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ASTRONOMY AND THE DREAMING:
THE ASTRONOMY OF THE ABORIGINAL AUSTRALIANS

THE WORLD'S FIRST ASTRONOMERS

The Aboriginal Australians were arguably the world's first astronomers. Their complex systems of knowledge and beliefs about the heavenly bodies evolved as an integral part of a culture which has been transmitted through song, dance and ritual over more than 40,000 years, predating by many millennia those of the Babylonians (who probably developed the zodiac familiar to Western cultures in about 2000 BC), the ancient Greeks, the Chinese, the Indians and the Incas. More importantly for our understanding of their significance, Aboriginal beliefs survived, until very recently, within a complete cultural context. It is impossible for us to understand what hunter-gatherer Europeans thought when they looked up at the northern constellations some 15,000 years ago, for we have no access to the body of knowledge which provided the context for their ideas about the stars. Even the beliefs and legends associated with Babylonian, Greek and Roman astronomy have come to us only as isolated stories, divorced from the culture of which they were an integral part so that we can not appreciate the complex resonances they carried for those whose stories they were.

However, for one broad cultural group, the Aboriginal Australians, we can, at least partially, reconstruct the context from which their star legends derived their meaning.

CULTURAL CONTEXT

From nineteenth and early twentieth century accounts of Aboriginal culture we know that their beliefs about the stars were located within a social and value system which both developed from and accounted for the brilliant nightly spectacle of the southern sky, the daily reappearance of the sun and the phases of the moon. Astronomy, in the sense of a comprehensive and coherent body of knowledge about the stars, was an integral component of Aboriginal culture, not a discrete body of knowledge. Like the Newtonian-based system of Western science, it represented an attempt to construct a view of the universe as an

ordered and internally consistent system and hence to obtain some sense of control over the natural world. But in most ways it was fundamentally different in its premises and procedures.

Because the Aborigines were not interested in positional astronomy for its own sake, but only as an aspect of something much broader, their understanding of the constellations was relational rather than mathematically based. Indeed, traditional Aboriginal culture paid no attention to the two basic Western concepts of numeracy and temporality; they made no measurements of space or time, nor did they engage in even the most elementary mathematical calculations. For the same reasons they were concerned with similarity rather than with difference, with synthesis rather than analysis, and with symbiosis rather than separation. Thus natural phenomena, whether terrestrial or celestial, were regarded as existing within an all-encompassing relationship which both sustained, and was sustained by, traditional rituals. The social obligations within the community were projected on to and reinforced by their celestial correlatives. To understand the interconnectedness of this Aboriginal world view and the place of astronomical knowledge within it, it is necessary to refer to the 'Dreaming'.

The term 'the Dreaming', derived from an early attempt to translate the Aranda word *Alcheringa* (derived from the word *altjerri*, to dream), expresses a concept common to many, if not all, Aboriginal groups and languages (Figure 1). However, such a linking with the European notion of dreaming should not be taken to mean something unreal, arbitrary, individual or ephemeral. On the contrary, the Dreaming denotes an ever-present reality, a dimension more real and fundamental than the physical world, which is merely temporal and contingent.

Unlike the myths of origin of most religions, Aboriginal creation stories locate the creative power not remotely in the heavens, but deep within the land itself. Originally, it is believed, the land was flat and featureless and the sky was always dark, but during the Dreaming the Ancestors, creative spirits, emerged from the land or sky, taking the form of men and animals, or even inanimate elements such as fire and water. By their presence and actions, and particularly by their epic journeys, they created the landforms, the celestial bodies, and all the living creatures we know today. The Dreaming is not confined to the past but is eternally present, and hence land, sky, animals, plants and human beings are united spiritually through the continued indwelling presence of the Ancestors.

It is significant in this regard that the Aborigines had no myth of alienation from Nature, such as the Judaeo-Christian story of expulsion from Eden. On the contrary they believed that through the evocation in ritual of their Great Ancestors of the Dreaming, they too were co-creators of the natural world, humanising its non-human elements (including the heavenly bodies) and, in the process, partaking of its universality.

Thus unlike the Western discipline of astronomy, discrete from terrestrial phenomena except in its reliance on the same physical laws, the Aborigines' knowledge of the heavens was intimately connected with all aspects of their



Figure 1 Map of Australia showing places and Aboriginal groups mentioned in the text

cultural life. It was a palimpsest of observation, song cycles, dance, art, ritual, social organisation and group identity.

In this article I shall, for convenience, discuss astronomical observation, the calendrical use of such knowledge and its mythological extensions as separate frames of knowledge, but it must be stressed from the outset that this is a concession to Western, analytic ways of thinking and organising material, and bears no relation to the complex, many layered understanding of the indigenous people living in the traditional ways and initiating their children into the secret-sacred knowledge of the clan.

Like scientific theories, Aboriginal myths are attempts to understand the universe in terms compatible with their cultural focus. For Western societies this focus is rational, material and abstract, grounded in the laws of physics and chemistry, in measurements of linear distance and linear time. In such a system the acceptability of astronomical observations and explanations depends on measurement and compatibility with acknowledged physical laws. For traditional Aboriginal cultures, such parameters were of little significance; they were, in fact, arbitrary, being always modified by social requirements. The distance from one place to another was a function of the time taken to reach it and that, in turn, was entirely contingent on the events that occurred en route, the people, animals and plants encountered, the mood of the traveller, etc. It is therefore not surprising that explanations of the celestial bodies, like those of terrestrial landforms, were based on the parameters of social organisation – on kinship laws, on marriage systems, on gender divisions of labour and social behaviour, and on ritual obligations. These were the unchanging primary characteristics and fundamental beliefs of their world, as weight, measurement and the Big Bang theory are in scientific societies. By extrapolating from social laws to celestial ones, projecting a social model on to the sky, Aboriginal peoples were, like Western scientists, proceeding from the known to the less well known on the assumption that the universe is inherently consistent. Both knowledge sets are constructs, evolved to make sense of the universe and hence to domesticate it, to make immensity bearable by analogy with the familiar and comprehensible.

There were many different kinds of stories: those that were primarily concerned to explain the origins of phenomena and beliefs; those that had a predictive function, reminding the group through narrative correlations between celestial and terrestrial events that certain functions had to be performed at specific times; and those that served an educative function in terms of enforcing socially sanctioned behaviour, values and morality.

MYTHS OF ORIGIN

The Aboriginal Australians were not concerned to explain everything celestial and terrestrial, but only those things that had material or ritual significance. Such explanations in turn legitimated and reinforced patterns of social behaviour or ritual observance. The myths associated with origins, being almost invariably associated with culture heroes, the Ancestors of the Dreaming,

dignified and personalised the universe and everything in it in a way that has no parallel in the impersonal constructs of Western science. Most of the Ancestors were associated with the land and its features, and their spirit beings were believed to remain indwelