using the sky to measure time. One exception is the Yaraldi of South Australia, who divided the day into seven sectors ... (Norris, 2016: 27).

Macintyre and Dobson (2017) propose that Noongar people traditionally divided their day into at least nine inter-phasing temporal categories corresponding to dawn, daybreak, sunrise, morning, noon, early afternoon, late afternoon, sunset and twilight. These hinge on the quality of sunlight. Macintyre and Dobson assign words to the categories, drawing on vocabularies of Lyon (1833), Moore (1842), and Grey (1840). Some words relate to specific times for example, biddorong, biddurong – forenoon, about two o'clock in the day (Moore), and others to time intervals, for example, waullu - light, dawn, daylight, the morning twilight, the interval been light and darkness (Moore).

Confirmation that the sun or sunlight were used to judge the time of day was provided by Wongai Elder Josie Boyle, Eastern Goldfields, when was speaking of her mother (Goldsmith, 2014: 518): "*Because every day, my mother couldn't read or write, so she had to tell the time by the birds, or the sun or the way everything was out in the land.*"



Twilight, Kalbarri, photo by Pat Forster.

- number of days/nights

Lyon's Noongar vocabulary (1833, April 13: 59) lists: "beedjar, sleep. This is the term by which they reckon both time and distance. Not so many days; but so many *beedjars*; that is so many sleeps, or nights; night being the proper time for sleep."

- sunrise and sunset seasonal markers

In 1851, Salvado (1977), recorded that when the Pleiades appear on the horizon at the break of dawn, the Noongar season of *cielba*, the grass season, is known to be drawing near. The Pleiades in the north-west sky at dusk served as a signal for the Ngadju people, Eastern Goldfields/ Great Western Woodlands, WA. Kupilya ngarrin:

... is the sleeping and hibernating season ... This season is cold and rainy. People are resting up; it's good for mushrooms. ... the Seven Sisters are in the north-west sky just after sundown to indicate that female *jula* (emus) will start egg laying. (O'Connor and Prober, 2010: 36).

For the Pitjantjatjara people in the Western Desert WA, which is adjacent to the Great Western Woodlands, Pleiades in the dawn sky in late autumn signalled the dingo breeding season had begun, so it was time for dingo fertility ceremonies to be performed (Tindale and George, 1976).

In the Great Sandy Desert, south Kimberley/ Pilbara, the appearance of the Pleiades in the sky before dawn signalled the onset of the coldest nights – with the explanation that the sisters were dropping water on people who were sleeping, causing them to shiver (Lowe and Pike, 1990). Noongar Elder Noel Nannup (2008) describes how:

I grew up hearing from my mother about the Seven Sisters, and at night, when the sky was clear and lit with a multitude of stars, she would point them out to me and my siblings, telling us how the sisters got to be in the sky. What made this creation story more real for me was that on extremely cold winter nights, when the dew lay heavy on the land and dripped off the roof like rain, my mother would say, 'Them old people in the Pilbara, they would tell us: It's those Seven Sisters, they weeing on us tonight.'

As an overarching calendar organiser, Macintyre et al. (2020), propose:

... that the Sun's strength and luminosity (and possibly photoperiod) ultimately structured the Nyungar calendar, dividing it into two overarching seasons of light and darkness, not dissimilar to the natural cycles of day and night but extending over an annual cycle or year.

In support of the hypothesis, Macintyre et al. (2020) draw on the Noongar vocabulary by early explorer Grey (1840). Entries in Grey's vocabulary include: "Be-rok—the summer season. . . . "Ngan-ga moor-doo-een," the sun is powerful." (ibid. 9-10); "Moor-doo-een—strong, powerful." (p. 87); and "Mag-go-ro— . . . "Nganga-nu-map", the sun is not powerful;—winter, . . . the rainy season." (ibid: 76); "Nu-map—small, little, diminutive." (ibid: 102). Grey does not refer to the sun in relation to other seasons. Support for the two-overarching seasons is provided by Bates (in Thieberger, 2017). Informant Woolberr from Gingin, north of Perth, said years are calculated by ". . . magoor – winters, or beeruk -summers"; informant Nyau from the Murchison said "Years by cold & hot seasons"; informant Geenjarra, from the Central Districts said years are calculated by ". . . hot (unurn) and cold (nyinnga) seasons". (ibid: no page numbers).

Macintyre et al. (2020: web page) also highlight complexity within the hypothesised dark/light seasons, namely ". . . other seasons, sub-seasons and "named periods" . . . ", and:

different numbers of these for different Nyungar language groups, but hold that there are two primary seasons, *berok* and *maggoro*, and that these are: . . . universally represented in the indigenous calendars of southwestern Australia, including at Perth, Albany and New Norcia/ Victoria Plains.

O'Connor and Prober (2010) identify complexity within two seasons for the Ngadju people of the Eastern Goldfields WA. *Ngarnngi*, the Hot Time takes more than half the solar year and is further divided into two seasons. *Kaluru*, the Cold Time, is typically less than half the solar year and also contains two seasons.



Moon



Moon and Aboriginal Culture, by Pat Forster, 2021. 40cm x 60 cm

Quilt statement: In the Southern Hemisphere, the moon illuminates from left to right. The yellow starts as a crescent on the left, then fills half the circle (first quarter phase), then goes *past* first quarter (waxing gibbous phase as shown), next is full moon. Then the yellow recedes, with black filling the circle from the left. The moon illuminates from right to left in the Northern Hemisphere.

The shapes of the quilted dark patches on the moon are authentic. The references to Aboriginal Culture are taken from the literature and are for Aboriginal Peoples of WA.

Cotton fabrics, polyester cotton thread, wool/polyester wadding. Reverse applique, free-motion machine quilting including the text.

Introduction

Narratives mediated the traditional life of Aboriginal people. Narratives served to explain the creation of the heavens, earth's landscape, people and nature on earth, and natural phenomena. They functioned as oral maps of journeys, and conveyed (un)acceptable social behaviour, amongst other things. Many of the narratives are analogical - through metaphor or simile or other linguistic means, they draw parallels between what is familiar and what is observed but intangible. Such is the case with the Moon. As well, an element of fantasy enters some Moon narratives – to explain the unexplainable.

Narratives relating to the Moon, from Aboriginal peoples in Western Australia (WA), are summarised. They pertain to Aboriginal people from Noongar Country (south-west WA, which includes Perth, the state's capital city), the Eastern Goldfields (south-east WA), the Murchison (central-west WA), the Pilbara (north-west WA), the Kimberley (north WA) and the Central Desert area. In addition, pragmatic uses of the Moon are described, including as a calendar, weather indicator, and for direction finding. The quotes provided come from an extensive internet-based search.

Characterisation of Moon

- Moon was a stop over

A narrative from Eucla, Eastern Goldfields WA, describes a man ascending to the Milky Way who can only be seen when he "walks across the moon" (Róheim, 1971: 53). So, the moon was enroute to the Milky Way, and a lunar eclipse is explained.

Hassell (n.d.: 183) recorded a story about Waitch (Emu in the Sky) among the Gindies (stars), told by Tupin, of the Wheelman Noongar people (south coast WA), who learnt Aboriginal law from her mother and elderly father. Waitch is seen as dark spaces in the Milky Way, with the Coalsack as the head, and the body extends along the body of the Milky Way through Scorpius and Sagittarius constellations, although there are other variations (Norris, 2016). When thunder was heard, Tupin said: "Waitch far away, there she move again, as the thunder rumbled again." In brief: Waitch was blown into the sky in smoke from a fire. She went to the Moon to rest, but the Moon got fat and squeezed her out. She went to the Sun but the Nunghars there did not want her as she talked too much. She went to the Gindies who were keeping the earth up and they allowed Waitch to camp with them if she would help take the load. ...



The Aboriginal "Emu in the sky". Public domain photo owned by Barnaby Norris and Ray Norris.
https://en.wikipedia.org/wiki/Australian_Aboriginal_astronomy

- Moon heated a 'star' which fell down

Kirsty Burgu (1972 -), daughter of a Ngarinyin Elder of the Kimberley, writes about elements of her painting Marriage Laws 2011: that the evening star [Venus] and the Moon always try to come closer to each other (Desert River Sea, n.d.: web page). It seems that one time they came too close: Kimberley Elder Jack Jugarie described the first star [the evening star] rising in the afternoon, followed by the Moon, *Yalgarn*, which made the star too hot, so it fell down and made Wolfe Creek crater (Goldsmith, 2014).

<IMAGE>

Marriage Laws, 2011, by Burgu <https://desertriversea.com.au/art/387>

- Moon, a source of fire

A creation narrative for Lake Coogee in Perth, related by an Aboriginal consultant during a land survey (McDonald et al., 1997), tells of a sparrow and a hawk that flew to a round hole in the earth, where the Moon rested during the day. The two birds stole fire from the Moon in the form of a firestick. They flew along the limestone ridge near the ocean. The bush caught fire. The Moon called his uncle, the ocean, to help. The ocean rose and extinguished the fire. Nyungars were drowned, and the lakes in the area were formed, including Lake Coogee.

- Moon has light, not fire

In a narrative from northwest WA, recorded by Bates (n.d.b, 66), the Koonyoolo (Moon) "has got a light Kalgal that won't burn you, but Walga (the sun) has got a fire.

- Moon, a giver of babies

Kagabin, near Mt. Stirling, is full of spirit babies (kagub) and any woman who goes there and looks at Kagub will get a baby. Miuk (the moon) is also the baby giver, and when he is full you can see all the babies. He is the maam (father) of all nungar (men) for it is he who gives the babies to their women. (Bates, n.d.a, 20)

- *Moon baths Earth in light*

< IMAGE >

Moon Dreaming by Mick Namarari Tjapaltjarri, Western Desert WA, 1978

<https://cs.nga.gov.au/detail.cfm?irn=170262>

Socially unacceptable behaviour

- *a man who wanted to break marriage law became the Moon*

Many Aboriginal Dreaming narratives identify the Moon "with a man, sent to the sky for evil acts". (Norris, 2016: 8). Moon-man/evil-act links are evident in several Western Australian accounts. For Lunga people, East Kimberley, Moon is a man who broke marriage laws causing death (Kaberry, 1939). Renowned artists Rusty Peters (1935 -) and Mabel Juli (1931-), Gija people, east Kimberley, have painted the same topic. For example: *Theliny Theliny-Warriny, Two Mothers for the Moon*, 2012, by Peters (Desert River Sea, n.d.); and *Garnkeny Ngarranggarni* (Moon Dreaming), 2010, by Juli (Desert River Sea, n.d.): the man in the narratives for these paintings wanted to marry the mother of the woman he was supposed to marry and became the Moon.

<IMAGES>

Garnkeny Ngarranggarni, 2010, by Juli <https://desertriversea.com.au/art/155>

Theliny Theliny-Warriny, Two Mothers for the Moon, 2012, by Peters <http://desertriversea.com.au/art/246>

Theliny warriny: Two Mothers for the Moon, Rusty Peters, 2012 \ <http://desertriversea.com.au/state-art/173>

Jaru Elder Jack Jugarie (1927 - 1999), east Kimberley, told a narrative where the Moon wanted to marry his cousin sister, who was inappropriate for him (Goldsmith, 2014). An old woman tried to redirect his interest but the marriage took place. No consequences are mentioned - Goldsmith suggests the narrative may not be complete.

- *Moon was punished for flouting marriage law*

In Wati Kutjara (two Lizard Men) narratives (Róheim, 1945) that belong mainly to the desert peoples of WA (Warburton Ranges groups, Kaili from Mandjindja, Western Desert and Yulbara people of Laverton), Moon-man chases a group of women, wanting to have sex with them. The Wati-Kutjara wound Moon-man with their magic boomerang, and he dies, or otherwise meets his demise. Kaili and groups from the Warburton Ranges refer to the rule that governs marriages as Kidilli law (Moon-man law). Kidilli should not have been chasing the women. He should have been marrying someone according to the law. The women, ancestral spirits rather than the human beings, are said to have fled to the sky and become the Pleiades.

- *Moon watches you, be careful*

Barbara Merritt (1950s -), of Badimia people in the Murchison (mid-west WA), recalled as a child being told "Don't do this, he'll be watching you, there like, someone on the moon was something scary to look at" (Goldsmith, 2014: 177).

- *dark patches are a disobedient girl on the Moon*

For the Mowanjum community in the Kimberley, dark patches on the Moon appeared when a whirlwind carried away a disobedient girl and put her into the Moon (Utemorra et al., 1980).

Waxing and waning

- *the Moon waxes and wanes, comes to life and dies*

The statement for Mabel Juli's *Garnkeny Ngarranggarni* 2016 painting elaborates further on the Moon Dreaming (mentioned above). It describes how the man who wanted wrong-way marriage is shamed by the people. He climbs a hill, cursing the mob who had judged him, telling them they are going to die, but that he would always live. And so, he always appears as the new Moon in the west. He dies for three days, rests for a while and then rises again (Museum of Contemporary Art Australia, n.d.: webpage; RMIT University, n.d.: video).

<IMAGES>

Garnkiny Ngarranggarni, 2016, by Juli <https://www.mca.com.au/artists-works/works/2016.34/>
RMIT University, n.d. Garnkiny: Constellations of Meaning, video.
[Garnkiny: Constellations of Meaning | RMIT University - YouTube](#)

Some aspects of the Two Lizard Men (Wati-kutjara) narrative (see above) are told in the story book 'The Two Lizard Men' (Welch, 2017). Welch is non-Indigenous. He has lived in northern Australia since 1979 and, in conjunction with Aboriginal people, has engaged in systematic documentation and interpretation of Kimberley rock art. In the Lizard Men story, the Moon-man comes back every month, only to be cut up into pieces again by the two Lizard-men.

Hassell (n.d.: 281) wrote of the Wheelman Noongar people, south coast WA: "The moon they say is different for he dies and comes to life, also he gets very fat and thin just before he dies." Hassell also recorded a kangaroo and Moon story told by Moobbil, an elderly Aboriginal man. The friends of a boastful kangaroo started avoiding him, so he made friends with the Moon. The Moon also tired of his boasting and eventually bragged:

"I never die, I live for ever". There upon the kangaroo said "That is foolish talk" he knew better than that, everything died. The Moon declared it was quite true that he [the Moon] never died, the kangaroo said things would change now, the Moon should die for a short time then come to life again and it has been so ever since. (Hassell: 588-589).

Palmer (2016: 197) refers to Moobbil's story in his anthropological report for a Native Title claim saying a story "from the Jerramungup area, and relating to a particular site, tells of an interchange between the Kangaroo and Moon, both now being represented in the features of a large granite dome." Noongar Professor Kim Scott (1957-), Curtin University, also writes of the Kangaroo and Moon (Scott, n.d.: 15). The setting is potentially the same large granite dome:

I told Clancy of how *Kayang* [auntie] Hazel made us stop the car at the edge of the bitumen road ... she crossed the wire fence and led us across the shifting soil to a rocky outcrop. She pointed, there: a series of neat circles in the rock that grew small, then larger again. '*Yongar and Miak*', she said, and told the old story of Kangaroo and Moon [similar to the above] ... It is both a responsibility and a privilege to stand beside where that story is imprinted in stone, and hear its ancient utterance.

Bates (n.d. a, 4) recorded another narrative from Southern WA about the Moon and Kangaroo.

In the Nyitting times of long ago, Meeka the Moon and Yonggar the kangaroo were friends, and used to sit down together and talk about things. Meeka always talked very fast, but Yonggar was a slow talker. One day they talked about death, and Meeka said to Yonggar, "What happens when you die?"

Yonggar wanted to hear first what happened to Meeka when he died, and so he answered slowly, "Nyinduk wong, nyinduk wong," (You tell, you tell) and Yonggar pursed his mouth and spat and turned his head from side to side and ate the grass and waited for Meeka to tell him what happened when he died.

Meeka was very clever, and he wanted to make Yonggar speak first, so he said very quickly, " Nyinduk wong, nyinduk wong," and then he tickled Yonggar to please him. Yonggar liked being tickled (joop dorning) and he laughed and played about and then said very slowly, "Ngain a ja dordibung guttuk werinyin, ngoondin kwaj" (When I die I go murra murrin (nowhere, anywhere) and my bones get white on the ground, and jellup the grass grows over them and covers them up.)

Then Meeka the Moon laughed big and loud and said very quickly, "Birbirung guttuk" (I die, I die, I sit up again, I die, I die, I sit up again, I die and come alive again and go home to Barramurning, my own country.)

Now if Yonggar had not spoken first and had made Meeka tell him what he did when he died, all the Bibbulmun people would have been able to come up again after they died, the same as Meeka the Moon.

Another Moon and Kangaroo narrative from Bates (n.d.a, 2), from Southern WA, references the Moon, Sun and Venus:

Miak the Moon was a nungar (man), kura (long ago) and Ngank the Sun was his yog (wife). They had two children, Mardyet and Bootul or Bolangur. Bootul, the big star in the west (Venus) is Ngank's daughter. ... Every evening Bootul follows her mother home, and comes up after her in the morning.

Miak made the first nungar and the first yog. He was maam (father to all of them).

Miak had two ngooljarwun nungar who hunted for him. These nungat used to catch plenty yonggar, but instead of giving him the gung and good parts of the yonggar, they gave him dowel (thigh). He was very sulky and beat his dogs in anger, and the dwerd knew why he beat them and they watched for the nungar

as they returned from hunting, intending to kill them. But Miak knew what they were about to do, and as the nungar were with borungur, and Manitch, he did not want to kill them, so he called out to the dogs who were in hiding, "Yuarr! yuarr! burdain jo, burain jo," and the dogs came out of their hiding place and returned to Miak. Miak could die and come alive again, but neither the nungar who caught the yonggar, nor the yonggar could come up after they were dead. The first Miak died at Baramurning and came alive again there. (Bates, n.d.a, 2)

- Moon is a boomerang

Waxing and waning of the Moon is not only addressed by kangaroo/Moon narratives. For the Wongry [Wongai people ?, Eastern Goldfields, WA], there was a man, Kalu, who was terrified of the night (Noonuccal, 1990). He became pale and round and obsessed by his problem, turned into the Moon, and sometimes rests on a boomerang.



Boomerang moon, photo by Pat Forster.

Eclipses

- lunar eclipses are bad omens

Solar and lunar eclipses were commonly seen by Aboriginal people as bad omens (Hamacher and Norris, 2011). However, Aboriginal people of Beagle Bay, west Kimberley, were apparently unafraid of solar eclipses but believed a lunar eclipse was an omen of death of a man - if the Moon is hungry and wants to eat someone (a man), it becomes dark, but it is not uninterested in eating a woman (Peggs, 1903). An Aboriginal man from a nearby group said a lunar eclipse represents a man who had become sick (ibid).

- blood makes the Moon red during an eclipse

The red colour of an eclipsed Moon is sometimes linked with blood (Hamacher and Norris, 2011). For Ungarinyin people of the Kimberley, an unfriendly medicine man causes the Moon to be covered with blood and this frightens everyone: but a friendly medicine man ascends into the sky and, when he returns, tells everyone he made the Moon better (Elkin, 1977).

- Moon plays a part in solar eclipses

Explanations for the cause of solar eclipses vary, but many groups seemed to understand that they occur when the Sun is covered by something (Hamacher and Norris, 2011). A narrative from Eucla, Eastern Goldfields WA, describes a man ascending to the Milky Way who can only be seen when he "walks across the moon" (Róheim, 1971: 53).

A narrative from Wheelman Noongar people, south coast WA, involves the Moon (Hassell, n.d.: 146-147). In summary: Long ago, the Zhi (Sun) shone all day, and all night the Maak (Moon) was bright. The men hunted in the daytime, but then they went to sleep and did not hunt, and the women scolded them. There was a big noise, and the Zhi and Maak came down and split the earth in half. The men that slept and the women that scolded were on one side. Those who had hunted remained on the other side. It is never cold, because the Zhi shines all day and the Maak all night. But now and then the Nunghars on the other side of the Sun want to know what is going on here, so they crowd together and they tip the Sun over one side as they peer down. There are a lot of them so they cover the Zhi and make it dark, then it is very cold down here. They take the warmth away for themselves. But they don't stay long, they only stop long enough for each one to look down.

Moonlight

- Moon's handprint

Perth Aboriginal people refer to Dale's Cave, located north-east of Perth on a bank of the Avon River, as: "Mountain of the Moon", because they believe that the Moon once entered that cavern, and left the print of her hand on its side." (Armstrong, 1836: 790). Unlike the other narratives for WA, Moon is unambiguously female rather than male or of indeterminate sex. Another version is that:

Legend has it that in the Dreamtime the moon was a man on the earth and some warriors chased him into this cave. He got tired of being confined there so he put his hand on the cave wall and using that leverage he burst out, making the jagged hole in the roof and escaped into the sky where he roams around still. (Shire of York, n.d.: 4).

- reflection in water

A Moon narrative from Noongar Country, south-west WA, relates to the cave Meekadarabee (the bathing place of the Moon). A girl drowned herself in the cave after her lover was killed. When the Moon is bright, you can see her hair reflected in the water (South West Aboriginal Land and Sea Council, n.d.).

- Moonlight on water

The Noongar 'Carers of Everything' narrative (Nannup, 2008), describes the creation of the Milky Way by an evil spirit woman (the Charnock woman), who carried spirit children in her hair, up into the sky, where they became stars. Many places in Noongar Country (south-west WA) are linked with the Charnock woman. For example, a strand of her hair snapped off and created the lakes at Joondalup in Perth (Robertson et al., 2016); and during full Moon, you can see the reflection of her long white hair in Lake Joondalup (City of Joondalup, n.d.).

- bearded full Moon

Jo Northover, of Wheelman Noongar heritage, south-west WA, describes Minningup, a stretch of the Collie River. "It is the resting place of the Ngangunguditj walgu, the hairy faced snake. Baalap ngany noyt is our spirit and this is where he rests. You have big bearded full moon at night-time you can see him, his spirit there, his beard resting in the water. And we come to this place ... to show respect to him" (Northover, n.d.: audio).

Lunar markers of time

- Moon, a calendar for ceremony

Examples of ceremony being linked to the Moon include that, in the Pilbara, prior to the initiation ceremony for boys,

... the women store a large quantity of grass seeds, etc., so as to have a supply in readiness for the feast, which is a feature of this ceremony. The families then meet at some given spot, the time being arranged by the stages of the moon, as "new" or "full," until the company present is of vast numbers. (Withnell, 1901: 10).

For the Mowanjum people in the Kimberley, a halo around the Moon signalled it was the time for boys to be initiated (Utemorra et al., 1980).



Supralateral halo, by Luis Argerich, June 23, 2013. Creative Commons license to publish.

<https://www.flickr.com/photos/lrargerich/9126295867/>

When writing about the Wheelman Noongar people, south coast WA, Hassell (n.d.: 191) recorded that, for big yardies (the coming together of groups for ceremonies, discussions and trade and marriage), “Some large plains where food and water were plentiful was settled on as a meeting place and they were all together there just before the full moon.”

- *Moon, a calendar for mourning*

When living in the Pilbara (north-west WA), Withnell (1901: 36) wrote in his journal:

When a death occurs in the camp the men and women throw themselves on the ground, run a few paces ... In memorial they gather round and cry every time that stage of the moon returns, as they mark the time by new and full moon. This is done every month until the season changes ... they know the periods of summer and winter--not only by the heat and cold, but by the difference in the vegetation.

- *Moon, a calendar for hunting*

The Firestick Ceremony of the Gija people in the east Kimberley, is performed to welcome the new Moon and ensure bountiful hunting (Massola, 2016). For Ngadju people, Eastern Goldfields, “The new crescent moon is a good time for hunting — when it is shaped like a boomerang. The kangaroos travel then, and animals come out and move around freely because it is dark. There is also an abundance of fish down at the coast before the new moon.” (O’Connor and Prober, 2010: 22). The painting held by the Parliament of Western Australia, Seasonal Hunters by Noongar Tjyllyungoo Lance Chadd, depicts Aboriginal men ready to hunt at full Moon (Parliament of Western Australia website, n.d.).

<IMAGE>

Seasonal Hunters by Tjyllyungoo Lance Chadd (Acrylic on Canvas 120 x 180 cm)

<http://www.parliament.wa.gov.au/parliament/artcollect.nsf/WebPP/2914E0AA48224C40C825735C000C7263?opendocument>

Birlinbirlin is a sacred site of the Yindjibarndi Peoples of the Pilbara, north-west WA (Juluwarlu Aboriginal Corporation, 2008). It includes a dancing circle - a smooth, round, flat area of rock. Also on the site, contours in the rock are known to represent a crescent Moon and full Moon. A song and details of an increase ceremony for a bright moon to assist hunting at night are documented (ibid). Ceremonies may be for males or females only, or mixed (Johnson, 2014). For the Wolmeri people of the Kimberley, ritual and ceremony linked with the Moon were witnessed by men only (Kaberry, 1939).

- *Moon, a calendar for a fertility rite*

Hassell (n.d.: 255) noticed how the Mulga or wizard man who visited the Wheelman Noongar people (south coast WA):

... had a small irregular piece of white quartz with two tiny specks of gold this had something to do with making the women bear children it was carefully wrapped in bark and wound round with kangaroo sinew and carried in the woman’s Coot [cloak] from full moon to full moon then returned to him when he pronounced some magic words over the woman.

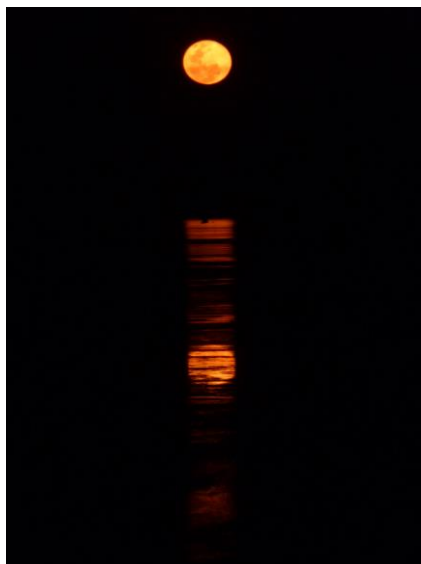
Perhaps the quartz was carried for the Moon cycle because that is close to the average human female cycle - success or failure of the ritual would be known.

- *full Moon, a sign for Caterpillar Dreaming*

Noel Nannup (2018: 3) also relates how, in December 2005, there was:

... a meteorite going across the sky at 9 o’clock at night. Lit everything up like daylight and that was on the 3rd of December 2005. I contacted Violet [cultural advisor] the day after ... and I said ... what should I do? And she said ‘just sit and wait. There’ll be certain things we have to watch for now. And as they unfold we have to be able to piece them together.’ And she said something really significant will happen on the next full moon or thereabouts.

On the day of the next full moon, a whale was beached on nearby Rottnest Island, which was a sign for the Caterpillar Dreaming, the traditional: “. . . movement of Nyungar women . . . for the principal purpose of maintaining genetic diversity in diverse Aboriginal language groups.” (Blackwood, 2018: 11). The December 2005 meteorite was an omen for a chain of events - the beached whale, then a trek and the sharing of knowledge, which in some ways re-enacted the traditional trek, which are reported by Blackwood (2018) in her doctoral thesis.



Full Moon reflected in the waters of Roebuck Bay, west Kimberley, photo by Pat Forster.

- *Moon, a subject of ceremony*

Birlinbirlin is a sacred site of the Yindjibarndi Peoples of the Pilbara, north-west WA (Juluwarlu Aboriginal Corporation, 2008). It is on a riverbed. It includes a dancing circle - a smooth, round, flat area of rock, and contours in the rock are known to represent a crescent moon and full moon. Each feature continues to be celebrated through gatherings, song, dance and ceremony.

The Meeka Moorart Full Moon celebration in Perth in 2019 and 2020, saw the performance of Meeka Moorart, a song composed for the celebration (Walley, 2020). Dr Richard Wally OAM (b. 1953) is a prominent Noongar musician, artist and campaigner for his people and culture. The song relates to Whadjuk Noongar people. Speaking of the song, Noongar Elder Noel Nannup (2020) says:

The vision for the . . . [Moolarong ?] Meeka, which is the song for Meeka Moorart, the Moon is rising, and as it's rising, of course that's a very important time of the day, and as it first peeps over the horizon, that's been seen by thousands of generations of our people, and at that instant, it is like you are just continuing an ancient ceremony of singing a song that is attached to ancestry . . .

<VIDEO>

Vision for Meeka Moorart Full Moon Celebration. Video. https://www.youtube.com/watch?v=l2_K1HFxocY

- *lunar months not named*

Salvado (1977: 131) observed, for Nyoongar people:

The months are distinguished from one another by the moon, but they are not given individual names, or divided into weeks. Again the days are not distinguished except by the position of the moon.

Also, the Nyoongars reckoned weeks and days according to the Moon, but these smaller divisions of time were not as important as the six seasons in the Nyoongar temporal order (Salvado, 1977).

- *lunar months indicated distance as well as time*

An entry in Moore's (1884: 331) journal indicates that lunar months served as a distance as well as time indicator for Noongar people (south-west WA): "I persisted in my enquiries from the natives about the water to the East. They still say there is a sea in that direction, but far away "Moons plenty dead" is all the information I can get."

From the North West (Bates, n.d. b, 62): "Whalebone", another Cossack native, long in the employ of W.S.Hall, furnished Mr. Brown with the following legend – "A long time ago a medicine man journeyed far to the westward in order, as he told his friends, to have a look at the moon at the place where she touches the earth when she goes down. It was a long way, and he was walking two moons (coothora weelarra) before he came to the place where the moon sets, which is a place very far west of the tableland. He saw the moon stop on the top of a high hill; he was on the hill waiting for it when it got there. He was quite close to it and saw some very big

kangaroo and emu. They were very big, vastly exceeding the size of the animals he used to hunt. Then he reached out his hand to feel the moon and it immediately fell over the other side of the hill and the light (or fire in the moon) went out and it was dark and he could not see the moon more, so he turned around and walked back home."

Direction

- *Moon rises in the east*

Nora Nungabar (c1919 - 2016) of the Martu people, east Pilbara, was born and grew up in country that became Wells 33 – 38 of the Canning Stock Route (Martumili Artists, n.d.). Norah's painting, Kinyu n.d., depicts Kinyu (Well 35, Canning Stock Route). The statement for the painting (Estrangin Gallery, n.d., webpage) describes the Dingo Dreaming for the area in which two dingoes travel to Wilarra, "following the call of the moon". Wilarra is on the edge of a lake and the name means Moon. The dingoes and their litter of puppies are looked after by the Moon, and later travel east towards the rising Moon, to Kinyu. A fuller version of the narrative can be read on the Estrangin webpage for the painting. The Dreaming is also illustrated in the collaborative painting 'Wilarra', which references a windbreak that was created by the Moon as shelter for the dingoes (Martulili Artists, 2017).

<IMAGE>

Kinyu, n.d., by Nungabar <http://www.aboriginalsignature.com/martumiliartpeintureaborigene/nora-nungabar-country-around-the-canning-stock-route-152-x-76-cm-13-282>

Of her painting Yakarn (Moon) Dreaming, 2020 (Revealed WA Aboriginal Art Market: webpage), Gracie Green says:

This is my totem and what my mother told me. Two dingos started travelling, chasing the emu. Chase him all the way down. Blue ones are the lake and Lake stretch in Bililuna. I was born there. Lake Gregory (Barragu, Mussels in that water) Sturt River (Myarra, strong Camel). Moon was directing the emu telling him the right way to go. Moon gave up and went up in the sky, emu was killed and creek formed. The moon travelled from the east, he saw down below that the two dingoes were chasing an emu. The moon felt sorry for the emu, so he decided to help the emu. He called out to the emu and gave directions to keep him away from the two dingoes who were chasing him. The moon led the emu to Lake Stretch, where finally the dingoes caught up to the emu. The emu struggled to run away, but the dingoes were eager to kill the emu, so they killed it. The dingoes fought over the emu as to who was going to eat it. Finally they both ate it. After that the moon dropped murrungkut (little men) along the way. This is how Lake Stretch was formed. The little people murrungurr (Dwarves - horse shoe shapes) turn into big people and look after you. I had a little person used to sit on the end of my bed when I was little girl. Longtime ago when the moon was travelling in the sky, it was Carrying all the little peoples we call them murrungurr and dropping them off Along the Sturt river And to Bililuna Community Yellow ones are claypans. On the side are sand hills. Colors are flowers after the rains. Spinifex yellow one.

<IMAGES>

Yakarn (Moon) Dreaming 2020 by Gracie Green <https://revealed.net.au/artworks/yakarn-moon-dreaming/>
Yakarn (Moon) Dreaming by Gracie Green, image in row 15, second left
<http://www.mangkaja.com/about/project/mangkaja-arts-21-year-anniversary-exhibition>

- *Moon sets in the west*

In the *Garnkeny Ngarranggarni* (Moon Dreaming) for the Giga people, East Kimberley, the man who became the moon dies for three days each month and then appears as the new moon in the west (RMIT University, n.d.): a new Moon is visible in the west, soon after sunset, when it is setting.

Weather indicator

Norris (2016: 9) explains that, "in cold weather, a halo often surrounds the Moon, as a result of ice crystals in the upper atmosphere." A halo was linked with cold weather by Ngadju people, Eastern Goldfields, WA: "A big circle around the moon indicates rain and cold temperatures." (O'Connor and Prober, 2010: 22). However, judging by internet media, a halo is not a strong indicator- it can be the forerunner of rain, but rain is not guaranteed. Also, a circle around the Moon may be a corona, which is more colourful than a halo, and is produced by refraction of light in water droplets – its presence is not linked with weather.



Moonrise in the east over Roebuck Bay, west Kimberley, photo by Pat Forster.

Rusty Peters, east Kimberley, in the statement for his painting *Dry Season*, 2013, addresses another means of weather prediction: “It’s getting dry, big dry season. You know it’s going to be hot when the stars are all [gestures twinkling movement] and the moon, so bright.” (Desert River Sea, n.d.: web page). From a scientific viewpoint, twinkling blue stars can indicate hot weather, but twinkling and weather are not well correlated (Hamacher et. al, 2019); and the Moon does not affect temperature (Hogg, 1935).

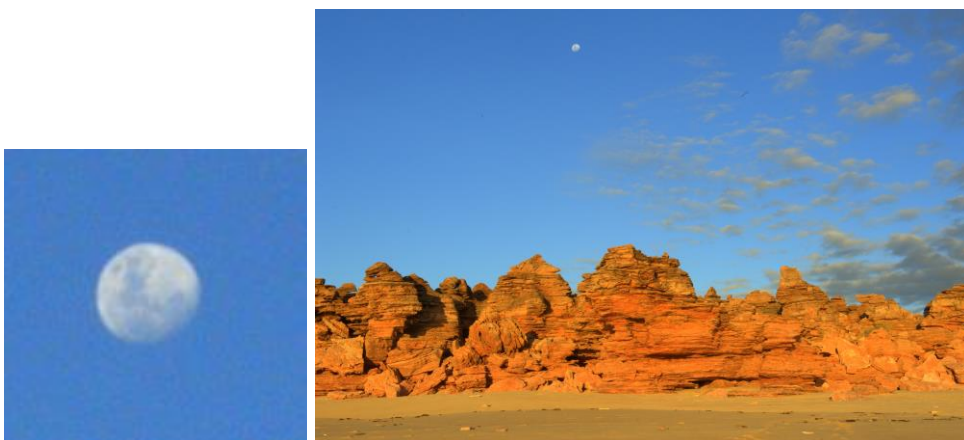
<IMAGE>

Peters, 2013 <http://desertriversea.com.au/art/244>

Vocabulary for fractions

- *Moon-phase vocabulary indicates notional understanding of fractions*

Traditionally, Noongar people might have had notional understanding of a quarter and three-quarters, because Moore (1842) lists words for phases of the Moon in his Noongar vocabulary: moon waxing - new moon, first quarter, half moon, second quarter, full moon; and moon waning - three quarters, half moon, and last quarter. In listing the words, Moore included the proviso that “the meaning of several terms has not been distinctly ascertained.” (ibid: 73). Certainly, the word for half-moon (moon waxing) “Bangal” (ibid: 53) is linked linguistically to the word Bang-ga, half of anything.



Waxing gibbous phase (more than half illuminated from the left), named second quarter in Moore's list. Rising Moon, 5pm, from Reddell Beach, Broome, photo by Jim Forster, looking east

Appendix. Additional images

Ochre paintings by Rusty Peters, of the Giga people, East Kimberley

Three Nyawana in Yarity Country, n.d., by Rusty Peters.

<https://www.seanrichardsmith.com/warmunartcentre/three-nyawana-in-yarity-country-by-rusty-peters>

Theliny warriny: Two Mothers for the Moon, 2012, by Rusty Peters, <http://desertriversea.com.au/state-art/173>

Three Nyawana in Yarity country 2016, by Rusty Peters.

<https://nationalgallery.gov.au/defyingempire/artists.cfm?artistirn=23224>

Moon Dreaming, 2014, by Rusty Peters. <http://www.nancysevergallery.com.au/art-consultancy-services>

Three mothers for the moon, 2016, by Rusty Peters. <https://artguide.com.au/art-and-science-take-flight-in-gravity-and-wonder>

Ochre paintings by Mabel Juli, of the Giga people, East Kimberley

Garnkiny Ngarranggarni (Moon Dreaming), n.d., by Mabel Juli. <http://artatrium.com.au/mabel-juli-wiringgoon-garnkiny-ngarranggarni-moon-dreaming/>

Garnkiny Ngarranggarni (Moon Dreaming) #2, n.d., by Mabel Juli. <http://artatrium.com.au/mabel-juli-wiringgoon-garnkiny-ngarranggarni-moon-dreaming-2/>

Wirringgoon, n.d., by Mabel Juli. <https://www.shortstgallery.com.au/artists/83-mabel-juli/works/837792-mabel-juli-wiringgoon/>

Untitled, by Mabel Juli. <http://artatrium.com.au/mabel-juli-wiringgoon-no-title-4/>

Moon Dreaming, or Garnkeny Ngarranggarni, 2010, by Mabel Juli. <http://desertriversea.com.au/art/155>

Garnkiny du Wardel du Lalanggarrany du Darndal, The Moon and the Star, the Crocodile and the Turtle, 2013, by Mabel Juli. <http://desertriversea.com.au/art/159>

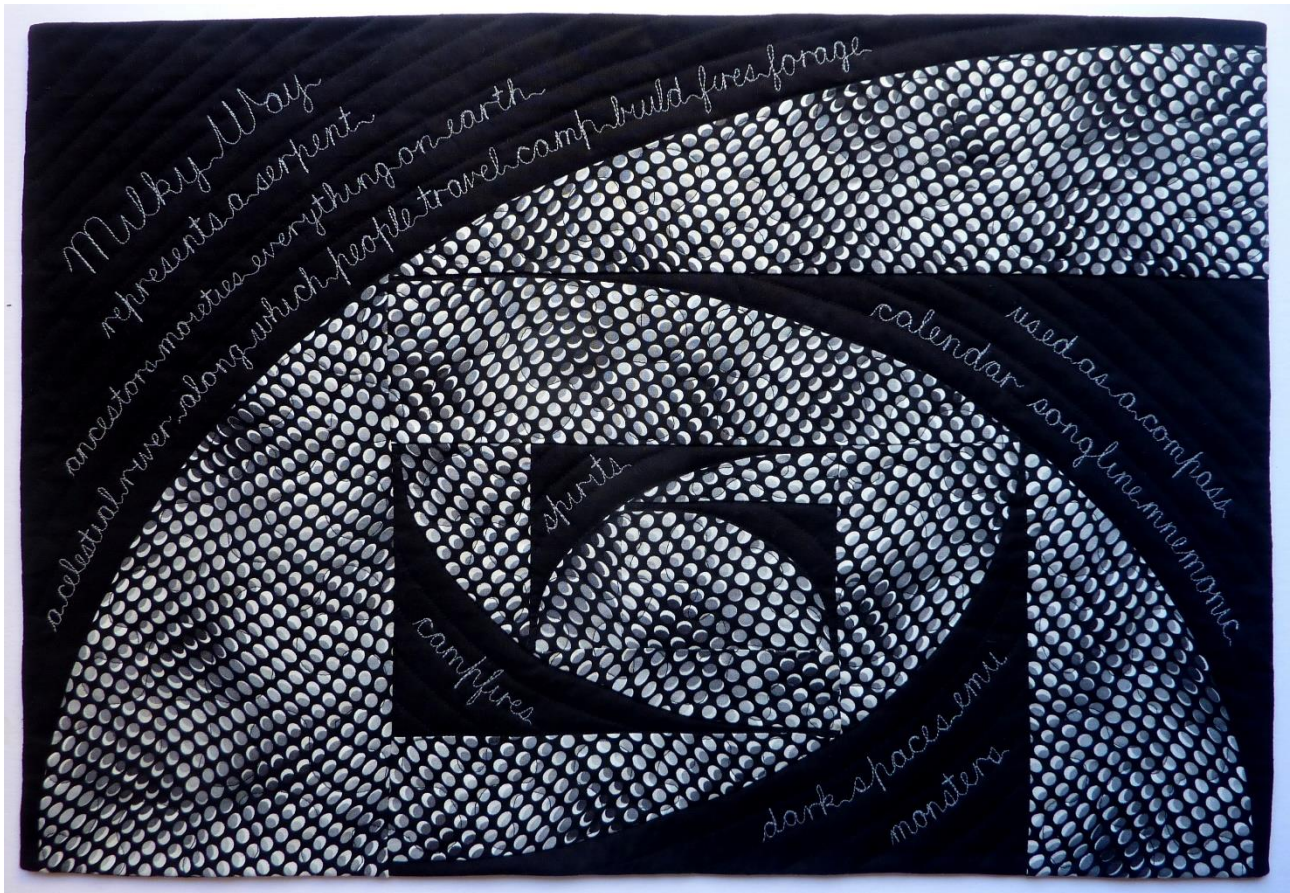
Moon Dreaming, or Garnkeny Ngarranggarni, c2013, by Mabel Juli.

<https://news.aboriginalartdirectory.com/2013/08/winner-announced-for-the-25000-kate-challis-raka-award-2013.php>

Analysis of Mabel Juri's art.

<http://desertriversea.com.au/download/Darren%20Jorgensen;%20Warmun%20Landscape%20Painting%20and%20the%20Ngarranggarniny%20of%20Mabel%20Juli.pdf>

Milky Way



Milky Way and Aboriginal Culture, by Pat Forster, 2021. 40cm x 60 cm

Quilt Statement: The quilt was made in response to an exhibition call with the theme 'Oceania: Distance and Diversity' and was juried in. It is travelling to quilt shows and galleries in New Zealand and Australia for 2021-2022.

The quilt celebrates the discovery during 2020 of one million distant galaxies, 10 or more billion light years away, using a new super-radio-telescope in the Murchison, Western Australia, Oceania. The discoveries bring the total number of known galaxies to three million.

The text on the quilt recognises diverse perceptions of the Milky Way Galaxy, held by great observers of the night-sky, the Aboriginal Peoples of Australia. Traditional perceptions and associated narratives convey practical and moral guidance. The super-radio-telescope in the Murchison occupies traditional lands of the Wajarri Yamaji Aboriginal People.

Commercial cotton fabrics, cotton and polyester-cotton thread, grey polyester-wool wadding. My original block, designed as a square and elongated for the 'Celebrate' quilt. Templates made from the design drawn to size. Machine pieced. Echo machine-quilting on black fabric, free-motion text on black fabric, free-motion stippling on patterned fabric. Faced.

Introduction

Narratives mediated the traditional life of Aboriginal people. Amongst other things, they explained creation of the Milky Way, creation of people on earth as directed by heroic figures in the Milky Way, and means of transfer between earth and sky worlds. Many accounts assume that the worlds are similar, for example, that they are populated with children/spirit children, ancestors/ancestral spirits, and moieties (social groups). Similarities extend to animals, such as snakes, and to terrain, including rivers. Many narratives carry a message about acceptable/unacceptable social behaviour as well as considering the two worlds. The account below

summarises narratives from Aboriginal people in Western Australia. References all relate to the Milky Way, or dark spaces within in the Milky Way. Particular stars and constellations within the Milky Way are not considered.

Creation of the Milky Way

- *by a spirit woman*

The epic creation Dreaming 'Moondang-ak Kaaradjiny: the Carers of Everything' told by Noongar Elder Noel Nannup (Nannup, 2008), south-west WA, addresses creation of the Milky Way. In summary, spirits moved across the land during the nyetting (cold time), realised they were going to become real, and wanted one group (people, plants or animals) to become carers of everything. A spirit serpent, the Wogarl, used all its strength to partially lift the sky, became real, created trails and hills, went underground, and rose again where there would be lakes. The sky was lifted up from Earth, by spirit children working in unison; the Milky Way was created by a spirit woman who carried spirit children up in her hair; shooting 'stars' are spirit children returning to Earth; spirits on Earth became real with the first hint of wind.

Others tell the same Dreaming or elements of it including Noongar Elder Toogarr Morrison (1950-) in Goldsmith (2014) and in his paintings at the Horizon Planetarium, Perth and the Cosmology Gallery at the Gravity Centre, Gingin, WA.

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Scroll down. <http://rebeccaisabroad.blogspot.com/2012/08/tim-tams-and-other-less-important-things.html>

The narrative is on a plaque in Victoria Park, Claisebrook, East Perth:

Long before the Nyitting, (cold times) there lived a giant Charnock (evil spirit) woman named Woor-Jall-Luk who went from Kallep to Kallep (camp fires) stealing Koolungahs (children). She had very long white hair and was taller than the Karri and Jarrah trees. She stole children to feed her man, Mulchin-Jal-Lak. (His cave is known as Bates Cave). She used her hair as a net to place the spirit children, leaving her hands free to gather more. The spirit people of the south west of Western Australia were worried their children were disappearing. ... [they] turned themselves into a totem of the magpie (Coolbardies). They knew that the only way to get close to her was by flying at her in a flock ... [but] Woor-Jall-Luk grabbed a big fire stick to beat the Coolbardies. ... a great fight followed ... As Woor-Jall-Luk was hurled into the sky by jumping on Gnadio-Darange-E-Noo (Wave Rock) and made our Bibbee-Goor-Ee (Milky Way), a great many children fell out of her hair and fell back to mother earth. They made the first Bwia-Ee-Koolungah's-Nyinna place which we know as Hippo's Yawn. The five stars, (Hyades Star Cluster) represents her Kallep, they are like an upside down 'V' and located half way between the three Women Elders (Orion's Belt) and the Pleiades Star Cluster (Seven Sisters). The star Aldebaran on the bottom right side of the Hyades Group is her camp fire and it is always burning brightly. ... The magpie totems today still swoop on little children to let them know that the giant Charnock woman is still up there looking and planning around her fire. (Goldsmith, 2014: 198, quoting the Claisebrook plaque)



Charnock woman mosaic (hair top right), Claisebrook, photo by Pat Forster.

<IMAGE>

Charnock Woman doll <https://perthvoiceinteractive.com/2014/05/29/stories-and-stitches/>



The Milky Way rises over Island Point in the Peel-Harvey estuary, Western Australia.
Photograph by Luke Busellato, Creative commons license to publish.
https://commons.wikimedia.org/wiki/File:Milky_Way_over_Island_Point.jpg

<IMAGE>

Sun, Moon and Stars by Paddy Jaminji, East Kimberley, painted ceremonial board c 1979. The Milky Way is depicted in a strongly symbolic ceremonial design.
<https://www.coeeart.com.au/?s=Paddy+Jaminji>



Wave Rock, where the Charnock woman launched herself into the sky. Photograph by Pat Forster



Hippo's yawn, near Wave Rock, where spirit children returned to earth as stones. Photograph by Pat Forster

Creation on Earth

- *directed from above*

Josie Boyle (c. 1943 - 2020), Wongai Elder, Eastern Goldfields, told narratives handed down by her mother who followed traditional ways for much of her life (Goldsmith, 2014). Creation, in brief, was when: the creator (Jindoo the Sun) sent two spirit men down from the Milky Way to shape the Earth (Boyle, 2007). They made landforms and oceans. Then Jindoo sent seven sisters, stars of the Milky Way, to beautify the Earth with flowers, trees, birds, animals and creepy things.

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The Two Wise Men and the Seven Sisters.

<https://webarchive.nla.gov.au/awa/20040916011940/http://pandora.nla.gov.au/pan/41142/20040326-0000/www.ablnat.com.au/dream2/twowisem1.html>

For Mowanjum peoples (Worrorra, Ngarinyin and Wunumbal) of the Kimberley, Idjajir is the great creator and resides in Wallungunda, the Milky Way (Jorgenson, n.d.). Idjajir sent the Wandjina (spirits) and made the Gyorn people (now represented in a distinctive rock art style) at the beginning of time. The Gyorn were difficult to control so the Wandjina travelled back to the Milky Way and asked Idjajir for more Wandjina to help on earth. The new Wandjina gave law and culture to the Gyorn. (caption on the painting Gyorn 2005 by Marjorie Mungulu in Jorgenson, n.d.).

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Wanjinas and Guyon, 2000 by Marjorie Mungulu

https://www.researchgate.net/figure/Marjorie-Mungulu-Wanjinas-and-Guyon-Guyon-2000-Acrylic-on-paper-x-7-cm-photograph_fig9_291739493

For Wunambal people of the north-west Kimberley:

In the sky lives Wallanganda, the lord of the sky and at same time the personification of the Milky Way. Of Wallanganda it is said that he "made everything". At first there was nothing on earth. Only Ungud [in the form of a large serpent] lived in the earth's interior. Wallanganda cast fresh water down from the sky onto the earth. But Ungud "made the water deep" and also caused it to rain on earth. Thus life could begin. (Akerman, 2016: 108, citing Lommel, 1997).

<IMAGE>

Wandjina & Ungud, 2014, by Gordon Barunga <https://desertriversea.com.au/art/379>

For Ungarinyin people, of the north-west Kimberley, Walanganda is a sky hero, creator and law giver:

Wálanganda is said to have his sky "camp" in a cave, and a second way out of this cave leads to "the other side of the sky", where he hunts together with the shadows of great Wóndjina and where there is a world as there is in earth, only everything more beautiful and perfect. (Akerman, 2016: 108-109, citing Petri, 1954).

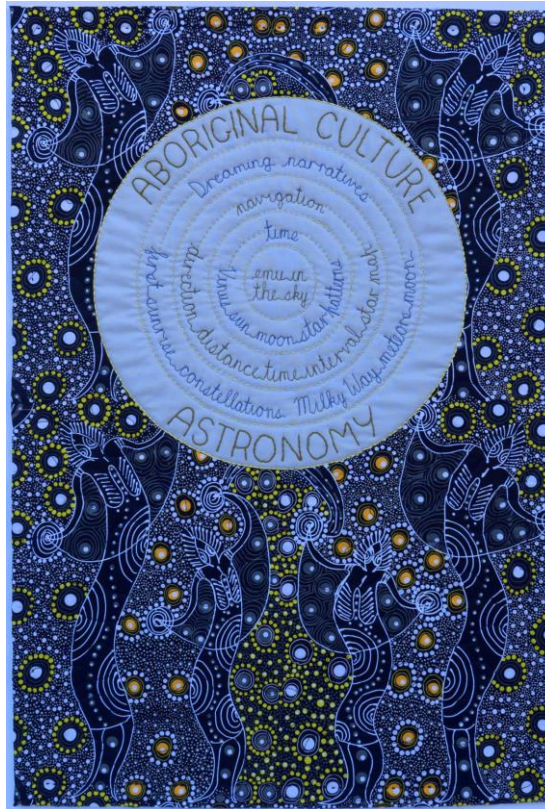
Parallel worlds

- *spirit children*

For Noongar people, south-west WA, spirit children were carried into the sky by an evil spirit woman, and they became the Milky Way. Her campsite is the Hyades star cluster - Aldebaran is her fire (Goldsmith, 2014, quoting the Claisebrook plaque). See the Creation section above.

- *spirit ancestors*

Over Australia generally, particularly in the west and north-west, spirits of the dead went to the sky-world and lived with the ancestral heroes (Berndt and Berndt, 1974). For some in the Kimberley, the place of the dead was in the west (Kaberry, 1939); for others it was the Milky Way (Durack, 1969).



Aboriginal Culture: Astronomy, by Pat Forster, 2018, 59 cm x 40 cm

Aboriginal fabric, Dancing Spirit designed by Colleen Wallace of the Arrernte people, Northern Territory. Dancing Spirit represents the sacred dance of ancient aboriginal ancestors since the time of creation. When dancing, these aboriginal spirits pay their respects to Mother Earth, expressing their love and admiration for the sacred land. (MS Textiles Australia, n.d.)

- *moieties (social/ritual groups)*

For the Pitjantjatjara people, Western Desert (partly in WA), "the Skyworld was split up into two groups—the summer sky (Orion, Pleiades and Eridanus) and the winter sky (Scorpio, Argo and Centaurus) ... [the] summer sky was considered to be *nganatarrka (nananduraka)*, meaning the generation of one's self, grandparents and grand-children. The winter sky was *tjanamiltjan (tan-amildjan)* and therefore of the parents' and children's generation level". (Clarke, 2014: 314, citing Mountford, 1976).

For Ungarinyin people, north-west Kimberley, Walanganda is sky hero who with the hero pair Wodoi (Alpha Gemini) and *Jungkun* (Beta Gemini) are culture-bringing ancestors (Petri, 1954). The hero pair are primary moiety totems today.

<IMAGE>

Marriage Laws, 2011, by Kirsty Burgu <https://desertriversea.com.au/art/387>

- *campfires in the sky*

Kerry-Ann Winmar, Noongar heritage, in her storybook (Winmar, 2009), describes the stars as looking like the campfires of the ancestors. Hassell (n.d.: 285) wrote, of the Wheelman Noongar people (south-east coast WA) that: "I was told the names of several tribes of stars, the names I regret to say I have forgotten".

<IMAGE>

http://www.wheatbeltnrm.org.au/sites/default/files/basic_page/files/Annual%20Calendar%202016%20FINAL%20APPROVED%20with%20FSC.pdf

- *songline in the sky*

Noongar Elder Noel Nannup, south-west WA, explains the importance of Magellanic Clouds and the Milky Way for people in south-west WA: "the Small Magellanic Cloud is associated with law and is sensitive and/or secret, and the Large Magellanic Cloud contains "everybody's" story, and is much more open." (Goldsmith, 2014: 69);

and "the Milky Way and the Megilion [sic] Clouds are *The Seven Sisters Dreaming*; it runs a long way down from the Pilbara region." (Kerwin, 2006: 69).

There are several Seven Sisters Songlines in WA, all named for the Pleiades. The Ululong Songline in the west Kimberley, is another that is linked closely with the Milky Way - with Emu in the Sky which is the dark space along the length of the Milky Way (see below). Landforms on the songlines are said to have been created or used by spirit ancestors who now reside in the skyworld. Because songline narratives link stars with landforms, they likely served as mnemonics for what landforms to expect on a journey (Fuller et al., 2014a). Travel was generally during daytime - stars don't seem to have been used for real-time navigation between landforms at night. Further, fantastical narratives, which many songline narratives are, can be easier to remember than those that resemble reality (Kelly, 2016).

- *a celestial river*

For Karadjari people of the Pilbara WA, Bulanj, the rainbow serpent, "... is the rainbow of the day-time sky and the river of the Milky Way in the night sky." (Worms and Petri, 1998: 158).

- *a snake*

In the Two Sisters Dreaming told by Paddy Roe, Elder of the Goolarabooloo tribe of the Nyigina, from the Kimberley, one sister was greedy and made a snake from tree bark to frighten her sister away from Njarri Jaari (bush onion) that she had found. When the other sister ran towards the greedy one, she saw the snake and called out "sister, big snake, cannot come to you" and, at that moment "the two sisters and the snake went up into the sky. So today we can see them, at time when you can find the Njarri Jaari, the sisters are each a star on either side of the Milky Way". (Hoogland, n.d.: webpage). The Dreaming has many other messages, which like in this episode, address unacceptable behaviour and consequence.

- *place of incarceration*

In the 'Two Men in the Sky' narrative told and sketched by Jaru Elder Jack Lannigan, east Kimberley, the men are the Large and Small Magellanic Clouds with the Milky Way around them (Goldsmith, 2014: 146). The 'men' come down and make a man numb due to wrong-way marriage:

Because he steal your wife, wrong type of marriage. Mulli (in laws) would straighten him out. Two men come out of the Milky Way, two men, he take your spirit away. He keeps you in the Milky Way till you die. That's finish.

- *landform representation*

Birlinbirlin is a sacred site of the Yindjibarndi Peoples of the Pilbara, north-west WA (Juluwarlu Aboriginal Corporation, 2008). Contours in the rock are known to represent a crescent moon and full moon. Quartz chips in the rock represent the Milky Way and more-widely scattered chips individual stars. A circular patch of quartz represents the morning star Venus. Each feature continues to be celebrated through gatherings, song, dance and ceremony. A morning star song has been recorded - it welcomes the first light, dewy morning and waking up under the Milky Way.

- *movement between the parallel worlds*

There are various narratives about how movement between earth-world and sky-world occur. In the north Kimberley, it was via a rainbow, and in the east Kimberley, via a string (Elkin, 1977). For the Pitjantjatjara people, Central Desert, partly in WA, six of the seven sisters, while being chased by a man, escaped earth as birds (Mountford, 1976). Noongar Elder Theresa Walley also links the sisters with birds in her storybook (Walley, 2013). The Sisters have the names of birds, are sent to search for their father, venture too far, lie down and never awake. Their spirits drift into the heavens and can be seen in the night sky. They return as birds during the day.

In a narrative from the Wheelman Noongar people, south-east coast WA (Hassell, n.d.: 287-294), a woman, her future daughter-in-law and children are returning home after an epic journey. A storm blows up, they take shelter, rest on a baark (cloak) but are blown into the sky on it, and become the Pleiades. In another narrative from the south-east coast, four sisters of the Southern Cross were blown from earth into the sky (Hassell, n.d., 213-215).

Emu in the Sky was blown from earth to sky in smoke from a fire - Moon was a stopping point enroute (Hassell, n.d.: 183). A narrative from Eucla, Eastern Goldfields WA, describes a man ascending to the Milky Way who can only be seen when he "walks across the moon" (Róheim, 1971: 53) - so, again the route to the Milky Way was via the moon. The situation also explains a lunar eclipse.

Dark Spaces in the Milky Way

- *dark patches represent ceremonial boards, the Coal Sack a kangaroo*

For some Aboriginal people in the north Kimberley, a creation hero spirit, Galalang, lives in the dark patch of the Milky Way, between the Centaurus and Scorpius constellations (Worms, 1986). For the Lunga of the Kimberley, dark patches were a bullroarer (Kaberry 1939). For the Karadjeri people, south-west Kimberley, the younger of two ancestral men swung a bullroarer, then did the same with a pirnmal, a larger version of a bullroarer. The string broke and the pirnmal flew into the sky and can be seen "as a series of patches extending along the Milky Way, approximately from Centaurus to Aquila." (Róheim, 1945: 56). The same ancestral men tracked a large kangaroo and speared it, whereupon it "jumped into the sky where he became the "Coal Sack", a dark patch in the Milky Way beside the Southern Cross." (ibid: 57). For the Ngadadjara people of the Warburton Ranges WA, the dark patches between Alpha Centauri and Alpha Cygni are a totem board made by two ancestral heroes (Tindale, 1936).



Evening twilight, Southern Cross, the Pointers, with the Coal Sack Nebula visible (above and between the two upper stars of Crux in the photo), at the Amphitheatre, Mount Magnet, photo by Jim Forster.

- *Coal Sack represents a kangaroo*

The same ancestral men who swung the bullroarer (see above) tracked a large kangaroo and speared it, whereupon it "jumped into the sky where he became the "Coal Sack", a dark patch in the Milky Way beside the Southern Cross." (Róheim, 1945: 57).

- *Coal Sack represents a giant Emu Man*

In another narrative of the Karadjeri people, Marimari is a giant emu man: he "wanted to obtain water, but two large hawks called Dia came and speared him. All three characters are now visible in the sky: Marimari as the "Coal Sack" and the Dia as the pointers of the Southern Cross." (Róheim, 1945: 64).

- *Emu in the Sky*

Emu in the Sky, seen as dark spaces in the Milky Way, has the Coalsack as the head, and the body extends along the body of the Milky Way through Scorpius and Sagittarius constellations, although there are other variations (Norris, 2016). Early references to Emu from WA sources cited by Fuller et al. (2014b) are of a resting Emu, by Aboriginal groups in the Musgrave Ranges (Basedow, 1925); and an Emu called Kalaia, by Pitjantjatjarra people (Tindale, 1935). Badimia people in the Murchison (Day and Morrisey, 1995) and Watjarri in the Murchison (Goldsmith, 2014) also recognise Emu.



The Aboriginal "Emu in the sky". Public domain photo owned by Barnaby Norris and Ray Norris.
https://en.wikipedia.org/wiki/Australian_Aboriginal_astronomy

- *Marala the Emu Man*

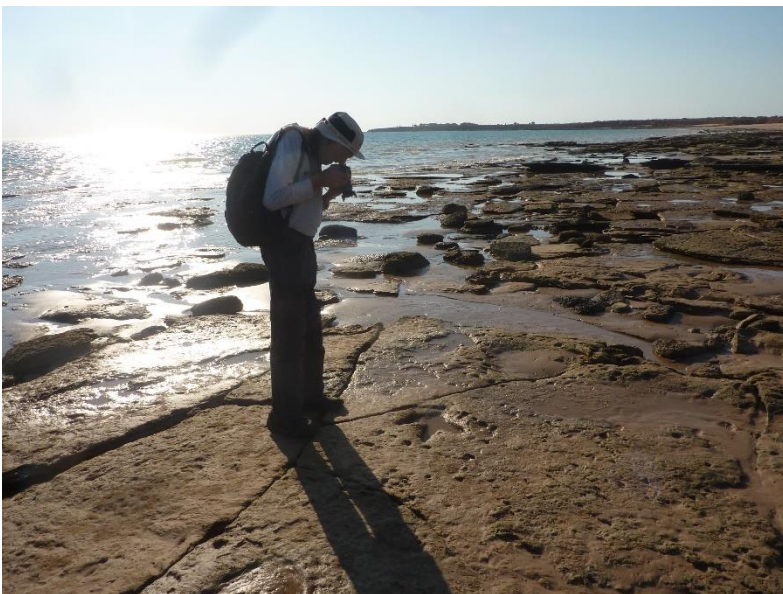
For the Goolarabooloo traditional custodians of the Dampier Peninsular, West Kimberley, Emu is Marala, the Emu Man (Mountford, 1973). Marala is an important Bugarrigarra [creation time] being associated with the Ululong Songline. He “was the ‘lawgiver’, and instilled in the country the codes of conduct for behaviour needed to help ensure its well-being” (Salisbury et al., 2016: 2). As he moved along the Songline:

Marala left behind threetoed tracks [Figure 4]. He also left behind the grooved impressions of his tail feathers (his ‘ramu’ or ceremonial engravings) when he sat down to rest ... Today, three-toed dinosaur tracks (typically those assigned to *Megalosauropus broomensis*) and impressions of cycad-like bennettitaleans (Marala’s tail feather impressions and ramu) are seen as testimony to Marala’s journey as narrated in the Song Cycle ... Marala’s emu-like form persists today as a shadow of dark nebulae running virtually the length of the Milky Way. (ibid).

There are numerous narratives about Marala that address moral behaviour.

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<https://www.ancientpages.com/2017/03/29/aboriginal-creation-story-marala-true-worlds-largest-dinosaur-footprints-confirm-ancient-creation-myth/>



Marala’s footprints on Reddell Beach, Broome, west Kimberley. Photos by Pat Forster.

- *emu’s own father*

From southern WA (Bates, n.d.a, 10):

Jutitch (native cat) had two wives, Ngau and Wej [emu]. ... Jutitch’s wife Wej used to get plenty of roots, seeds, fruit and small game, and one day when she came home, a Gumal [possum?] came to her camp. Before he left her he decorated her with wilak (red ochre) and by and by when Jutitch came back he saw the wilak and asked wej where she got it.

"I found it," said Wej, but Jutitch saw Gumal's tracks and he told Wej to make a big fire and when he had made it he threw her into it. Wej screamed and got out of the fire but her arms were burnt and that is why wej have only a little bit wing.

Jutitch then tracked Gunmal, but Gumal had collected mir gen – a crowd of brothers, and they speared Jutitch and that is why all Jutitch have white spots over them. Jutitch hit Gumal on the back near the tail and that is why all gumals' backs are all flattened.

The dark patch in the Milky Way is call Wej Mor (emu's own father). By some district natives this is supposed to be the wej that Jutitch tried to burn, but wej escaped and went up into the sky.

- *Emu a seasonal indicator*

Emu in the Sky is a seasonal indicator in many places in Australia (Norris, 2016). The positions and poses of Emu indicate: the lifecycle of emus - when they travel to waterholes, sit on them, leave them, when eggs are available and when the chicks hatch (Fuller et al., 2014b). For the Badimia people, Murchison WA: "In autumn, once the nights become colder and following the first rains, the emu in the night sky becomes quite visible. Below the emu is a cluster of eggs. This signifies that the time is right to look for emu eggs." (Day and Morrissey, 1995: 4).

Badimia Carol Dowling, who tells the stories of her great-great-grandmother, grandmother and mother, refers to Emu as Yalibirri, and adds: "Below the emu is a cluster of eggs (known as Wallah). ... This was also the time for dancing as central focus of Badimia practical, judicial and spiritual law." (Dowling, 2017: 149). Yindjibarndi peoples in the Pilbara use the changing angle and shape of Emu to know when emus lay their eggs, and the time for hatching (Juluwarlu Aboriginal Corporation, 2008). Similarly, Watjarri Elder Olive Boddington (c1940 - 2016), from the Murchison, describes the changing angles of Emu (Goldsmith, 2014: 183):

When you first see the emu, you don't see the whole of him, just you see the neck and the head part and as the months go by it shapes more into the emu, and then ... it's sort of lying and when it does that that's when the emu's laying eggs and everyone seems to hunt for them...(the emu eggs) ... special time.

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Aboriginal Astronomy: Navigating Seasons by the Stars, multiple images [Aboriginal Astronomy: Navigating Seasons by the Stars – Scientific Scribbles \(unimelb.edu.au\)](http://Aboriginal Astronomy: Navigating Seasons by the Stars – Scientific Scribbles (unimelb.edu.au))

- *other dark space configurations*

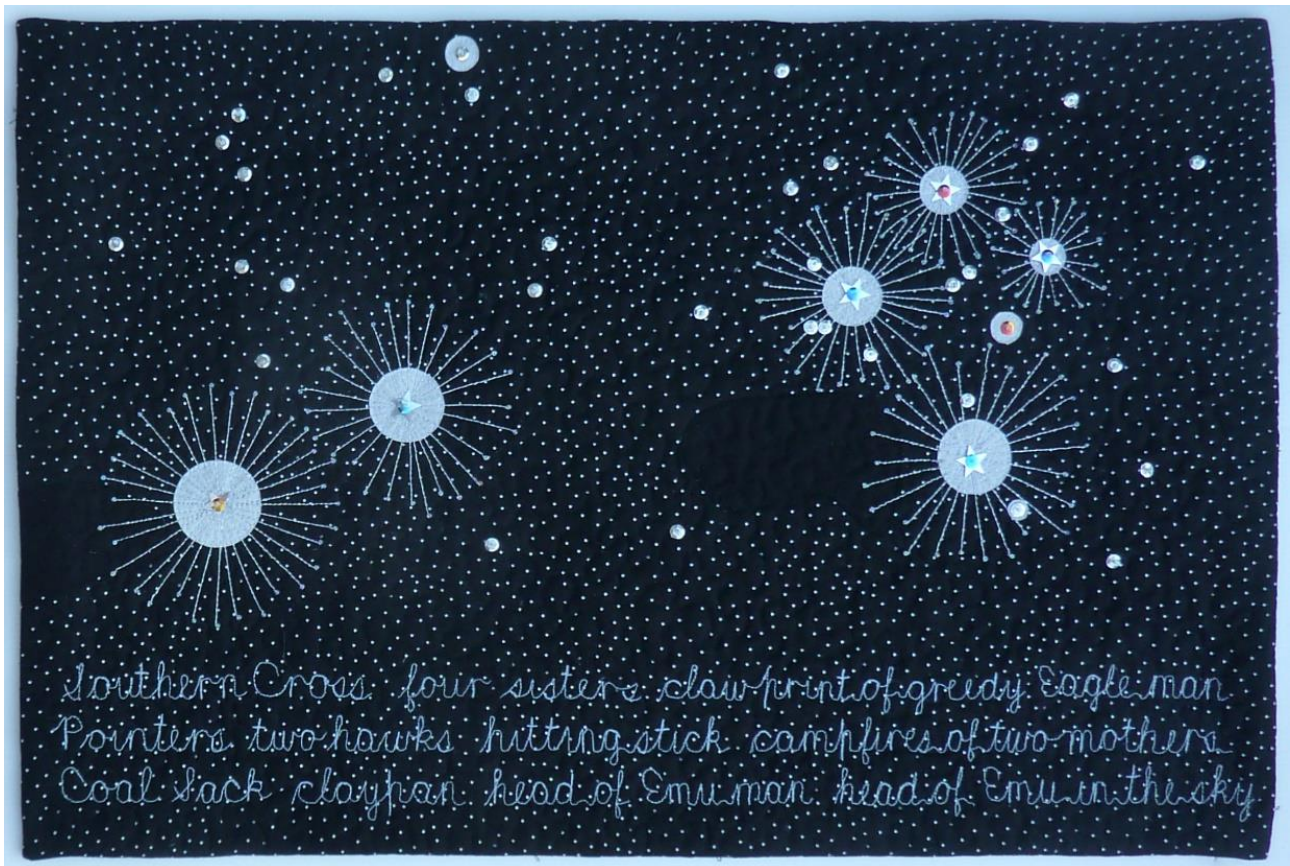
Jaru Elder Jack Jugarie, east Kimberley described:

... a creature called "Yilgarn" or "Yulgarn" in the Milky Way, near the Emu sky pattern. ... [He] noted that some people regard a dark patch in the Milky Way as the legs of the emu, whereas others regard it as a separate creature called "Yilgarn" ... [He] described Yilgarn as a "leech" sucking the blood from the Emu, and he was very specific indicating the location of "Yilgarn". It comprises a small dark patch in the Milky Way, near the constellation Scorpius. (Goldsmith, 2016: 141).

For some Aboriginal people in the north Kimberley, a creation hero spirit, Galalang, lives in the dark patch of the Milky Way, between the Centaurus and Scorpius constellations. For the Lunga of the Kimberley, dark patches were a bullroarer (Kaberry, 1939). For the Ngadadjara people of the Warburton Ranges WA, the dark patches between Alpha Centauri and Alpha Cygni are a totem board made by two ancestral heroes (Tindale, 1936).



Southern Cross, Pointers and Coal Sack



Southern Cross, Pointers and Coal Sack, and Aboriginal Culture by Pat Forster, 2021, 60 cm x 40 cm

Quilt statement: The quilt design was inspired by a digital image of the Southern Cross from IAU (International Astronomical Union) <https://www.iau.org/public/themes/constellations/> (see next page) Areas of the fabric circles are proportional to the brightness of the stars, and sequins denote less bright stars. Coloured sequins at the centres of the fabric stars denote star colour. The positions of 'stars' on the quilt, including those represented by sequins, indicate the relative positions of stars as seen from the Southern Hemisphere. The text refers to narratives told by Aboriginal Peoples of WA about the Southern Cross, Pointers and Coal Sack.

Star names and colours

The five brightest stars in the Crux constellation form the Southern Cross. Their names and colours are:

- Acrux (Alpha Crucis), bluish, really a multiple star system, bottom of the cross as depicted on the quilt
- Mimosa (Beta Crucis), blue-white binary star system, left side of the cross on the quilt
- Gacrux (Gamma Crucis) red, top of the cross on the quilt
- Imai (Delta Crucis), blue-white subgiant star, right side
- Ginan, orange, below Imai on the quilt

<https://www.constellation-guide.com>

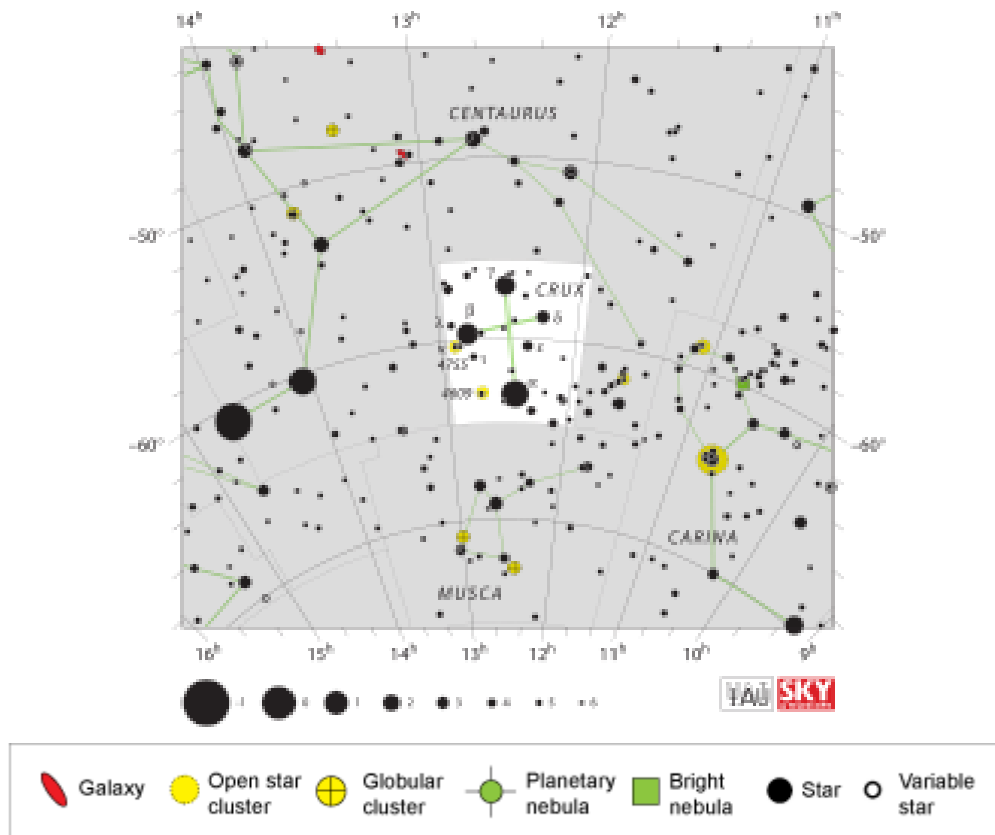
In 2020, the International Astronomical Union assigned indigenous names to 86 stars, among them an Australian Aboriginal name to the fifth brightest star in Crux, Ginan - the name used by the Wardaman people of the Northern Territory. Ginan means a red dilly-bag filled with special songs of knowledge. The brownish-red colour of the dilly bag is like the colour of the star, which is an orange giant that lies 228 light years away. [Aboriginal star names recognised - Cosmos Magazine](#)

Alpha Centauri (left most bright star on the quilt) and nearby Hadar (Beta Centauri) are known as the Pointers since they point to the Southern Cross. Both are very bright. Both are triple star systems. The brightest stars of Alpha Centauri are yellowish and orange, Beta Centauri appears bluish.

https://en.wikipedia.org/wiki/Alpha_Centauri https://en.wikipedia.org/wiki/Beta_Centauri

The Coal Sack nebula, the dark patch near the Southern Cross, is an opaque interstellar dust cloud that obscures the light of the background Milky Way stars.

<https://www.constellation-guide.com/constellation-list/crux-constellation/>



Southern Cross. Area of the depicted stars indicates magnitude (brightness).

IAU (International Astronomical Union) and Sky & Telescope magazine (Roger Sinnott & Rick Fienberg), Creative Commons image

<https://www.iau.org/public/themes/constellations/>

Introduction

This account is based on an extensive internet-based search. The references relate to Aboriginal people from Western Australia. They are from peer-reviewed research papers, accepted theses, as well as from less conventional sources including storybooks, artist statements for paintings, art-project accounts and early settlers journals.

Characterisations of the Southern Cross and Pointers

- *Southern Cross, eagle-hawk's claw print*

Noongar man Rod Garlett, in describing his painting Noongar Boodja Wangkiny (Our Land Is Talking) (Garlett, 2017: video), points to his depiction of the Southern Cross that has four claws of an eagle touching the four brightest stars, and says: "... waalitj is the eagle, and this symbol here of the Southern Cross, reminds us he [waalitj] was responsible for creating the laws of our Noongar land, our sea, and for its people."

In the west Kimberley, the Southern Cross is Jina (eagle's claw print) and the pointers are Gwuraarra (hitting stick) (Salisbury et al., 2016). Eagles have four sharp claws which correlate with the number of stars forming Jina, so the claws also explain the naming. The claw print is of Warragunna (or Warakarna), the 'Eagle Man' or 'Eagle-hawk' (Salisbury et al., 2016):



Figure 13. Eagle claws, artist unknown, 1885, inspiration for Aboriginal naming of the Southern Cross. https://commons.wikimedia.org/wiki/File:Eagle%27s_Talon.jpg

Warragunna was kogga (uncle) to jindabirrbirr the wagtail, and joogajooga the pigeon. Every day the three went hunting for the honey of native bees. When the boys found a bee's hollow in a tree, Warragunna went up the tree and always found honey, but ate nearly all of it, and sent down only a small portion. The boys became tired of getting so little, so they said "We will hunt for langgur (opossum) and koordi (bandicoot) and kogga will kill them for us." Warragunna killed the animals but again cheated the boys. Realising this, they went to a koordi ground. Joogajooga made a deep hole, like a koordi's nest. Jindabirrbirr found a stick and gave it a sharp point. They stuck the stick in the hole, with the sharp point upwards. Next day Warragunna and the boys went out and came to the hole. Warragunna put his foot down, quickly and hard, to kill the koordi. The stick ran through his foot and he cried out. Koordurwain, a sorcerer, came and pulled out the stick. But, "water came rushing out of the hole in Warragunna's foot and ... made a river ... And Warragunna's foot went up into the sky where it is called the Southern Cross by white people, but all Jajjala-booroo woinoa (Broome men) know that it is Warragunna's foot." (Bates, 1929: 6, paraphrased)

So, Jina (eagle's claw print) symbolises greed. Perhaps the name Jina for Crux came about because eagles have four sharp claws which correlate with the four stars of Crux; and maybe the narrative came about because of the greed of eagle-hawks who fend off other birds from a kill until their own appetite is satisfied? Further, there is language link in the naming of the Southern Cross by Aboriginal peoples: foot of *Walja jinna* (South Australia); *Jina*, eagle's claw print (west Kimberley). In the Noongar language, *jinna* means foot (Moore, 1842: 134).

<VIDEO>

< Noongar Boodja Wangkiny (Our Land Is Talking) <https://www.youtube.com/watch?v=dspu8ccKwog>>

- *Southern Cross, a camp*

From the north-west coast of WA, the Southern Cross is the camp of two mothers (Roberts and Mountford, 1974). Pointers Alpha and Beta Centauri are their fires. They came to earth for food, carrying fire sticks which got out of control. People on earth captured the resulting fire.

- *Southern Cross, head of a kangaroo*

From Noongar Elder Noel Nannup: "The Southern Cross and the stars around it are really the head of a kangaroo. You can see the ears and the teeth, you can see the kangaroo's back coming down and the tail going off." (Nannup, 2008: 103).

- *Southern Cross, four sisters*

Merninga-Gnudju Noongar Carol Petterson (1940 -), of the south coast WA, in her storybook (Petterson, 2007), relates how four sisters go to a sacred place. They are chased away by men who attack them with spears but they escape by fleeing to the sky, where they become the Southern Cross.

In the version recorded by Hassell (n.d.: 213-215), south-east coast WA, four sisters are sent to fetch water. Instead of coming straight back, they play. Men of the tribe find them playing and, as punishment, prod the girls in the carves of their legs with hunting spears. The girls run as fast as they can. A big wind springs up and blows them into the sky. They spread out to avoid the spears the men throw at them, which is why they are not clustered like other stars. They stay up there because they are frightened, which is a lesson to other girls not to play when sent on a task, because they will never get to find a man and be married.



Koodjal djookan by Carol Petterson, Cover

- *Southern Cross and Pointers, six galahs*

<IMAGE>

Southern Cross by Kevin Merritt (1943-), Wajarri people, Murchison WA .

<https://www.skatelescope.org/shared-sky/virtual-gallery/#!jig11/NG/371>

An Aboriginal Story of pink and grey galahs. They had a big disagreement with the other birds, so they fled up into the sky to escape. They were then turned into stars of the Southern Cross and the Pointers.

- *Southern Cross and Pointers, family members*

"Konk and moyer (uncle and nephew) (mother's brother and sister's son) are the terms applied to the Pointers of the Southern Cross, the Cross itself is called Ngank nob (mother and daughter)." (Bates, n.d.a, 7)

- *Pointers, cockatoo feathers*

For people of the north-west Kimberley, the Southern Cross Pointers are white cockatoo feathers adorning the head of the sky hero Walanganda (Petri, 1954, in Akerman, 2016).

- *Pointers and Coal Sack, large hawks*

For Karadjeri people, south-west Kimberley, Marimari, a giant emu man:

... wanted to obtain water, but two large hawks called Dia came and speared him. All three are now visible in the sky: Marimari as the "Coal Sack" and the Dia as the pointers of the Southern Cross. (Róheim, 1945: 64).

Coal Sack Nebula

On a clear winter night in the Southern Hemisphere, the bright stars of the Southern Cross shine above, flanked by the Pointers (Alpha and Beta Centauri) to the left ... Just below the Southern Cross, to the left, you can clearly see a dark patch, called the Coal Sack by astronomers. The Coal Sack is an absorption



Evening twilight, Southern Cross with the Coal Sack Nebula visible (above and between the two upper stars of Crux in the photo), at the Amphitheatre, Mount Magnet, photo by Jim Forster.

nebula (an expanse of cool gas and dust that absorbs background light, making it appear dark) approximately 600 light years away and 20-30 light years across. (Hamacher, 2011, webpage)

- *head of Emu in the Sky*

Emu in the Sky is widely recognised by Aboriginal people, with the Coalsack as the head, and the body extending along the body of the Milky Way through Scorpius and Sagittarius constellations (Norris, 2016). The Southern Cross can be considered its crown. Early references to Emu from WA sources are of: a resting Emu, by Aboriginal groups in the Musgrave Ranges (Basedow, 1925); and an Emu called Kalaia, by Pitjantjatjarra people (Tindale, 1935). Badimia people in the Murchison (Day and Morrisey, 1995) and Watjarri in the Murchison (Goldsmith, 2014) also recognise Emu and use the changing angle and pose of Emu as a seasonal indicator in relation to egg laying and hatching and other life phases of emus on earth (eg., Day and Morrisey, 1995). The Pointers are aligned with Emu's neck.

< IMAGES >

Poses of Emu by Kyle Pickett, Yamaji Art, WA

[https://www.skatelescope.org/shared-sky/virtual-gallery/#!jig\[1\]/NG/373](https://www.skatelescope.org/shared-sky/virtual-gallery/#!jig[1]/NG/373)

[https://www.skatelescope.org/shared-sky/virtual-gallery/#!jig\[1\]/NG/374](https://www.skatelescope.org/shared-sky/virtual-gallery/#!jig[1]/NG/374)

[https://www.skatelescope.org/shared-sky/virtual-gallery/#!jig\[1\]/NG/375](https://www.skatelescope.org/shared-sky/virtual-gallery/#!jig[1]/NG/375)

- *head of Giant Emu man*

For Karadjeri people, south-west Kimberley, Marimari, a giant emu man, "wanted to obtain water, but two large hawks called Dia came and speared him. All three are now visible in the sky: Marimari as the "Coal Sack" and the Dia as the pointers of the Southern Cross" (Róheim, 1945: 64).

For the Goolarabooloo traditional custodians of the Dampier Peninsular, west Kimberley, Coal Sack is the head of Marala, the Emu Man (Mountford, 1973). Marala is an important Bugarrigarra [creation time] being associated with the Ululong Songline. He "was the 'lawgiver' and instilled in the country the codes of conduct for behaviour needed to help ensure its well-being." (Salisbury et al., 2016: 2). As he moved along the songline:

Marala left behind threetoed tracks [Figure 4]. He also left behind the grooved impressions of his tail feathers (his 'ramu' or ceremonial engravings) when he sat down to rest ... Today, three-toed dinosaur tracks (typically those assigned to *Megalosauropus broomensis*) and impressions of cycad-like bennettitaleans (Marala's tail feather impressions and ramu) are seen as testimony to Marala's journey as narrated in the Song Cycle (ibid).

<IMAGE>

Legend by Elizabeth Durack (1946). See Salisbury et al. (2016) for outline of the narrative of 'Legend' which involves Warragunna (Eagle Man) and Emu in the Sky.

http://www.elizabethdurack.com/artworks_series.php?img_id=201&series_id=37&curPage=0

- *a shovel*

From Southern WA (Bates, n.d. a, 7): The dark spot in the Milky Way is a yak (native shovel) – the "coal sack".

- a *claypan*

From the Murchison, midwest WA (Bates, n.d. c, 1): "The buli [snake] is now represented by the dark wavy line, near the Milky Way; the clay pan is the Coalsack; the emu adjoins the Coalsack and the wavy line."

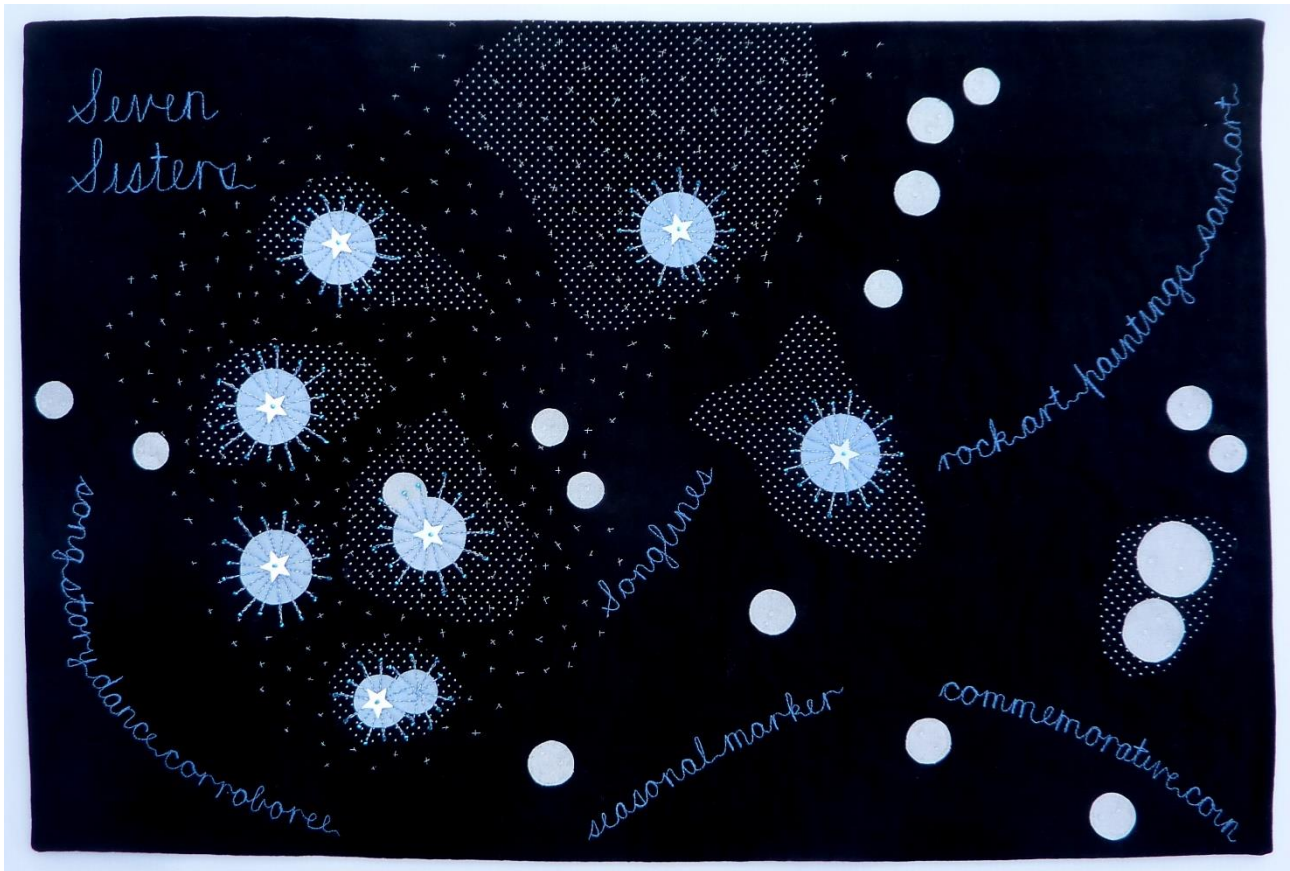
- a *kangaroo*

Another narrative attributed to the Karadjeri in Northwest is that they:

attribute everything to the two brothers called Bagadjimbir... One morning they started to track a large kangaroo called Djalanir. When they found it lying down, one of them threw a spear at it. The kangaroo, however, was not killed, but jumped into the sky where he became the "Coal Sack", a dark patch in the Milky Way beside the Southern Cross. (Róheim, 1945: 57, citing Piddington, 1932)



The Pleiades (Seven Sisters)



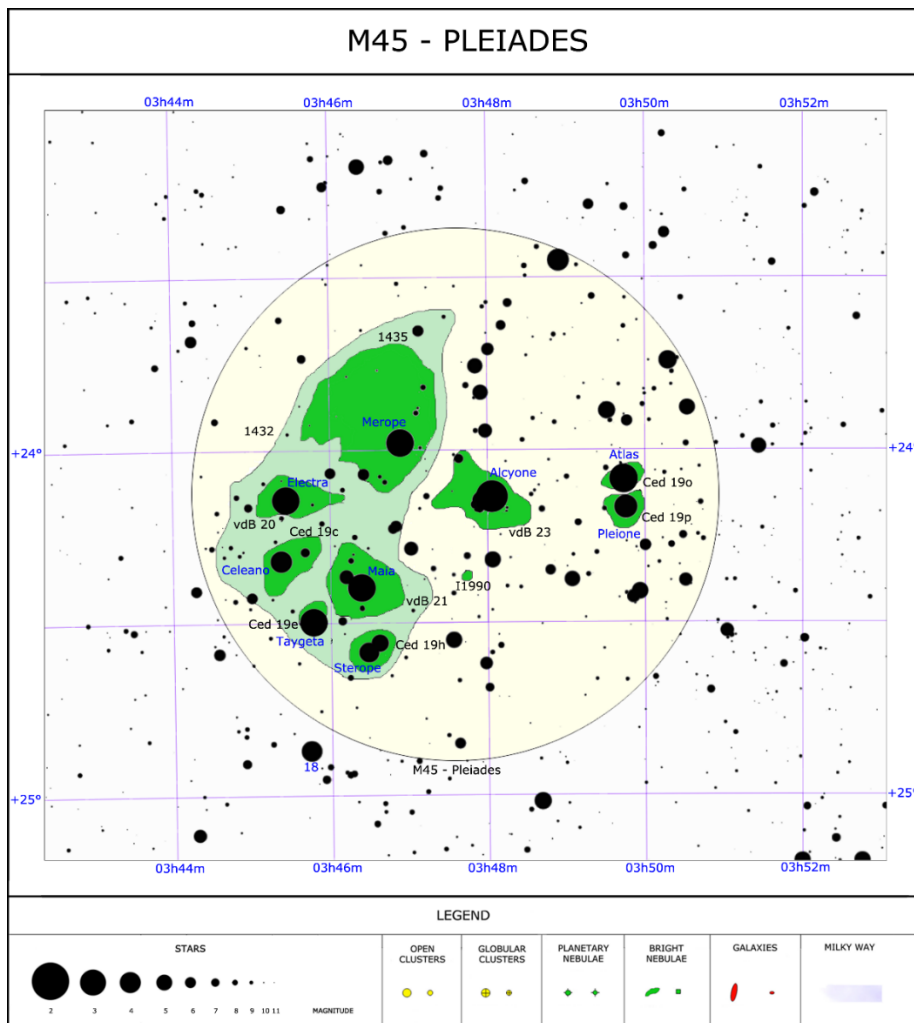
Celebrate Aboriginal Culture: The Seven Sisters, by Pat Forster, 2021, 60 cm x 40 cm

Quilt statement: Inspired by a digital image of the Pleiades by Robert Muro, [Pleiades.png \(2500x2783\)](#) ([wikimedia.org](#)) See next page.

The orientation of the star cluster is as seen from the Southern Hemisphere, 30 degrees south, turned slightly anticlockwise to suit the rectangular quilt (artistic license!).

The Pleiades star cluster is dominated by hot blue, luminous stars which have attracted attention worldwide since antiquity. Pleiades is the Greek name. Seven of brightest stars are referred to as the Seven Sisters and by various other names by Aboriginal peoples (e.g., Napaljarri). They are depicted in blue on the quilt. One of the sisters is a double star (the pair of blue stars towards the bottom left of the quilt). The quilt represents surrounding stars as circles that are proportional in size to their magnitude (ie brightness). Two large bright stars that appear close to each other (right edge of the quilt) are the sisters' parents in ancient Greek mythology but I haven't found them referenced in Aboriginal narratives.

The Sisters on the quilt are very sparkly, just as they were on their adventures in Western Australia. The rays are sewn with metallic thread, together with blue thread for stability. There is a blue bead at the end of each ray, and blue beads hold down the star sequins. There are a few, clear, sparkly beads within all the white circles, which are made of sparkly fabric, which unfortunately doesn't show up in the photo. The spotted fabric and small crosses in metallic thread represent gas clouds that catch the light (nebulae). The black spaces are quilted with feather stitch in black thread.



Pleiades as viewed from the Southern Hemisphere, 30 degrees south. The black circles within the seven green areas to the left indicate the Seven Sisters. The black circles within the two green areas to the right are their parents.

Public Domain digital image by Robert Muro. [Pleiades.png \(2500x2783\) \(wikimedia.org\)](#)

Introduction

Aboriginal narratives from Western Australia (WA), as for Australia in general, refer to the Pleiades as Seven Sisters. The (spirit) sisters descended from the sky, made landforms including water sources, and so created songlines which they flew along. Several Seven Sisters Songlines straddle Western Australia. The sisters dance and play enroute and are chased by a lusty man (Orion) or men (stars in Orion). In some narratives, dingoes protect them. In several, one sister meets her demise, which is consistent with the number of distinct bright stars in the Pleiades that can usually be seen with the naked eye. Seven Sisters narratives and other songline information are passed down through the generations and celebrated in many different ways including song, story, dance, drawings in the sand and rock art. Further, the Pleiades appearing on the horizon at dawn or dusk signal seasonal changes in weather and animal cycles.

The account below is based on an extensive internet-based search. The references pertain to Aboriginal people from Noongar Country (south-west WA, which includes Perth, the state's capital city), Wongai (Wongatha) Country (Eastern Goldfields, south-east WA), Yamatji Country (the Murchison, mid-west WA), the Pilbara (north-west WA), the Kimberley (north WA) and Pitjantjatjara and Ngaanyatjarra Lands (Central Desert areas). The references are from peer-reviewed research papers, accepted theses, as well as from less conventional sources including storybooks, artist statements for paintings, art-project accounts and early settlers journals.

Characterisation of the Pleiades

- Seven Sisters

For nearly all Australian cultures, the Pleiades are female, usually seven sisters, chased by a young man or men, usually Orion or stars in Orion (Norris, 2016). Such is the case for Western Australia, as exemplified in three art projects involving WA Elder women painting, dancing, singing and telling their Seven Sisters narratives. One relates to the Canning Stock Route, WA (La Fontaine & Carty, 2011); another to Martu Country which includes places on the Stock Route (Coates and Sullivan, 2013), the third to the Martu Country including part of the Canning Stock Route, and Anangu/ Pitjantjatjara/ Yankunytjatjara (APY) Lands (partly in WA, mainly in Northern Territory and South Australia), and Ngaanyatajja Lands (mostly in WA) (Neale, 2017).

The Seven Sisters are chased by a lusty man (Orion) known by different names by different language groups. Sometimes a group of men are in the chase. The Sisters fly from place to place, create water sources and other landmarks, and, at various locations, they rest, dance, sing, pierce their noses, eat bush foods, get lost or sick, hide, get caught by the man/men, defend themselves, suffer rape, escape, split up and regroup, and then fly away into the sky.

For the Anangu Pitjantjatjara Yankunytjatjara (APY) peoples of the Western Desert, "Wati Nyiru is the ancestral man who pursued the sisters across land and sky"; on earth he was "an older clever man, a shape-shifter of great powers who can turn himself into ripe bush tomatoes, great big shade trees, grass seeds ready for gathering – anything to entice the young maidens into his grasp"; in the sky, "he is the red star that most of us know as Taurus and his footprint is Orion's belt"; his "misshapen footprint, Orion's belt, follows them forever." (James, n.d.: webpage). Outside the entrance to Walinynga rock art cave, in South Australia, also known as Cave Hill, in which the Dreaming is depicted, "a large single rock embodies Wati Nyiru, ... he is intently watching the sisters inside the cave" (ibid). Images of the cave and rock are available National Museum of Australia website (n.d. a: webpage).

<VIDEO>

Minyipuru: Waters of the Songline, video. <https://vimeo.com/347197786>
Nyiru, 2011. [Nyiru, A Short Film by Curtis Taylor - YouTube](#)

<IMAGE>

Walinya rock art [Home - Walinynga rock art \(nma.gov.au\)](http://nma.gov.au); Wati Nyiru rock [Wati Nyiru rock - Walinynga rock art \(nma.gov.au\)](http://nma.gov.au)

- six Sisters

The number seven in relation to the Pleiades is puzzling because less than seven bright stars are normally visible in the cluster; but, in several accounts one or two of the sisters are absent (Norris, 2016). How many you actually see depends on your eyesight, atmospheric conditions, and light pollution.

Noongar Elder Noel Nannup (1948 -), south-west WA, relates:

When it comes to the story of the Seven, there are really only six, as the seventh is one of the planets, and the planets go the opposite way. This is why you will always hear the desert people saying the seventh sister is coming home. ... You will see the seventh sister getting closer and closer, but then she will go past ... And when that happens, people will say she has visited her sisters. (Nannup, 2008: 98)

Six sisters in the sky were also implied by Wongai Elder Josie Boyle (c1943 - 2020), Eastern Goldfields, when she spoke about her mother:

... my mother was a star girl. We called her a star girl. But she always believed she was one of the Seven Sisters left behind. We had to watch her [dance] every day, and become that star sister. And she said that star sister, Seven Sisters, left behind, and she was in that story. ... So we couldn't go past that story every day. (Goldsmith 2014: 515).

Josie carried some of what she learnt about the Seven Sisters into a story for children (Boyle, 2007). In brief, the Sisters came from the Milky Way to beautify the Earth, and they needed water. The youngest sister was sent for it. Two spirit men found her, and she fell in love with them, which was forbidden. After finding her, the other six Sisters returned to the Milky Way, leaving the youngest sister with the men.

Recognised educator (MBE) May O'Brien (1932 -) of Wongai heritage, in her storybook (O'Brien, 2009), describes how Seven Sisters landed on a plateau on earth, were chased by small Yaryarr men most of whom gave up, but one persisted and approached a sister who had wandered away from the group. She ran for her

life back to the plateau, realised her six sisters weren't there, but she saw them in the sky, and followed them. So, today six sisters can be seen clearly, and the seventh faintly, as she trails behind.

Six sisters also remain in two other narratives that come from desert peoples. See the next section.

- protected by dingoes

Dingos for protection were a component of a Seven Sisters ceremony that White (1975) witnessed in desert areas in South Australia. The ceremony was for a girl's first menstruation. A woman took the role of the lusty man, so represented Orion (Njuru), who chased seven women who came from the north-west. He chased them through WA (Meekatharra, Wiluna, Laverton, Kalgoorlie to Cuneelee), where he caught one, raped her, and she died - a consequence of the man being a relative so that the rape was beyond moral behaviour as well as marriage lore. The six sisters continued with the man in pursuit. They set their dingoes upon him when he attempted rape again.

For the Pitjantjatjara people, Central Desert, partly in WA, mostly in South Australia and the Northern Territory, the Sisters kept a pack of dingoes for protection against a man, but he managed to rape one of the sisters who then died (Mountford, 1976). The man pursued the other six who became birds and flew into the sky. He followed them and is seen in the stars of Orion's belt.

- birds

Noongar Elder Theresa Walley (1937 -) also links the sisters with birds in her Seven Sisters storybook (Walley, 2013). They have the names of birds and are sent to search for their father. But they venture too far, lie down to rest and never awake. Their spirits drift into the heavens and can be seen in the night sky. They return as beautiful birds during the day. Johnson (2014) observes that casting the Seven Sisters as earthly birds is common for Aboriginal people in general. Perhaps this is because birds are free spirits?

- spirits from the sea

For the Goolarabooloo people of the Dampier Peninsular, west Kimberley: Marala the Emu Man (Emu in the sky) chased Ngadjayi (spirit women from the sea) (Salisbury et al., 2016). The spirit women failed to listen to a command of their leader, Yinara, who then shamed them, and together they moved into the sky and became the Pleiades. Stone pillars at Bungurunan Beach, south of Broome, now represent the Ngadjayi.

- a family saga

Hassell (n.d.: 287-294), recorded a narrative of the Wheelman Noongar people, south-west WA. In summary: a man goes hunting and meets three Kar (men from another tribe). The man asks them to his camp with his wife, children and Wardah, who is to be the wife of the eldest son. They all travel to the coast. A Kar wants Wardah as his wife, so the Kar are told to leave. The Kar attack, the man and sons are speared, a wind blows them into the sky. Orion is the man with a son on each side, and the three stars hanging down are the Kar trying to reach them, which is a warning to all not to take in strangers. The wife, children and Wardah hide, and a baark (cloak) is spread over the children. A storm blows up, wind catches a corner of the baark and blows them all into the sky: the wife and Wardah are the two brightest stars in the Pleiades, the dimmer ones are the children because the baark covers them.

- chased by Moon-man

In Wati Kutjara (two Lizard Men) narratives (Roheim, 1945) that belong to Central Desert peoples of WA (Warburton Ranges groups, Kaili from Mandjindja, Western Desert and Yulbara people of Laverton), Moon-man chases a group of women, wanting to have sex with them. The Wati-Kutjara wound Moon-man with their magic boomerang and he dies, or meets his demise in other ways. In the Warburton Ranges and Kaili narratives, the women are identified as the Pleiades. In the version from Yulbara people, the women went up to the sky after Kulu (Moon-man) was killed, and they became the Pleiades.

- rescued from serpents

For the Tararu and Ibarga peoples of the Pilbara, north-west WA, the Wati Kutjara "rescued the Wonatara women [the Pleiades] from two mythical serpents (Wonambi) and then they went up into the sky and waited until the Wadi Kudjara should come up and marry them". (Roheim, 1945: 43).

Places the Sisters Visited

- Roebourne to Coober Pedy Songline

The names of many WA locations visited by the Seven Sisters are publicly known, particularly for the Seven Sisters Songline which has been subject to art projects (see Seven Sisters section above). The songline starts in Roebourne (Pilbara coast), goes east across the Pilbara, north-east up part of the Canning Stock Route, south-east through the Western Desert, and finishes near Coober Pedy in South Australia (Macfarlane and McConnell, 2017). The rugged terrain traversed in WA is highlighted in the video 'Minyipuru: Waters of the Songline' (Martumili Artists and the Australian National University, 2016). The video Nyiru (Taylor, 2011) from Martu people in the Pilbara provides a shorter version.

<VIDEO>

Minyipuru: Waters of the Songline. <https://vimeo.com/347197786>
Nyiru, 2011. [Nyiru, A Short Film by Curtis Taylor - YouTube](#)

However, any route, such as just been described, is a simplification for "the Seven Sisters Songline is not a single line, but is a woven set of lines that come together and disperse, and that have numerous additional lines spreading out from them." (Macfarlane and McConnell, 2017: 66). Unlike the Canning Stock Route, and other routes determined by European colonisers, "the indigenous foot tracks follow the intelligence of the land; tracking waterhole to waterhole, diverging for good food sources, marking the trees, caves, hills, grass plains, creekbeds and water sources that sustain the life of people and animals travelling through the land". (James, 2013: 31). Further, in their National Heritage assessment, Macfarlane and McConnell (2017: 70) put forward the view that "because the [Roebourne-Coober Pedy] route was flown [by the sisters], it is unlikely that the route has significance as a physical place." It is places visited that hold significance, and many are water sources (ibid).

<IMAGE>

Kunkun by Nora Nangapa, Nora Wompi, Bugai Whyoulter, Kumpaya Girgaba, 2008.
<http://collectionsearch.nma.gov.au/ce/Bugai?object=160045>

In addition, some stopping points for the Seven Sisters offered particular bush foods such as bush melon and bush onion (FORM, 2019). Ceremonial and resting sites have also been documented, for example by Neale (2017). Macfarlane and McConnell (2017) identify the following as key places on the Roebourne – Coober Pedy Seven Sisters Songline, going as far as the border with South Australia. The captions on the webpages for the listed images provide details of the Seven Sisters' activities at each place.

- Roebourne, WA [start of journey] – Cleaverville Beach (private Communication, Roebourne Visitors Centre, 14/07/20)
- Parnngur, WA – a Western Desert Waterhole

<IMAGES>

Parnngur (12-114) by **Bugai Whyoulter** <https://pauljohnstonegallery.com.au/martumili-artists-wantili/>
Minyipuru by Jakayu Biljabu, 2008 <http://collectionsearch.nma.gov.au/object/160044>
Parnngurr Rockhole by Bugai Whyoulter , 2015 <http://collectionsearch.nma.gov.au/ce/Bugai?object=247606>

- Kalypa, WA - Canning Stock Route well 23
- Wantili - near Canning Stock Route well 25

<IMAGE>

Wantili Claypan by Bugai Whyoulter, 2015 <https://thedesigntfiles.net/2017/04/bugai-whyoulter/>

- Tiwa - Canning Stock Route well 26

<IMAGE>

Tiwa by Lily Long, 2008 <http://collectionsearch.nma.gov.au/ce/TIWA?object=160046>

- Juntu, WA - permanent spring near Canning Stock Route well 30

<IMAGE>

Juntujuntu: Minyipuru and Kurrkurr, by Nancy Chapman, 2007.
<http://collectionsearch.nma.gov.au/ce/Nancy%20Chapman?object=160040>

- Pangkapini, WA – located between Canning Stock Route wells 35 & 36

<IMAGES>

Pangkapini, Minyipuru, by Mulyatingki Marney, 2007.

<http://collectionsearch.nma.gov.au/ce/Mulyatingki%20Marney?object=160043>

Pangkapini (in between wells 35 & 36) - Seven sisters by Mulyatingki Marney

<http://www.aboriginalsignature.com/martumiliartpeintureaborigene/mulyatingki-marney-pangkapini-in-between-wells-35-36-seven-sisters-122-x-76-cm-16-159>

- Marapinti – located E of Pangkapini

<IMAGE>

Marapinti by Josephine Nangala, 2008

<http://collectionsearch.nma.gov.au/ce/%E2%80%A2Marapinti?object=160761>

- Mutingarra, WA - permanent waterhole in cave (Eye of the Night Owl)
- Mirapinti, WA, rock hole west of Kiwirrkurra

Other places visited by the sisters include Kunawarritji and Nyipil (Well 34) (Brooks, 2007) and Kartarru .

<IMAGES>

Kunawarritji, 2007, by Nora Wompi, <http://collectionsearch.nma.gov.au/ce/wompi?object=160042>

Canning Stock Route Country by Patrick Tjungurrayi, 2007.

<http://collectionsearch.nma.gov.au/ce/Patrick%20Tjungurrayi?object=160010>

Kartarru (Well 24) by Jakayu Biljabu

<http://www.aboriginalsignature.com/martumiliartpeintureaborigene/jakayu-biljabu-nomadic-life-152-x-76-cm-16-37>

- other sites

WA places visited by the sisters, other than on the Roebourne - Coober Pedy Songline, have also been documented. Noongar Elder Noel Nannup, south-west WA, noted another Songline; “The Milky Way and the Megilion [sic] Clouds are *The Seven Sisters Dreaming*”; it runs a long way down from the Pilbara region.” (Kerwin, 2006: 69).

Noongar Elders identify Cantonment and Clontarf Hills in Fremantle with the Seven Sisters and say five other hills in the area have been flattened, but that the spiritual essence of the landscape lives on (City of Fremantle et al., 2016). The five hills were quarried early-on for the Fremantle Harbour development. The Seven Sisters also visited Yamatji Country, mid-west WA:

... in the back of Geraldton ... where that road goes, ... you go over that hill. You see all these beautiful formations of hills and things. Well along there, there is a lovely story of how they dropped the crystals through there. (Goldsmith, 2014: 523, informant Josie Boyle, Wongai Elder).

Josie also speaks of a Seven Sisters site in the Eastern Goldfields: a hill in Coolgardie that was a dancing site and end of the Sisters’ journey on Earth (Goldsmith, 2014). Noongar Elder Noel Nannup, referring to the Wongai people, wrote “their Seven Sisters Dreaming starts at a place called Weibo, north of Kalgoorlie in the Goldfields, at a very special place where the sisters came down from the sky.” (Nannup, 2008: 98).

<IMAGE>

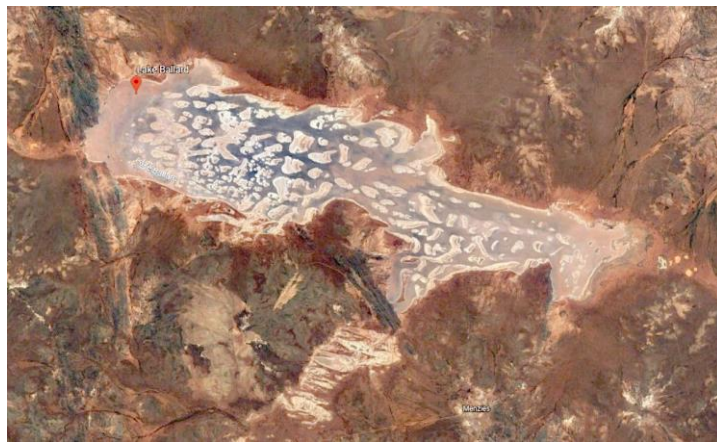
Seven Sisters Songline painting by Josephine Mick showing a branch to Kalgoorlie, National Museum Australia

<http://www.nma.gov.au/exhibitions/songlines/highlights>

Paddy Walker, Wongai Elder, Eastern Goldfields (Brody, 2005), described how the Seven Sisters visited Lake Ballard (Figure 1): they stopped and played, and a man chased them. They hid in seven rock holes on the shore of the lake; became islands on the lake; the man seized the youngest of the girls; a young man loved one of the sisters and wished to dance with her; and a tree at the end of Lake Ballard is one of the sisters.



Lake Ballard, (L) large hill that represents the oldest sister, (R) looking North photos by Pat Forster.



Lake Ballard

Google CNES / Airbus DigitalGlobe Landsat / Copernicus Camera : 111 km 29°27'12"S 121°10'45"E / 409 m

In her storybook (O'Brien, 2009), recognised educator (MBE) May O'Brien (1932 -), of Wongai heritage, names other Eastern Goldfields places which the Seven Sisters visited: a flat-topped plateau near Leonora; a hill near the plateau called Yabu Yulangu which means the hill where they cried; and places close to Wiluna, Laverton, Kalgoorlie and Menzies. Lake Ballard, in Paddy Walker's account, see above, is near Menzies.

Also in the Eastern Goldfields, Ngalia people hold that the Die Hardy Range including Mount Geraldine, is associated with and represents the man who pursues the Seven Sisters, and that peaks in the Yokradine hills represent the Sisters (Muir, 2012). The name of the Yokradine Hills is based on the Noongar term "Yokrakine, yoka kaany, women's spirit place" (Muir, 2012, 17, source Tim McCabe). Muir (1970 -) is leader of the Ngalia people. Tim McCabe is a long-standing Noongar Language Teacher, Ph.D. Curtin University.

Representation on Earth of The Pleiades and the Sisters

- song

Traditional song sagas recount the ancestors' exploits and indicate the location of water and food sources Songlines are living cultural routes, a web of oral knowledge of country that maps places of significance for the Indigenous peoples of this land". (James, 2013: 31). Songlines are sophisticated systems of interconnecting cultural routes mnemonically signposted in song (ibid).

From Josie Boyle, Wongai Elder, Eastern Goldfields, WA:

I always try to walk on that path, that the seven sisters had. ... They left all these wonderful things like what we eat today, when we go into the bush, and how do we have the knowledge of eating witchetty grubs? How do we have the knowledge of eating bush tucker? Who told us we could eat all this? See, this was what I was asking my mum. Who made this law? She said it's all in the song book. And we sing the songs

... how the seven sisters went around and they seeded the earth and they danced the cycles of life on earth. And how they went and stored the harvest in those caves in those sites today. ... (Goldsmith, 2014: 521).

- story

Story (narrative) was and is a common way for communicating Seven Sisters sagas. However, a warning for researchers and others, attempts to convey, through the written word, information embedded in either song and story "lacks the performance quality which is an important part of what is being told." (Kelly, 2016: 56).

- stories in the sand

From Josie Boyle, Wongai Elder:

... all those sites have the best sand going, all those lovely seven sisters sites. You go into those caves, that the seven sisters caves, where they all have, you see the amazing sand. ... Pure white. Beautiful white paint there, there's beautiful ochre, yellows, different colours of yellows, different colours of red earth. You even get that really maroon red earth ... and you can make ripples in the red earth and fill in the sand stories you know, like the stories in the sand that the sand holds for you. ... you can see all these amazing stories in the sand, and the sand is the holder of the stories. (Goldsmith, 2014: 519)

- dance and corroboree

Josie Boyle relates about her mother, " We called her a star girl. But she always believed she was one of the Seven Sisters left behind. We had to watch her every day, and become that star sister". (Goldsmith, 2014: 521). "It was a religion for my mum. She danced the sun up every morning. She used to get up at daybreak." (Goldsmith, 2014: 521).

Also from Josie Boyle:

I go to the one [site] in Coolgardie, ... and I take Bronwyn there, and we stand on this hill and we look out ... and pay our respect that it deserves, because it's a dancing site, see? so everything has a different story of the sites of what happened, when the seven sisters were here on earth, see, and that was a dancing site and it was like the celebration site of the end of the journey on the earth. And that was where the boundary line came for the Noongar people... it was all danced the Seven Sisters, and they made the boundaries as they went over the land ... (Goldsmith, 2014:517).

<VIDEO>

Recorded in conjunction with the art projects incorporating the Canning Stock Route.

Minyipuru: Waters of the Songline. A collaborative production of Martumili Artists and the Australian National University, 2016. <https://vimeo.com/347197786>

Kungkarangkalpa: Seven Sisters Songline. <https://cdhr-projects.anu.edu.au/songlines/>

The Bali Balga performed in the Kimberley is an example of a corroboree that references the Seven Sisters/Pleiades. The dance style is traditional, but the story can be current: the story is passed through the generations via dreams; the current owner is Alan Griffiths (Carriageworks n.d.: web page).

<VIDEO>

Bali Balga, Waringarri Arts, Kimberley, video. <https://www.youtube.com/watch?v=GEWmlpZCdQg>

Body movements in dance and corroboree convey essential information, including information that defies clear expression in word (Kelly, 2016), Interpreting the information can depend on knowing the code, for example, for Pitjantara peoples, "opening the whole hand and shaking the fingers" showed how the Pleiades stick to the sky (Róheim, 1945: 44).

- body paint

Inma walka are the marks painted on women's breasts as they dance the parts of the story, representing different places along the path of the story (Macfarlane and McConnell, 2017).

- masks and costumes

Masks and costumes also convey essential information (Kelly, 2016) for example in the Bali Balga. See video link above.

- *totem boards*

Men performing the Bali Balga corroboree carry totem boards which depict elements of the corroboree story (Desert River Sea, n.d.: web page). The totems were traditionally made with hair and are now made with thread. The thread constructions represent the Seven Sisters, the Morning Star and other non-night-sky elements, as do paintings by Alan Griffiths:

<IMAGES>

Bali Balga by Alan Griffiths 2012, Kimberley. <http://desertriversea.com.au/art/10>

Bali Balga by Alan Griffiths, n.d. <https://www.aboriginal-art-australia.com/artworks/alan-griffiths-bali-bali-balga-3a/>

- *etchings*

Bayley (1999) provides an example where etchings on a spear thrower served as a communication means and prompt for naming water sources in sequence. Kumpaya Girgiba recently (2009) produced an etching of 24 water sources in the Gibson Desert, WA, and named them in order, recalling them from when she lived there 40 years previously. Her list included places on the Roebourne – Coober Pedy Seven Sisters songline. She was born near Kiwirrkurra in the "tali" (sandhill) country of the Gibson Desert. She walked that area with her family as a young girl until, in the 1960s, "The whitefellas took the family to Jigalong, ending the pujiman [traditional] days." (Wangka Maya Pilbara Aboriginal Language Centre, 2009, webpage). Kumpaya imported her knowledge into the collaborative painting, 'Canning Stock Route and Surrounding Country, 2008':

<IMAGES>

Canning Stock Route and Surrounding Country, 2008

<http://collectionsearch.nma.gov.au/ce/Canning%20Stock%20Route?object=160054>

Kumpaya Girgiba paints her country, 2009

https://marnti-warajanga.moadoph.gov.au/kumpaya_girgiba.html

Etchings on digging sticks, message sticks, ceremonial boards, coolamon dishes (yardi in Noongar country) also serve as memory prompts (Kelly, 2016).

- *rock art*

The Roebourne - Coober Pedy Seven Sisters Songline is painted on the walls of Walinyrna (Cave Hill), near Amata, Musgrave Ranges, South Australia (MacFarlane and McConnell, 2017). It includes many concentric circles and tracks. Concentric circles often represent water. A web search did not reveal literature describing the painting as showing connections with the night sky. The songline is also pecked (engraved/etched) into the rock at the Kuli waterhole, Musgrave Ranges, South Australia (James, 2009).

- *contemporary paintings*

Links to images of many contemporary paintings by Aboriginal artists have been given above. The were informed by traditional knowledge, and many are associated with major art projects (described in the Seven Sisters section above). A short video of collaborative painting for the Canning Stock Route is as follows:

<VIDEO>

Painting Country: Women's Painting - by Nicole Ma, Canning Stock Route project.

<https://vimeo.com/21006880>

Other paintings not associated with the large art projects include:

<IMAGES>

Seven Sisters by Christine Collard, Yamaji Artist, WA.

https://www.researchgate.net/figure/One-of-the-paintings-from-the-Ilgarijiri-which-means-things-belonging-to-the-sky-in_fig1_241364509

The Sun Shining on the Seven Sisters by Margaret Whitehurst Yamaji Artist WA.

<https://www.icrar.org/outreach-education/indigenous-engagement-initiatives/>

The Seven Sisters by Josie Boyle

[https://www1.health.gov.au/internet/main/publishing.nsf/content/7A4BFC6CAC715EC8CA257BF000193A79/\\$File/NATSIEH.pdf](https://www1.health.gov.au/internet/main/publishing.nsf/content/7A4BFC6CAC715EC8CA257BF000193A79/$File/NATSIEH.pdf)

- commemorative coin

Two coins were issued in 2020 commemorating Aboriginal Astronomical knowledge, one depicting Emu in the Sky with artwork by Wiradjuri artist Scott "Sauce" Towney from NSW. The other depicts the Seven Sisters with artwork by Wajarri-Noongar artist Christine Jugarnu Collard of Yamiji Art, WA.

<IMAGE>

<https://theconversation.com/new-coins-celebrate-indigenous-astronomy-the-stars-and-the-dark-spaces-between-them-145923>

- sculpture

Many contemporary artworks represent traditional Songline understandings and Aboriginal night sky perceptions in general. These include huge sculptures of Orion and Pleiades constellations mounted on a wall in Perth International airport (Forlano, n.d.) with text by Noongar Elder Doolan Leisha Eatts.



From the skies sculpture at Perth Airport T1 by Dr Penelope Forlano, Pleiades (as seen in the Northern Hemisphere!). Photo by Pat Forster.

The basket-weaving sculptures Kungkarrangkalnga-ya Parrpakanu (Seven Sisters are Flying) by the Tjandi Desert Weavers, Central and Western deserts, WA) are other magnificent contemporary examples (National Museum of Australia, n.d. b: webpage), as are the woven baskets :

< IMAGES)

Kungkarrangkalnga-ya Parrpakanu <https://songlines.nma.gov.au/tjanpi> (interactive image)

Seven Sisters, woven baskets an short video [Seven Sisters | National Museum of Australia \(nma.gov.au\)](https://www.nma.gov.au/collections/objects/7211)

Pleiades as a Calendar

In 1851, Salvado (1977, cited by Macintyre et. al., 2020), recorded that when the Pleiades appear on the horizon at the break of *dawn*, the Noongar season of *cielba*, the grass season, is known to be drawing near.

For the Pitjantjatjara people in the Western Desert WA, which is adjacent to the Great Western Woodlands, Pleiades in the *dawn* sky in late autumn signalled the dingo breeding season had begun, so it was time for dingo fertility ceremonies to be performed (Tindale and George, 1976). In the Great Sandy Desert, south Kimberley/ Pilbara, the appearance of the Pleiades in the sky before dawn signalled the onset of the coldest nights – with the explanation that the sisters were dropping water on people who were sleeping, causing them to shiver (Lowe and Pike, 1990).

The Pleiades in the north-west sky at *dusk* served as a signal for the Ngadju people, Eastern Goldfields/ Great Western Woodlands, WA. Kupilya ngarrin:

... is the sleeping and hibernating season ... This season is cold and rainy. People are resting up; it's good for mushrooms. ... the Seven Sisters are in the north-west sky just after sundown to indicate that female jula (emus) will start egg laying. (O'Connor and Prober, 2010: 36).

After the emu eggs comes a part of Kupilya ngarrin called the time of the ngurpany, dingo pups (*Canis lupus dingo*). This is about June, about nine weeks after the dingoes mate. (O'Connor and Prober, 2010: 38).

Noongar Elder Noel Nannup (2008) describes how:

I grew up hearing from my mother about the Seven Sisters, and at night, when the sky was clear and lit with a multitude of stars, she would point them out to me and my siblings, telling us how the sisters got to be in the sky. What made this creation story more real for me was that on extremely cold winter nights, when the dew lay heavy on the land and dripped off the roof like rain, my mother would say, 'Them old people in the Pilbara, they would tell us: It's those Seven Sisters, they weeing on us tonight.'

In a New South Wales narrative, coldness was originally associated with the Pleiades on earth, whose bodies sparkled with icicles, and who were pursued by young men (Parker, 1898). After chase and rape of two sisters by an older man, the Pleiades went into the sky, as did the young men who are represented by Orion's belt and sword. Since then, ice (frost) appearing on earth has been taken to be dropped by the Pleiades. Natale (2012) analyses the narrative in terms of sexuality.



Orion



Celebrate the Culture of Australia's First People, by Pat Forster, 2018, 78 cm (wide) x 78 cm (high)

Quilt statement: The quilt celebrates Aboriginal night sky understandings which emanate from Western Australia.

The patterned fabric is 'Seven Sisters in the Milky Way' designed by Marlene Doolan of Aboriginal heritage. The galaxy block is original. The Orion Constellation is depicted in the middle of the right side of the quilt, as seen in the Northern Hemisphere. In the Southern Hemisphere it appears upside down and flipped from left to right

Text on the quilt, starting at the top left block and rotating anticlockwise

- emu in Milky Way black spaces signals seasons signifies Marala the emu man
- star maps guided navigation
- moon a distance time indicator
- Seven Sisters Pleiades
- Jundas campsite Hyades
- morning star
- (no text) comet sequin

Machine pieced. Machine quilted curves on plain fabric and free motion stippling on patterned fabric with black polyester cotton thread. Machine quilted text with grey polyester/cotton. Stem-stitch heading, metallic thread. Hand quilted emu, star map lines and moon with metallic stranded thread. Polyester wadding.

Characterisation of Orion

- a lusty man

In many Aboriginal narratives, Orion is a hunter, a man or a group of men, or is linked with male initiation ceremonies (Leaman & Hamacher, 2014). If cast as a man, Orion is often associated with the Pleiades (Seven Sisters), and is frequently chasing them, including in narratives from WA.

<VIDEO>

Minyipuru: Waters of the Songline, video. <https://vimeo.com/347197786>

Nyiru, 2011. [Nyiru, A Short Film by Curtis Taylor - YouTube](#)

- red-tail black cockatoos

From the Ngaiuwonga tribe in northwestern WA, Bates (n.d. b: 3) recorded:

Ngadagurdain, a Ngadawonga, stated that biargo (black cockatoo, red tail) was yamaji, Miamba time [long ago]. A warura or bogar [turtle?] laid some eggs and covered them up. Biargo wandi (women) were away in the bush, but presently came back and saw the eggs. They sat around them and lifted the cover up and then all the eggs fell down and broke. The women fell down too and they are now up in the sky. They turned into biargo and went up bila (skywards) but some remained down on earth and that is why there are biargo. The biargo who went up bila, now form the constellation Orion.

- a man, his sons and three visitors

In the Kar narrative of Wheelman Noongar people, south-west WA., recorded by Hassell (n.d.: 287-294) (see page 39), a family is visited by three Kar (men from another tribe). There is a dispute, The Kar attack, the man and sons are speared, a wind blows them into the sky. Orion is the man with a son on each side, and the three stars hanging down are the Kar trying to reach them, which is a warning to all not to take in strangers.

Orion's Belt

- footprint of a lusty man

For the Anangu Pitjantjatjara Yankunytjatjara peoples of the Western Desert, partly in WA: "Wati Nyiru is the ancestral man who pursued the sisters across land and sky." (James, 2015: 42), informant Nganyinytja (c. 1920), a Pitjantjatjara Elder woman, OAM). On earth he was:

... an older clever man, a shape-shifter of great powers who can turn himself into ripe bush tomatoes, great big shade trees, grass seeds ready for gathering – anything to entice the young maidens into his grasp.

In the sky: '... he is the red star that most of us know as Taurus and his footprint is Orion's belt.' (ibid). His misshapen footprint, Orion's belt, follows the sisters forever.

In another version from the Pitjantjatjara people, the sisters kept a pack of dingoes for protection against a man, but he managed to rape one of the sisters who then died (Mountford, 1976). The man pursued the other six who became birds and flew into the sky. He followed them and is seen in the stars of Orion's belt.

- lizard's footprint

Jaru Elder Jack Jugarie, east Kimberley, associated the Orion constellation with a lizard footprint. He:

... referred to the stars which make up the belt and "sword" of the constellation Orion ... as "Kalarrcar", the lizard footprint. ... Jack drew both the imprint of the lizard footprint, and the star pattern, noting the similarity between the two. (Goldsmith, 2014: 142).

No narratives about lizard were reported.

- three women elders

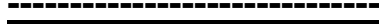
In the Charnock woman narrative which describes creation of the Milky Way (see page 23), the three stars in Orion's belt represent three Women Elders. Toogarr Morrison (1950-) portrays the belt as such in his Noongar cosmology painting at Gravity Centre, Gingin, WA.

<IMAGE>

Scroll down. <http://rebeccaisabroad.blogspot.com/2012/08/tim-tams-and-other-less-important-things.html>



From the skies sculpture at Perth Airport T1 by Dr Penelope Forlano, Orion (as seen in the Northern Hemisphere!). Photo by Pat Forster.



Magellanic Clouds

Characterisation

- *blood letter (the Small Magellanic Cloud)*

Elders Jack Jugarie (1927 - 1999) and Jack Lannigan (b. 1924) of the east Kimberley, when interviewed by Goldsmith (2014: 143), gave accounts of a man being speared or people being otherwise hurt, then, "... the Small Magellanic Cloud comes down like a misty, smoky cloud over the dead body, and takes blood out of the dead body." The person comes back to life, and after two or three days returns to the dead state. Goldsmith proposes the initial dead state may be trancelike.

- *two men*

In the Two Men in the Sky narrative told and sketched by Elder Jack Lannigan, the men are the Large and Small Magellanic Clouds with the Milky Way around them (Goldsmith, 2014: 146). The men come down and make a man numb due to wrong-way marriage:

Because he steal your wife, wrong type of marriage. Mulli (in laws) would straighten him out. Two men come out of the Milky Way, two men, he take your spirit away. He keeps you in the Milky Way till you die. That's finish.

- *spirits of gigantic men*

Two men are also key figures for the Karadjeri people (south-west Kimberley) - brothers called Bagadjimbir (Róheim, 1945: 56):

Before their time there was nothing—no trees, no water, no people, no animals, and so on. When they first arose from the ground the Bagadjimbiri were two dingos. They later became gigantic men reaching up to the sky, and when they died their bodies became bulai (water snakes) while their spirits became the Magellan (Clouds).

- *exploded lily roots*

In one version of a narrative from the north-west Kimberley, the Magellanic Clouds were created when the hero Walanganda:

.. had a fight with another mighty Wondjina [Wandjina]. He was defeated in this battle and one of his legs was shattered. He lay helpless on the ground, but in the ashes of his fire he prepared himself something to eat from the roots of waterlilies. When the roots were cooked, they burst apart in the embers, and indeed with such force that he was hurled into the sky with them ... and the lily roots can be seen as the Magellanic Clouds. (Petri, 1954, in Akerman, 2016: 109)



Aurora

Characterisation

- *fear and surprise inducing*

Aurorae are commonly known in Australia as the Southern Lights. In his paper *Aurora in Australian Aboriginal Traditions*, Hamacher (2013a: 216) concluded that:

... most Aboriginal accounts describe aurorae in negative terms and associate them with blood, death, fire or evil spirits. Aurorae are also associated with a southerly direction. This is due largely to their generally reddish appearance on the southern horizon.

An early written report of aurora seen from Perth appeared in the *Swan River Guardian*, and then in *The Colonist* (1838, 11 July: 3), a Sydney newspaper:

in the course of last month ... The heavens to the southward suddenly became illuminated, and assumed the appearance of a red colour. Vivid coruscations of pale light from the main body darted themselves into the sky, and formed a most interesting spectacle. A considerable number of natives were encamped in the town of Perth at the time, and expressed their astonishment by loud shouts.

Explorer John Septimus Roe, when near Esperance on the south coast of WA, recorded another aurora in 1848: "Here on the evening of the 17th [of November], we viewed with peculiar interest ... a lengthened exhibition of the mysterious southern lights." (Roe, 2014: 429). No response by Bob, the Aboriginal tracker with Roe, was recorded.



Southern lights, or aurora australis, seen during a geomagnetic storm (KP6 level) at Lake Brown, Western Australia (304km NE of Perth), 7 March 2016. Large and Small Magellanic Clouds in view. Photo by Grahame Kelaher

https://commons.wikimedia.org/wiki/File:Aurora_Australis_shot_from_Lake_Brown_in_Western_Australia,_7th_March_2016.webm

<IMAGE>

Aurora Australis from Western Australia <https://www.rogergroom.com/astro-photography/aurora-australis-from-western-australia/>

<VIDEOS>

Southern Lights over the Great Australian Bight

https://eol.jsc.nasa.gov/BeyondThePhotography/CrewEarthObservationsVideos/videos/slights_iss_20170817/slights_iss_20170817.mp4

Southern lights, or aurora australis, seen during a geomagnetic storm (KP6 level) at Lake Brown, Western Australia (3004km NE of Perth), on the 7th March 2016.

https://commons.wikimedia.org/wiki/File:Aurora_Australis_shot_from_Lake_Brown_in_Western_Australia,_7th_March_2016.webm

Venus

Morning Star

- *a lusty man*

For Kukatja people (Gugadja) of the Kimberley, Venus, the morning star, is the man who chased the Seven Sisters (Berndt and Berndt, 1989, in Johnson, 2014).

- *a brother to Jupiter*

For people in the Western Desert which is partly in WA, Venus (Iruwanja) and Saturn (Irukulpinja) are brothers, and Jupiter is their dog (Mountford, 1976). Irukulpinja and the dog spend a lot of time catching food for Iruwanja.

- *recognised in corroboree*

The Bali Balga is a traditional dance that is:

an intrinsic aspect of cultural life and is still regularly performed in the Kimberley. Dancers carry large thread cross totems on their shoulders and move with stamping feet and swaying body movements to the accompaniment of song and clapping boomerang. The thread-cross constructions of brightly coloured wools represent key elements of the dance story and include: the seven sisters, the morning star, two sailing ships and the key characters of the Bali story. (Desert River Sea, n.d.)

<VIDEO>

Ian Griffiths performance archive for The National: New Australian Art, 2017

<https://robertlazarus.com/2017/10/22/bali-bali-balga/> scroll down

<IMAGE>

Bali Balga by Alan Griffiths 2012 <https://desertriversea.com.au/art/10>

- *signals daylight is coming*

For Whadjuk Noongar people, Venus signals a time of day: *Teean benne kwejjiat Hoolat* means Venus, daylight now coming (Bates in Thieberger, 2017). A morning star song is recorded for Yindjibarndi peoples in the Pilbara WA. It welcomes the first light, dewy morning and waking up under the Milky Way (Juluwarlu Aboriginal Corporation, 2008). Jaru Elder Stan Brumby (1933 - 2012), east Kimberley, referred to the Morning Star when interviewed by Goldsmith (2014: 476) and that he, the star, cannot always be seen:

One big star, not too big, come out from sunrise. He come out, at night, proper star. This star, bin fall down, that's the main star, we been use him for... droving cattle, that's the morning star, that's the main star. Well the drover lost that, we can't see him anymore. He's underground here, ... Yeh, yeh, very bright, morning star, he come and take a break now.

Evening Star

- *a spirit woman*

Moore (1884: 387) recorded, in relation to Noongar people:

When I was last in the bush in search of the natives, the stars were shining brightly at night. "What star is that?" I said to Deenat, pointing to Venus. "Oh, that is Julagoling," was the answer, "What is it—a man, or a woman, or what?" I enquired. "Oh, very pretty young woman," was the reply. "Where is her husband?" I said. "She has no husband; she has had some children, but she always kills them; she is very powerful in magic. Ah, there she goes off to the West, now to practice her enchantments upon us.

- *Moon's companion*

Goldsmith (2014) interviewed Jaru Elders, east Kimberley, who referred to the Evening Star. In brief, Elder Stan Brumby described two stars, a mother one and a baby one. Elder Jack Jugarie described "... a big star, now see, that's the first one, come up a little bit up here now, and then they see another bright coming behind him, that's the moon ..." (ibid: 139).

Kirsty Burgu (b. 1972), daughter of a Ngarinyin Elder of the Kimberley, writes about the evening star and the moon in her painting *Marriage Laws*, 2011, that they "... are always trying to come closer to each other- just like a young couple." (Desert River Sea, n.d.: web page).

<IMAGE>

Marriage Laws, 2011, by Kirsty Burgu <https://desertriversea.com.au/art/387>

- *daughter of Moon and Sun*

In a narrative from southern WA (Bates, n.d. b, 2):

Miak the Moon was a nungar (man), kura (long ago) and Ngank the Sun was his yog (wife). They had two children, Mardyet and Bootul or Bolangur. Bootul, the big star in the west (Venus) is Ngank's daughter. Maik and his daughters were jruk borungur, and Ngand was wit borungur. Every evening Bootul follows her mother home, and comes up after her in the morning.

This account recognises the Morning Star and Evening Star are the same object, which is not always the case in Aboriginal narratives (Norris, 2016).



Venus reflected on the Pacific Ocean by Brocken Inaglory.
<https://commons.wikimedia.org/wiki/File:Venus-pacific-levelled.jpg>



Star Navigation

- following a star

A WA example of navigation by following a star is provided by Grey (1841, digital version: April 9). His exploration party had been unsuccessful in locating water north of Perth:

We therefore continued our search ... It was now dark and we soon wandered from the path. Kaiber [the Aboriginal tracker] took a star for his guide and led us straight across the country.

In a sketch of the cosmos by Jaru Elder Stan Brumby (1933 - 2012), east Kimberley, the moon and other objects were shown, and: "... the diagonal line indicates the star, which is used to navigate back to camp." Goldsmith (2014: 152).

The diary of explorer John Septimus Roe (2014), for the years 1829 –1849 when Roe was in southern WA, doesn't seem to mention use of stars by his Aboriginal guides, but does mention many night-sky objects seen by Roe – he was alert to them so potentially would have been alert to his guides navigating with them.

- star maps

Songlines or Dreaming Tracks have been followed through the generations, including for trading. Star maps exist for them but don't seem intended for navigation; rather star maps seem to be used to illustrate the Songline songs and act as memory aids (Fuller et al., 2014a).

Noongar Elder Noel Nannup describes the W in the Sky star map for a Songline in south-west WA (British Broadcasting Corporation, 2017: video). Lines joining five stars (Canopus, Sirius, Rigel, Betelgeuse and Aldebaran) are imagined. They form a W. When compared with a map of places on the ground, the W in the sky is a mirror image of a W formed by lines joining the Stirling Range to Wagin Narrogin, the towards Katter Kich (Wave Rock), then through to and beyond Merriden, and back up across to Lake Moore. Each star lines up with a prominent granite rock in the land which marks a turning point along the Songline. Of the map's use, Nannup says only: "When you are teaching the children, then you lie flat on your back and look up there [pointing to the night sky]."

<VIDEO>

British Broadcasting Corporation, 2017. Stargazing Australia, Episode 1, Songlines of Indigenous Australians. Video. <https://www.bbc.co.uk/programmes/p04xx7s3>

An interview by Goldsmith (2014: 520-521) with Wongai Elder Josie Boyle, Eastern Goldfields, speaking about her mother, provides navigation detail:

... and they did lots of journeys ... straight across the Nullarbor where the railway line is today. ... That was the walking path of those people, my people, that walked from (Ombi?), long time ago, for ceremonies for star stories and star aligning stories ... That's how we got walking paths ... where they were going to their ceremonies, for the Guarnadagas [dances] and the singing songs of the alignment of everything, see, of the earth and the sky.

Josie mentioned that six of the sites visited are on a zigzag that is matched by stars on a zigzag, and named three sites: Gindowee, Niagara Falls, and Boorley Well. Niagara Falls is potentially the present Niagara Dam, north of Kalgoorlie. I can't identify the other sites on a map, even with different spellings.



Meteors, Meteorites, and Meteorite Craters

Introduction

In Western Australia (WA), like elsewhere in Australia, Aboriginal people did not necessarily distinguish meteors from comets. Records indicate both phenomena engendered fear of the unknown, which was correlated with bad omens, including of death. Called 'falling stars', they were sometimes conceptualised in terms of the familiar - children falling and a burning log flying through the air. There don't seem to be any confirmed WA records of Aboriginal people recognising meteorites, transporting them or using them. Wolfe Creek Crater is the only WA meteorite crater that has been extensively interrogated in regards Aboriginal people, who attribute it to a creator-serpent (or two) emerging from the ground, or a falling star. The quotes provided below come from an extensive internet-based search. They pertain to Aboriginal people from WA generally, but are mainly drawn from sources in Noongar Country (south-west WA, which includes Perth, the state's capital city), and the Kimberley (north WA).

Terminology

Comets are cosmic snowballs of frozen gases, rock and dust that orbit the Sun. When frozen, they are the size of a small town. When a comet's orbit brings it close to the Sun, it heats up and spews dust and gases into a giant glowing head larger than most planets. (NASA, a, webpage)



Comet Hyakutake by NASA photographer Bill Ingalls.

https://commons.wikimedia.org/wiki/File:Comet_Hyakutake_by_Bill_Ingalls.jpg

Meteoroids are objects in space that range in size from dust grains to small asteroids. When meteoroids enter Earth's atmosphere (or that of another planet, like Mars) at high speed and burn up, the fireballs or "shooting stars" are called meteors.



A meteor in the 2009 Leonid Meteor Shower with meteor, afterglow, and wake visible as distinct components. Creative Commons photo by Navicore, 2009

[https://commons.wikimedia.org/wiki/File:Leonid_Meteor_\(cropped\).jpg](https://commons.wikimedia.org/wiki/File:Leonid_Meteor_(cropped).jpg)

Meteor showers occur annually or at regular intervals as the Earth passes through the trail of dusty debris left by a comet. When a meteoroid survives a trip through the atmosphere and hits the ground, it's called a meteorite. (NASA, b, webpage)

Asteroids are small, rocky objects that orbit the Sun. Although asteroids orbit the Sun like planets, they are much smaller than planets. (NASA c, webpage)

Meteors

- *meteors and comets not distinguished in the naming*

Moore (1842) has the same word, Binnar, for meteor and comet in his Noongar vocabulary (south-west Western Australia). Separately, he also listed:

Binnar A meteor, described by the natives as a star of fire; seldom visible, but when seen considered by them as an omen of death. A remarkably large and bright meteor was observed a few years ago traversing a large space in the heavens from east to west. Its progress was accompanied by a loud crackling sound, like the combined discharge of musketry. (Moore: 1842: 13).

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Halley's Comet (detail) by Karne Comeagain, Yamaji Art
<https://stories.scienceinpublic.com.au/astronomy/art/>

- *bad omen*

Large meteors were taken as a sign of death by the Jaru people, east Kimberley, WA (Goldsmith, 2014). Death in the Kimberley from a great flood was said to be brought on by a star with trails (Mowaljarlai and Malnic, 1993).

- *stars visiting each other*

Hassel (n.d.: 100), when living near Wheelman Noongar people (south-east coast, WA) in the 1870s, recorded a narrative told by an Aboriginal girl from a nearby tribe:

A long time ago ... The stars were all clustered together in the milky way, and there were wide open spaces inbetween. Sometimes one cluster of stars visited another, but now and then they get lost and we can see them falling down to earth, other times they take a long time to get back to their own country. and if we watch the heavens carefully we can see them travelling to and fro ...

- *spirit children returning to earth*

From Noongar Elder Noel Nannup (south-west WA):

I know that we have all been outside on the dark night and seen a shooting star streak across the sky, I have heard some people say make a wish, when we see this we always say by-ee coolunger nyina, which means little spirit children returning to earth. When they reach earth they are nothing more than a little stone, some are a bit bigger than others, and some don't make it at all. The spirit children return to earth all the time. (Goldsmith, 2014: 195).

- *burning log*

For people in the north-west Kimberley (Petri, 1954: 144), the sky hero Wálanganda:

hunts kangaroos as he formerly did on earth. When he cooks his kill it happens at times that he takes a burning fire-log from the embers and hurls it across the firmament. That is murula (shooting star) ... We were [also] told that he throws spirit children, who are incarnated through a man's conception dream, down to earth ... The spirit children too become visible as murula – shooting stars.

- *a sign of something significant about to happen*

Noel Nannup (2018: 3) also relates how, in December 2005, there was:

. . . a meteorite going across the sky at 9 o'clock at night. Lit everything up like daylight and that was on the 3rd of December 2005. I contacted Violet [cultural advisor] the day after . . . and I said . . . what should I do? And she said 'just sit and wait. There'll be certain things we have to watch for now.

On the day of the next full moon, a whale was beached on nearby Rottnest Island, which was a sign for the Caterpillar Dreaming, the traditional: “. . . movement of Nyungar women . . . for the principal purpose of maintaining genetic diversity in diverse Aboriginal language groups.” (Blackwood, 2018: 11). The December 2005 meteor was an omen for a chain of events - the beached whale, then a trek and the sharing of knowledge, which in some ways re-enacted the traditional trek, which are reported by Blackwood (2018) in her doctoral thesis.



Meteorite shower (spirit children returning to earth), via Wikimedia Commons, photo by mLu.fotos
<https://creativecommons.org/licenses/by/2.0>

Meteorites

- occurrence in Western Australia

Bevan (2014: 238) reports that "described meteorite recoveries from WA account for nearly half (350) of all meteorites known from Australia, including the largest known", the Mundrabilla iron meteorite found on the Nullarbor Plain in 1966. There are many scientifically confirmed examples of meteorite fragments from specific craters being found away from the craters (Bevan and Bindon, 1996), but evidence that they were transported by Aboriginal people is circumstantial, including fragments that were found in or near traditional Aboriginal campsites.

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Mundrabilla iron meteorite <https://museum.wa.gov.au/research/collections/earth-and-planetary-sciences/meteorite-collection/mundrabilla-iron-meteorite-ma>

- traditional use

No examples of Aboriginal people using meteorites for practical purposes have been found (Bevan and Bindon, 1996). Explanations are that most samples are friable, although some crystalline meteorites are suitable for tool making. However, small meteorites may have been used as throwing stones (ibid)

- tektites

Tektites are small, pebble-like glassy objects of Earth material that have been melted by meteorite impact, splashed up into our atmosphere, and fallen to Earth again under gravity." (The Australian Museum, n.d.: web page). They are not meteorites, that is, not rocks originating in space. Tektites hold significance for Aboriginal people as magic stones, with their power derived "from their connection to ancestors who went up to the Skyworld after Creation." (Clarke, 2019: 158). Early records for WA indicate that possessors of the stones believed that: they were able to cure sick people and bewitch enemies (Tate, 1879); that faith healing procedures of sucking them from the body could cure sickness (Baker, 1957); and carrying them gave power to medicine men to convey messages long distances (ibid). The glassy composition of australites sets them apart from meteorites, as does their shape and composition, but there is a history of them not being distinguished in the naming.

Hassell (n.d.), when living near Wheelman Noongar people (south-east coast, WA) in the 1870s, found a booliah (wizard stone), which she gave to an older Aboriginal woman, and which others held to ensure their babies would be boys. She also saw stones owned by a Mulga (tribal doctor) that he used for rain making, curses and other things. Two were iron stones "... I am certain were meteorites. ... [Another was] in size and

shape like a goose's egg but dark green colour and extremely heavy and smooth." (Hassell: 249). Clarke (2019) refers to Hassell in his review, but not conclusively as having seen meteorites or tektites.

Meteorite Craters

- occurrence in Western Australia

There are 37 structures in Australia that are recognised to varying degrees of certainty as impact structures. Five of these are small, young, simple bowl shaped craters associated with meteorites ... Another 12 possible impact sites are currently under investigation." (Bevan, 2014: 249).

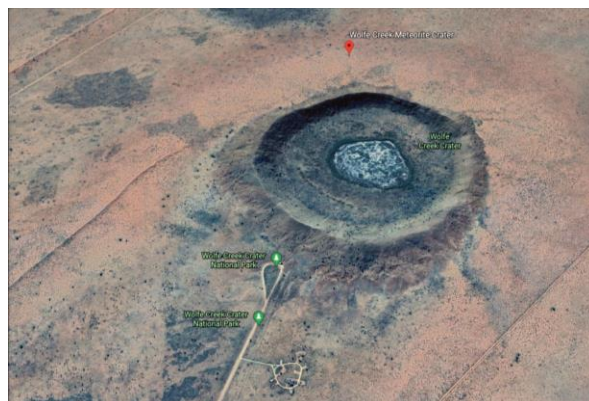
Three of the five that have been confirmed with found meteorites are in Western Australia (Wolfe Creek, Dalgara, Veevers); the other two are Henbury and Boxhole in the Northern Territory. The other 12 possible impact sites are much older and meteorite fragments haven't been found. However, of these, Gosses Bluff in the Northern Territory is widely accepted as an impact structure. Evidence includes "impact melts, shatter cones, and shocked quartz." (Bevan, 2014: 249).

- Wolfe Creek Crater

Wolfe Creek Crater (east Kimberley) is the second largest in the world from which meteorite fragments have been removed; the average diameter of the crater is 892 m, and the most recent estimate of age, based on modern methods, is approximately 120 000 years (Barrows et al., 2019). While craters can be subject to erosion, Wolfe Creek Crater is reasonably stable due to being in an arid region, so age estimates are possible (ibid).



Wolfe Creek Crater. Public domain image by Dieser Benutzer, December 2010. https://commons.wikimedia.org/wiki/File:Wolfe_creek_crater.jpg



Wolfe Creek Crater, from Google Earth, downloaded 28/02/21. <https://earth.google.com/web/search/wolfe+Creek+crater/>

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Wolfe Creek Crater by Frank Clancy . Figure 91. p. 399; and Wolfe Creek Crater by Stan Brumby . Figure 95. p. 403. <https://espace.curtin.edu.au/handle/20.500.11937/665>

- *Aboriginal name for Wolfe Creek Crater*

The local Jaru people call it Kandimalal, sometimes spelt Gandimalal (Goldsmith, 2014). An early finding was that the name Kandimala had no meaning (Cassidy, 1954), but recently Parke (2019) reported that local people say Kandimalal means no potatoes, since the bush potato doesn't seem to grow in the area around the crater (source, Ms. Darkie, Kimberley resident of Aboriginal heritage). In interviews with Goldsmith (2014: 457-459), Jaru Elder Jack Jugarie (1927 -1999) called the place "Muurring" and "Kandimalal".

- *created by a falling star*

There are several Aboriginal narratives about creation of the crater. Jack Jugarie (1927 -1999) described the first star rising in the afternoon, followed by the moon rising and making the star too hot, so it fell down and made the crater (Goldsmith, 2014). Jaru Elder Stan Brumby (1933 – 2012) told how the Evening Star was two stars, a mother one and baby one – the brightest star in the sky, and the bigger one came down forming the crater, leaving the baby one behind. (ibid). From Boxer Milner (c1934 - 2009), who was born near Sturt Creek and the crater, and who became a senior lawman and custodian for stories and songs of the Sturt Creek area: "Star bin fall down from top and made it. That's what happened, a big star fell and made Kandimalal (the Crater). We call that star kiki in our language". (Reeves-Sanday, n.d.: webpage). Note that Reeves-Sanday is an American anthropologist who conducted an ethnographic field work in the vicinity of the crater (Reeves-Sanday, 2007).

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Paintings and narratives by Boxer Milner and others

[Painting Gallery | Peggy Reeves Sanday \(upenn.edu\)](#)

Star Falling, Wolfe Creek Crater by Stan Brumby. Figures 99 -102, p. 406 - 409

<https://espace.curtin.edu.au/handle/20.500.11937/665>

- *shaped by a serpent or serpents*

At the end of his star explanation, Boxer Milner added; "There was a Rainbow Serpent traveling inside the ground and it came out from the crater." (Reeves-Sanday, n.d.: webpage). From Daisy Kungah (1940s -), who was born and grew up in Sturt Creek, "a star fell down and made the crater ... a snake came from the west, travelling high, and fell down into Wolfe Creek Crater. It made its home in the hole in the crater." (ibid). So, did the serpent travel underground, or come down from the sky? Walmajarri Elder Jack Lannigan (a Jaru speaker), born 1924 at Halls Creek, which is quite close to the crater, said "The snake went through the underground tunnel and came up into the middle of the crater. The snake made the hole by poking its head up through the ground, not by falling down from the sky. This is the Dreamtime story". (ibid).

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Wolfe Creek Crater by Barbara Sturt. Figure 93. p. 401. <https://espace.curtin.edu.au/handle/20.500.11937/665>

Narratives may evolve in the telling but, traditionally, Elders were custodians of the stories and drilled initiates to ensure consistency (Kelly, 2016). Also, different language groups may have different versions, which is acknowledged on Wolfe Creek National Park signage (Goldsmith, 2014: 396):

*A Jaru story tells of two rainbow snakes moving across the land ... **Gandimalal** is the place where one of the snakes came out of the ground. A **Walmajarri** story tells of a rainbow snake named **Karlputa** who came to **Gandimalal** from **Bidyadanga** (La Grange) on the coast south of Broome. The crater rim is where **Karlputa** has pushed up the ground. The central area of the crater is salty because **Karlputa** came from the sea. **Karlputa** still lies under the crater. ...*

A large serpent that emerges from the ground and shapes the earth is a common narrative among many Aboriginal groups, including in the nearby north Kimberley (Akerman, 2016). Creation by a falling star is not mentioned on the National Park signage. Since the crater was formed before Aboriginal presence in Australia, the star explanations can't be based on eye-witness accounts. They may have been deductions based on seeing 'falling stars', or were influenced by Western Science, or coincidentally align with Western Science (Hamacher and Goldsmith, 2013). Non-indigenous people first knew of the Wolfe Creek crater definitely by 1947 and possibly in 1935 (ibid). The star narratives might have appeared after that, and note that sometimes there is a falling star introduction to a rainbow snake Dreaming (see above).

- *water in the middle*

About water in the middle of the crater, Jack Jugarie said "*water don't stay, it go inside, go down to the river.*" (Goldsmith, 2014: 158). Boxer Miller describes how:

[That snake] came out right in the center of the crater. That's where the water comes from in the middle of the crater. It comes from Sturt Creek. Sometimes, you can see that snake. In the wet season you can see him. He appears like a big light in the middle of the water. ... The name of the snake is Kalpurtu". (Reeves-Sanday, n.d.: webpage).

Daisy Kungah provides some practical information:

This hole is not shallow — it goes down deep into the earth, all the way through to Red Rock on Sturt Creek. When rain falls the water rises up in the middle of the crater and you might sink down. Then the whole ground is soft and dangerous. ... In the dry time it is safe to go down, the ground is hard there. (Reeves-Sanday, n.d.: webpage)

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Wolfe Creek Crater by Barbara Sturt. Figure 92. p. 400

Wolfe Creek Crater and the Underground Tunnel by Barbara Sturt. Figure 103. p. 410

<https://espace.curtin.edu.au/handle/20.500.11937/665>

Jaru Elder Stan Brumby tells how bush women lived near the spring soak water in the centre of the crater near sugar leaf trees:

A star man comes and sees that bush women and he wants that sugar leaf so he comes down and that bush women runs away and that star man comes crashing into the earth and takes the sugar leaf and then he went into the earth never to come out again. That women comes back ... There is still a soak water hole in the middle of the crater and the sugar leaf today. (Goldsmith, 2014: 405, source Yarliyi Art Centre, Halls Creek).

<IMAGE>

Wolfe Creek Crater by Stan Brumby. . Figures 96 and 97. p. 404.

<https://espace.curtin.edu.au/handle/20.500.11937/665>

Other narratives highlight the danger of entering the hole. For example, from Barbara Sturt, born 1956 on Sturt Creek Station, Aboriginal artist (Reeves-Sanday, n.d.: webpage):

... one day an old man was hunting for bush tucker. He saw some little dingos with their mother. He chased that mother one... but the mother ran into the crater and climbed down into the hole in the center, where the underground river is. The old man followed. Later all the people were looking for that old man ... but he came out of that hole with all his skin scratched off.

So, the hole with water in the centre of Wolfe Creek crater is the subject of creation (Dreaming) and warning narratives. Geophysical surveys and modelling of the crater indicate that the true crater floor is 120 m beneath the present surface (O'Neill and Heine, 2011), so any hole accessed from the present floor may be relatively recent.

- *geology of Wolfe Creek*

In describing the geology of Wolfe Creek crater, Shoemaker et al. (2005: 529), lists "many striking features, including well-bedded ejecta units, crater-floor faults and sinkholes, a ringed aeromagnetic anomaly, rim-skirting dunes, and numerous iron-rich shale balls". Aboriginal narratives don't mention the variety of features, except for the central hole and the crater rim (see above). Ejecta rays are a topic for Henbury crater narratives in the Northern Territory, but not for Wolfe Creek. Also, the contemporary paintings of Wolfe Creek Crater which are subjects in the literature (Reeves-Sanday, n.d., Hamacher and Goldsmith, 2013), don't seem to exhibit the variety of features, and statements provided for the paintings don't identify them. However, sustained conversation with artists could uncover multiple nuances, for example, as provided in Neale (2017) for the Seven Sisters (The Pleiades).

- *falling star narratives for other sites*

Paruka (Lake Gregory) in the Kimberley, like Wolfe Creek Crater, is the subject of a falling star narrative. It is told in the Welcome Paruka brochure (Mulan and Mindibungu Aboriginal Corporations, n.d.), yet Bevan (2014) does not list Paruka as being a confirmed meteorite crater. Falling star narratives exist for Lake Argyle and a

location near Carnavon, both in WA, but again there are no confirmed impact craters associated with them (Hamacher, 2013). So, falling star impact narratives do not necessarily line up with the existence of craters (ibid).

The small Veevers Meteorite Crater in the Central Desert area of WA could be the subject of such a narrative since it is relatively young, less than 20 000 years BP, so the impact might have been witnessed by Aboriginal people (Hamacher and Norris, 2009). The same could apply to the Dalgaranga meteor impact site in the Murchison if its lower age estimate is accepted, <3000 years BP, but not if upper estimate is accepted, 270 000 years BP (Hamacher and O'Neill, 2013). Aboriginal narratives have not been identified for either Veevers or Dalgaranga (Hamacher and Goldsmith, 2013).



Dalgaranga Crater, September 2004, photo by Pat Forster



Veevers Crater, from Google Earth, downloaded 28/02/21.
<https://earth.google.com/web/search/Veevers+crater/>



References

- Akerman, K. 2016. *Wanjina. Notes on Some Iconic Ancestral Beings of the Northern Kimberley*. Carlisle, WA, Hesperian Press.
- Armstrong, F. 1836. Manners and habits of the Aborigines of Western Australia. *The Perth Gazette and Western Australian Journal*, 29 October 1836, 789-790.
<https://trove.nla.gov.au/newspaper/article/640230>.
- Baker, G., 1957. The role of australites in Aboriginal customs. *Memoirs of the National Parks of Victoria*, 22(8), 1-23.
- Barrows, T. T., Magee, J., Miller, G., and Figield, L. K., 2019. The age of Wolfe Creek meteorite crater (*Kandimalal*), Western Australia. *Meteoritics & Planetary Science* 54, 2686-2697.
<https://onlinelibrary.wiley.com/doi/10.1111/maps.13378>
- Basedow, H., 1925. *The Australian Aboriginal*. Brooklyn, NY, AMS Press.
- Bates, D., n.d. a. Myths and Legends of Southern W.A. <http://hdl.handle.net/2440/75983>
- Bates, D. n.d. b. Myths and Legends - Northwestern W.A. <http://hdl.handle.net/2440/75984>
- Bates, D.M. n.d. c. Magic, Myths, Legends. Murchison Tribes <http://hdl.handle.net/2440/76073>
- Bates, D., 1904-1912a. *Daisy Bates Collection*, Folio 26/113. Canberra, National Library of Australia.
- Bates, D. M. 1929. Warragunna, Jindabirbirr, and Joogajooga. A legend of Broome. *The Australasian*, Melbourne 9 March 1929, p. 6. p6 - 09 Mar 1929 - *The Australasian* (Melbourne, Vic. : 1864 - 1946) - Trove (nla.gov.au)
- Bayly, A.I.E. (1999). Review of how indigenous people managed for water in desert regions of Australia. *Journal of the Royal Society of Western Australia*, 82, Pp.17-25.
[https://www.rswa.org.au/publications/Journal/82\(1\)/82\(1\)bayly.pdf](https://www.rswa.org.au/publications/Journal/82(1)/82(1)bayly.pdf)
- Berndt, R.M., and Berndt C.H., 1974. *The First Australians*. Sydney, Ure Smith. (first printed 1952).
- Berndt, R.M., & Berndt C.H., 1989. *The Speaking Land: Myth and Story in Aboriginal Australia*. Ringwood, Victoria, Penguin Books
- Bevan, A.W.R. 2014. Some Australian contributions to meteoritics from the 19th to the 21st Centuries. *WA Science. Journal of the Royal Society of Western Australia*, 97, 237-252.
[https://www.rswa.org.au/publications/journal/97\(1\)/16.%20ROY%20SOC%2097.1%20BEVAN%20METEORITICS%20237-252%20LOW.pdf](https://www.rswa.org.au/publications/journal/97(1)/16.%20ROY%20SOC%2097.1%20BEVAN%20METEORITICS%20237-252%20LOW.pdf)
- Bevan, A.W.R., and Bindon, P., 1996. Australian Aborigines and meteorites. *Records of the Western Australian Museum*, 18, 93-101. <http://museum.wa.gov.au/research/records-supplements/records/australian-aborigines-and-meteorites>
- Blackwood, A., 2018. *The Caterpillar Dreaming Trail. Towards and Understanding of Conciliatory Landscapes*. PhD Thesis, University of Western Australia.
[file:///C:/Users/User/Downloads/THESIS_DOCTOR_OF_PHILOSOPHY_BLACKWOOD_Ailsa_Louise_2018%20\(5\).pdf](file:///C:/Users/User/Downloads/THESIS_DOCTOR_OF_PHILOSOPHY_BLACKWOOD_Ailsa_Louise_2018%20(5).pdf)
- Boyle, J., 2007. The Two Wise Men and the Seven Sisters.
<https://webarchive.nla.gov.au/awa/20040916011940/http://pandora.nla.gov.au/pan/41142/20040326-0000/www.ablnat.com.au/dream2/twowisem1.html>
- British Broadcasting Corporation, 2017. Stargazing Australia, Episode 1, Songlines of Indigenous Australians. Video. <https://www.bbc.co.uk/programmes/p04xx7s3>
- Brody, H., 2005. Inside Lake Ballard. In Gormley, A. (ed.). *Inside Australia*. London, Thomas and Hudson. Pp. 18-53.
- Brooks, C. 2007. Yiwarra Kuju, The Canning Stock Route. Juju: Telling our Stories through Painting, Song and Dance. Canberra, National Museum of Australia.
https://www.nma.gov.au/__data/assets/pdf_file/0018/19413/Yiwarra-Kuju-arts.pdf
- Carriageworks, n.d. Web page. <https://carriageworks.com.au/events/bali-bali-balga-alan-griffiths/>
- City of Fremantle and Mood jar Consultancy, 2016. Statements of Significance for the Fremantle Area and Registered Aboriginal Sites - Cantonment Hill, Rocky Bay and Swan River. City of Fremantle, WA.
https://www.fremantle.wa.gov.au/sites/default/files/Statements%20of%20Significance_Whadjuk%20Nyoongar.pdf
- City of Joondalup, n.d. Joondalup Mooro Boodjar. Brochure. <https://www.joondalup.wa.gov.au/wp-content/uploads/2018/01/Joondalup-Mooro-Boodjar.pdf>

- Clarke, P.A., 2014. The Aboriginal cosmic landscape. Part 1: The ethnobotany of the skyworld. *Journal of Astronomical History and Heritage*, 17(3), 307-325. <http://www.aboriginalastronomy.com.au/research/papers/>
- Clarke, P.A., 2019. Australites. Part 2. Early Aboriginal perception and use. *Journal of Astronomical History and Heritage*, 22(1), 155-178. <http://www.aboriginalastronomy.com.au/research/papers/>
- Coates, E., and Sullivan, G., 2013. *We Don't Need a Map*. Exhibition catalogue. Fremantle, WA, Fremantle Arts Centre.
- Collard, L.M., 2009. Djidi, wardong, kulbardi, walitj and weitj: Nyungar Dream time messengers. *Westerley*, 54(2), 7-26. <https://westerlymag.com.au/wp-content/uploads/2017/07/WesterlyVol.54Leonard-M.Collard.pdf>
- Cotterell, A., 2003. *A Dictionary of World Mythology*. Oxford, England, Oxford University Press. <https://www.oxfordreference.com/view/10.1093/oi/authority.20110803121314255>
- Curr, E.M., 1886. *The Australian Race: Its Origin, Languages, Customs, Place of Landing in Australia, and the Routes by Which It Spread Itself over That Continent, Volume 1*. Melbourne, J. Ferres.
- Day, L., and Morrissey, K., 1995. *Drawn to Mt Magnet, Wannars, Dolly Pots, Shears*. Mt Magnet, WA, Shire of Mt Magnet.
- Desert River Sea, n.d.
 Marriage Laws, 2011, by Burgu, <https://desertriversea.com.au/art/387>;
 Gamkeny Ngarranggarni, 2010, by Juli <https://desertriversea.com.au/art/155> ;
 Theliny Theliny-Warriny, Two Mothers for the Moon, 2012, by Peters <http://desertriversea.com.au/art/248>
 Bali Balga, by Alan Griffiths 2012 <https://desertriversea.com.au/art/10>
- Dowling, C.S., 2017. Find One of Your Own Kind: Auto-ethnography and my Aboriginal Women Ancestors. Ph.D. Thesis, Curtin University. <https://espace.curtin.edu.au/bitstream/handle/20.500.11937/73585/Dowling%20C%202017.pdf?sequence=1&isAllowed=y>
- Durack, M., 1969. *The Rock and the Sand*. London, Constable.
- Durack, E. 1948. Time and tide: the story in pictures of Roebuck Bay N. W. Australia; commentary by Mary Durack. Perth, Imperial Print. http://www.elizabethdurack.com/artworks_series.php?series_id=37
- Duwell, M., Dixon, R.M.W., 1994. *Little Eva at Moonlight Creek and other Aboriginal Song Poems*. Brisbane, University of Queensland Press.
- Elkin, A.P., 1977. *Aboriginal Men of High Degree*, 2nd Edition. St. Lucia, University of Queensland Press.
- Estrangin Gallery, n.d. Web page. Nungabar <http://www.aboriginalsignature.com/martumiliartpeintureaborigene/nora-nungabar-country-around-the-canning-stock-route-152-x-76-cm-13-282>
- Forlana, P., n.d. From the skies. Sculpture. <https://www.perthairport.com.au/Home/corporate/community-and-environment/public-art-program/a-sense-of-arrival>
- FORM, 2019. Bugai Exhibition Catalogue. FORM, Claremont, WA.
- Fuller, R.S., Trudgett, M., Norris, R.P., and Anderson, M.G., 2014a. Star maps and travelling to ceremonies: the Euhlayi people and their use of the night sky. *Journal of Astronomical History and Heritage*, 17(2), 149-160. <http://www.aboriginalastronomy.com.au/research/papers/>
- Fuller, R.S., Anderson, M.G., Norris, R.P., and Trudgett, M., 2014b. The emu sky knowledge of the Kamilaroi and Euhlayi peoples. *Journal of Astronomical History and Heritage*, 17(2), 171-179. <http://www.aboriginalastronomy.com.au/research/papers/>
- Goldsmith, J.M., 2014. Cosmos, Culture and Landscape : Documenting, Learning and Sharing Aboriginal Astronomical Knowledge in Contemporary Society. Ph.D. Thesis, Curtin University. <https://espace.curtin.edu.au/handle/20.500.11937/665>
- Grey, G., 1840. *A Vocabulary of the Dialects of South Western Australia*. London, T. & W. Boone, https://books.google.com.au/books/about/A_Vocabulary_of_the_Dialects_of_South_We.html?id=ue8UAAAYAAJ&redir_esc=y
- Grey, G., 1841. *Journeys of Two Expeditions of Discovery in North-West and Western Australia during the Years 1837, 38, and 39, Vol 2.* , London, T. & W. Boone. <http://gutenberg.net.au/ebooks/e00055.html>
- Hamacher, D.W., 2013. Recorded Accounts of Meteoritic Events in the Oral Traditions of Indigenous Australians. *Archaeoastronomy*, 25, 99-111. <http://www.aboriginalastronomy.com.au/research/papers/>

- Hamacher D., 2011. The Coal Sack and the "Emu in the..." er, I mean... the "Llama in the Sky"?! <https://aboriginalastronomy.blogspot.com/search?q=coal>
- Hamacher, D.W., 2013. Aurorae in Australian Aboriginal traditions. *Journal of Astronomical History and Heritage*, 16(2), 207-219. <http://www.aboriginalastronomy.com.au/research/papers/>
- Hamacher, D.W., Barsa, J., Passi, S., and Tapim, A., 2019. Indigenous use of stellar scintillation to predict weather and seasonal change. *The Royal Society of Victoria*, 131, Pp. 24–33. <http://www.aboriginalastronomy.com.au/research/papers/>
- Hamacher, D.W., and Goldsmith, J., 2013. Aboriginal oral traditions of Australian impact craters. *Journal of Astronomical History and Heritage*, 16(3), 295-311.
- Hamacher, D.W., and Norris, R.P., 2009. Australian Aboriginal geomythology: eyewitness accounts of cosmic impacts? *Archaeoastronomy*, 22, 60-93. <http://www.aboriginalastronomy.com.au/research/papers/>
- Hamacher, D.W., and Norris, R.P., 2011. Eclipses in Australian Aboriginal astronomy. *Journal of Astronomical History and Heritage*, 14(2), 103-114. <http://www.aboriginalastronomy.com.au/research/papers/>
- Hamacher D.W., and O'Neill, C., 2013. The discovery and history of the Dalgarranga meteorite crater, Western Australia. *Australian Journal of Earth Sciences*, 60(5), 637-646. <http://www.aboriginalastronomy.com.au/research/papers/>
- Hassell, A.Y., n.d. My Dusky Friends: Sketches of the South Eastern Natives of Western Australia. Journal. Mitchell Library, Sydney. <https://indigenous.sl.nsw.gov.au/collection-items/my-dusky-friends-sketches-south-eastern-natives-western-australia-1861-1910>
- Hogg, E.G., 1935. The Moon and the Weather. *Journal of the Royal Astronomical Society of Canada*, 29, 108-111. <http://adsabs.harvard.edu/full/1935JRASC...29..108H>
- Hoogland, F., n.d. The story of two sisters. Webpage. <http://www.goolarabooloo.org.au/dreamtime.html>
- James, D., 2009. *Painting the Song, Kaltjiti Artists of the Sand Dune Country*. Melbourne, McCulloch and McCulloch.
- James, D. 2013. Signposted by song: cultural routes of the Australian Desert. *Historic Environment* 25(3): 30-42. <https://australia.icomos.org/publications/historic-environment/he-vol-25-no-3-2013-connecting-cultures-and-continents-the-heritage-of-routes-and-journeys-1/>
- James, D., n.d. Long History, Deep Time. 2. Tjukurpa Time, webpage. <https://press-files.anu.edu.au/downloads/press/p319821/html/ch02.xhtml?referer=&page=10>
- Jorgenson, D., n.d. The cosmologists of Mowanjum. In Acker, T., and Tasker, S. (eds.), *Sharing Difference on Common Ground*. Catalogue. East Perth WA, Holmes a Court Gallery.
- Petri, H., 1954. *Sterbende welt in nordwest-Australien*. Braunschweig, Limbach Verlag.
- James, D., 2015. Tjukurpa time. In McGrath, A., Jebb, M.A., (eds.). *Long History, Deep Time*. Canberra, ANU Press. Pp. 33-45. <https://press-files.anu.edu.au/downloads/press/p319821/pdf/book.pdf>
- Johnson, D., 2014. *Night Skies of Aboriginal Australia. A Noctuary*. Sydney University Press. First published in 1998 by Oceania Publications. http://www.aboriginalastronomy.com.au/wp-content/uploads/2018/05/Night_Skies.pdf
- Juluwarlu Aboriginal Corporation, 2008. *Ngurra Wardurala Buluyugayi Wuyumarri. Exploring Yinjibardi Country – Gregory Gorge*. Roebourne WA, Juluwarlu Aboriginal Corporation.
- Kaberry, P.M., 1939. *Aboriginal Women: Sacred and Profane*. London, Routledge.
- Kerwin, D.W., 2006. Aboriginal Dreaming Tracks or Trading Paths: The Common Ways. Ph.D. Thesis, Griffith University. <https://research-repository.griffith.edu.au/handle/10072/386276>
- La Fontaine, M., and Carty, J. (eds), 2011. *Ngurra Kuju Walyja, One Country One People, Stories from the Canning Stock Route*. South Yarra Vic, Macmillan Publishers.
- Leaman, T.M., & Hamacher, D.W., 2014. *Journal of Astronomical History and Heritage*, 17(2), 180 -194. <http://www.aboriginalastronomy.com.au/research/papers/>
- Lommel, A. 1997. *The Umambal: a Tribe in Northwest Australia*. Sydney, Takarakka Publications.
- Lowe, P., and Pike J., 1990. *Jilji life in the Great Sandy Desert*. Broome, Magabala Books.
- Lyon, R., 1833. A glance at the manners, and language of Western Australia; with a short vocabulary. *Perth Gazette and Western Australian Journal*; 6/4/1833, p. 56; 13/4/1833, Pp. 59-60; 20/4/1833, Pp. 63-64. https://en.wikisource.org/wiki/The_Perth_Gazette_and_Western_Australian_Journal/Volume_1
- Macfarlane, I., and McConnell, A., 2017. The Waters of Australian Deserts' Cultural Heritage Study. Report to the Australian Government Department of Environment and Energy and the Australian Heritage Council. <http://www.environment.gov.au/system/files/resources/ef91ad97-f6dc-42b6-b3ca-df1f96c9e089/files/waters-australian-deserts.pdf>

- McDonald, Hales and Associates, 1997. Indigenous Heritage Sites. Site Id. JBE#1. City of Cockburn, WA. <https://www.derbalnara.org.au/IndigenousHeritageSites.pdf>
- Macintyre, K., and Dobson, B., 2017. Daytime Reckoning: "Light time" in Traditional Noongar Culture. Web page. <http://anthropologyfromtheshed.com/project/light-time-traditional-noongar-culture/>
- Macintyre, K., Dobson, B., Hayward-Jackson, I., 2020. The Science of the Dark and Light Seasons in Nyungar Culture. <https://anthropologyfromtheshed.com/project/thescience-of-the-dark-andlight-seasons-in-yungarculture/>
- Martumili Artists, n.d. Web page. Biljabu <https://martumili.com.au/node/60> ; Nugabar <https://martumili.com.au/node/72>
- Martumili Artists, 2017. Wilarra. Collaborative painting. In Martumili Artists and Spinifex Hill Artists, Pujiman. Exhibition catalogue.
- Martumili Artists and the Australian National University, 2016. Minyipuru: Waters of the Songline. Video. <https://vimeo.com/347197786>
- Moore, G.F., 1842. *A Descriptive Vocabulary of the Language in Common Use by the Aborigines of Western Australia*. London, WM. S. Orr and Co. https://books.google.com.au/books?id=1e8UAAAAAYAAJ&printsec=frontcover&dq=George+Fletcher+Moore&hl=en&ei=cY39TKLJEI30cf7SrMAG&sa=X&oi=book_result&ct=result#v=onepage&q&f=false
- Moore, G.F., 1884. *Diary of Ten Years Eventful Life of an Early Settler in Western Australia; and also A Descriptive Vocabulary of the language of the Aborigines*. London, M. Walbrook. <https://ia802604.us.archive.org/20/items/diaryoftenyearse00moorials/diaryoftenyearse00moorials.pdf>
- Mountford, C.P., 1973. European folk-lore in Australian mythology. In K. Tauchmann (ed.), *Festschrift zum 65. Geburtstag von Helmut Petri*. Köln, Germany, Bohlau Verlag. Pp. 360–371
- Mountford, C.P. 1976. *Nomads of the Australian Desert*. Adelaide: Rigby.
- Mowaljarlai, D., and Malnic, J., 1993. *Yorro: Aboriginal Creation and the Renewal of Nature: Rock Paintings and Stories from the Australian Kimberley*. Broome, Magabala Books Aboriginal Corporation.
- MS Textiles Australia, n.d. Dancing Spirit. Webpage. <https://www.mstextilesaustralia.com/product/dancing-spirit-purple-by-colleen-wallace/>
- Muir, K., 2012. Aboriginal Heritage Survey Report Consultations on Die Hardy Range & Red Legs Exploration Drilling Programme with Ngalia People for Southern Cross Goldfields. Aboriginal Heritage Consultants Pty Ltd, Leonora, WA. https://consultation.epa.wa.gov.au/seven-day-comment-on-referrals/marda-east-gold-project/supporting_documents/App%20K%20%20Cultural%20Heritage%20Reports.pdf
- Mulan and Mindibungu Aboriginal Corporations, n.d. Welcome Paruka brochure. Halls Creek NT, Mulan and Mindibungu Aboriginal Corporations. <https://static1.squarespace.com/static/59fecece017db2ab70aa1874/t/5a7be2078165f5f6263856d7/1518068299850/paruku-visitors-information-guide.pdf>
- Museum of Contemporary Art Australia, n.d. Gamkiny Ngarranggami, 2016, by Juli <https://www.mca.com.au/artists-works/works/2016.34/>
- Nannup, N., 2008. Carers of everything. In Morgan S., Mia T., and Kwaymullina, B. (eds), *Heartsick for Country, Stories of Love, Spirit and Creation*. North Fremantle WA, Fremantle Press. Pp. 95-111. https://books.google.com.au/books?id=3xZuHuvx_F4C&q=star#v=snippet&q=star&f=false
- Nannup, N., 2018. In Blackwood, A., *The Caterpillar Dreaming Trail. Towards and Understanding of Conciliatory Landscapes*. PhD Thesis, University of Western Australia, 3
- Nannup, N., 2020. Vision for Meeka Moorart Full Moon Celebration. Video. https://www.youtube.com/watch?v=I2_K1HFxocY
- Mountford, C.P., 1976. *Nomads of the Australian Desert*. Adelaide, Rigby
- NASA, a. webpage. <https://solarsystem.nasa.gov/asteroids-comets-and-meteors/asteroids/overview/>
- NASA, b. webpage. https://solarsystem.nasa.gov/asteroids-comets-and-meteors/meteors-and-meteorites/overview/?page=0&per_page=40&order=id+asc&search=&condition_1=meteor_shower%3Abody_type
- NASA, c. webpage. <https://solarsystem.nasa.gov/asteroids-comets-and-meteors/asteroids/overview/>
- Natale, A.R., 2012. The Pleiades and the Dreamtime: an Aboriginal Women's Story and Other Ancient World Traditions. *Coolabah*, 9, 113-127. <https://revistes.ub.edu/index.php/coolabah/article/viewFile/15648/18765>
- National Gallery of Australia, n.d. Namarari Tjapaltjarri M., Sunrise chasing away the night 1977-78 <https://artsearch.nga.gov.au/detail.cfm?im=5953>

- National Museum of Australia, n.d. a. Walinya rock art Home - Walinynga rock art (nma.gov.au); Wati Nyiru rock Wati Nyiru rock - Walinynga rock art (nma.gov.au)
- National Museum of Australia, n.d. b. Kungkarrangkalnga-ya Pampakanu, 2015. Interactive webpage. <https://songlines.nma.gov.au/tjanpi>
- Neale, M., 2017 (ed.). *Songlines: Tracking the Seven Sisters*. Canberra ACT, National Museum of Australia Press.
- Norris, R.P., 2016. Dawes review 5: Australian Aboriginal astronomy and navigation. *Publication of the Astronomical Society of Australia (PASA)*, 33, 1-39. <http://www.aboriginalastronomy.com.au/research/papers/>
- Northover, J., n.d. Minningup Pool. Language | Kaardijin Noongar (noongarculture.org.au)
- O'Brien, M., 2009. *The Legend of the Seven Sisters*. Aboriginal Studies Press, Canberra, ACT.
- O'Connor, M.H., and Prober, S.M., 2010. A Calendar of Ngadju Seasonal Knowledge. A report to Ngadju Community and Working Group. CSIRO Sustainable Ecosystems, Floreat, WA. <https://www.csiro.au/en/Research/Environment/Land-management/Indigenous/Indigenous-calendars/Ngadju>
- O'Neill, C., and Heine, C., 2011. Reconstructing the Wolfe Creek meteorite impact: deep structure of the crater and effects on target rock. *Australian Journal of Earth Sciences*, 52(405), 699-709. <https://www.tandfonline.com/doi/abs/10.1080/08120090500170450>
- Parke, E., 2019. Why Wolfe Creek Crater Attracts Scientists, Indigenous Traditional Owners and Horror Movie Fans. Australian Broadcasting Corporation web page. <https://www.abc.net.au/news/2019-07-07/the-three-stories-of-wolfe-creek-crater/11274576>
- Petri, H., 1954. *Sterbende welt in nordwest-Australien*. Braunschweig, Limbach Verlag.
- Palmer, K., 2016. *Noongar People, Noongar Land, The Resilience of Aboriginal Culture in the South West of Western Australia*. Anthropological report for native title claim. Canberra, ACT, Australian Institute of Aboriginal and Torres Strait Islander Studies. http://aiatsis.gov.au/sites/default/files/products/monograph/noongar-people-noongar-land_2.pdf
- Parker, K. Langloh, 1898. *More Australian Legendary Tales*. London, David Nutt; Melbourne, Melville, Mullen and Slade. https://en.wikisource.org/wiki/Australian_Legendary_Tales
- Parliament of Western Australia, n.d. Webpage. Seasonal Hunters by Noongar Tjyllyungoo Lance Chadd. Painting. <http://www.parliament.wa.gov.au/parliament/artcollect.nsf/WebPP/2914E0AA48224C40C825735C000C7263?opendocument>
- Peggs, A.J., 1903. Notes on the Aborigines of Roebuck Bay, Western Australia. *Folklore*, 14(4), 324-387.
- Petterson, C., 2007. *Koodjal-Koodjal Djookan, Four Sisters: the Legend of the Southern Cross*. Batchelor NT, Batchelor Press.
- Piddington, R., 1932. Karadjeri Initiation, *Oceania*, Vol. 3, 46-87.
- Reeves-Sanday, P., 2007. *Aboriginal Paintings of the Wolfe Creek Crater: Track of the Rainbow Serpent*. Philadelphia, University of Pennsylvania Press.
- Reeves-Sanday P., n.d. Track of the Rainbow Serpent, Australian Aboriginal Paintings of the Wolfe Creek Crater. Painting Gallery webpage. <https://web.sas.upenn.edu/psanday/exhibition/painting-gallery/>
- RMIT University, n.d. Gamkiny: Constellations of Meaning, video. [Gamkiny: Constellations of Meaning | RMIT University - YouTube](https://www.youtube.com/watch?v=...)
- Roberts, A., and Mountford, C.P., 1974. *The Dreamtime book: Australian Aboriginal Myths*. Adelaide, Sydney, Rigby. (first published in 1973).
- Robertson, F., Stasiuk, G., Nannup, N., and Hopper S. D., 2016. Ngalak koora djinang (looking back together): a Nyoongar and scientific collaborative history of ancient Nyoongar boodja. *Australian Aboriginal Studies*, 1, 40-54. [https://www.thefreelibrary.com/Ngalak+koora+koora+djinang+\(looking+back+together\)%3A+a+Nyoongar+and...-a0459804741](https://www.thefreelibrary.com/Ngalak+koora+koora+djinang+(looking+back+together)%3A+a+Nyoongar+and...-a0459804741)
- Roe, J.S., 2014. In Hercock, M.H. (ed.). *The Western Australian Explorations of John Septimus Roe 1829 – 1849*. Victoria Park WA, Hesperian Press.
- Róheim, G., 1945. *The Eternal Ones of the Dream. A Psychoanalytic Interpretation of Australian Myth and Ritual*. New York, International Universities Press. <https://ia800307.us.archive.org/34/items/eternalonesofdre00rohe/eternalonesofdre00rohe.pdf>
- Róheim, G., 1971. *Australian Totemism: a Psycho-analytic study in Anthropology*. New York, Humanities Press.

- Rose, R., 1957. *Living Magic: The Realities Underlying the Psychical Practices and Beliefs of Australian Aborigines*. London, Chatto and Windus.
- Salisbury, S.W., et al., 2016. The Dinosaurian Ichnofauna of the Lower Cretaceous (Valanginian–Barremian) Broome Sandstone of the Walmadany Area (James Price Point), Dampier Peninsula, Western Australia, *Journal of Vertebrate Paleontology*, 38 sup1, 1-152. <https://doi.org/10.1080/02724634.2016.1269539>
- Salvado, R., 1977. *The Salvado Memoirs: Historical Memoirs of Australia and Particularly of the Benedictine Mission of New Norcia and of the Habits and Customs of the Australian Natives*. Trans. E.J. Stormon. Nedlands, WA, University of Western Australia Press. Original edition, 1853
- Scott, K., n.d.. A Whisper in Stone. Essay. https://espace.curtin.edu.au/bitstream/handle/20.500.11937/37018/189371_189371.pdf?sequence=2
- Shire of York, n. d. York and Surrounding Districts Scenic Self-Drive Routes. Tour No 9. Brochure. York, WA, Shire of York, http://www.york.wa.gov.au/Assets/Documents/Content/information/tours/Self_Drive_Tour_No_9_Beverley__County_Peak_YIS.pdf
- Shoemaker, E.M., Macdonald, F.F., and Shoemaker, C.S. (2005). Geology of five small Australian impact craters. *Australian Journal of Earth Sciences*, 52(4-5), 529-544. https://francismacdonald.fas.harvard.edu/files/fmacdonald/files/2005_australian_impact.pdf
- South West Aboriginal Land and Sea Council, n.d. Margaret River Pre-Contact. Web page. <https://www.noongarculture.org.au/margaret-river-pre-contact/?searched=yes>
- Tate, R., 1879. Anniversary address of the president. *Transactions and Proceedings of the Royal Society of South Australia*, 2, xxxix–lxxv.
- Taylor, C, 2011. Nyiru. Video. Nyiru, A Short Film by Curtis Taylor - YouTube
- The Australian Museum, n.d. Tektites. Web page. <https://australianmuseum.net.au/learn/minerals/shaping-earth/tektites/>
- The Colonist, 1838. Swan River: Meteors, 11 July, 3. <https://trove.nla.gov.au/newspaper/article/31721340/4246054>
- Thieberger, N., 2017. Digital Daisy Bates. <http://bates.org.au/text/43-055T.html>
- Tindale, N.B., 1935. Unpublished fieldwork notes. South Australia Museum, Adelaide. Catalogue Number aa318/1/14. Pp. 457–459.
- Tindale, N.B., 1936. Legend of the Wati Kutjara, Warburton Range, Western Australia, *Oceania*, 7(2), 169-185. <https://ur.booksc.eu/reader/60579753>
- Tindale, N.B., 2005. Celestial Lore of Some Australian Tribes. In Chamberlain, V.D., Carlson, J.B., and M. J. Young, M.J. (eds.). *Songs from the Sky: Indigenous Astronomical and Cosmological Traditions of the World*. Oxford, Ocarina Books, Pp. 358-379.
- Tindale, N.B., and George, B., 1976. *Australian Aborigines*. Reprint Lloyd O'Neil, Windsor, New South Wales. First published Golden Press, Sydney 1971.
- Utemorrah, D., Umbagai, E., Algarra, B., Wungunyet J., and Mowaljarlai, D., 1980. *Visions of Mowanjum: Aboriginal Writings from the Kimberley*. Adelaide, Rigby.
- Walley, R., 2020. What is Danjoo Koorliny? Video. <https://www.youtube.com/watch?v=3gORRCouIQ4>
- Walley, T., 2013. *Mardamg Waakar-ak*. Batchelor NT, Batchelor Press.
- Wangka Maya Pilbara Aboriginal Language Centre, 2009. Kumpaya Girgiba paints her country. Webpage. https://marnti-warajanga.moadoph.gov.au/kumpaya_girgiba.html
- Welch, D.M., 2017. *The Two Lizard-Men - Aboriginal Children's Book*. Coolalinga, N.T., David M. Welch
- White, M.I., 1975. Sexual conquest and submission in the myths of central Australia. In L.R. Hiatt (ed.). *Australian Aboriginal Mythology*, Australian Institute of Aboriginal Studies, Canberra.
- Winmar, K., 2009. *Moodjar Yok, The Christmas Tree Woman; Djinda Widariny, Star Dancer*. Batchelor NT, Batchelor Press.
- Withnell, J.G., 1901. The Customs and Traditions of the Aboriginal Natives of North Western Australia. Amateur ethnography. <https://www.sacred-texts.com/aus/cat/cat.htm>
- Worms, E.A., and Petri, H., 1998. Australian Aboriginal Religions. *Nelen Yubu Missiological Series No. 5*. Kensington, Nel-en Yubu Missiological Unit. Revised edition.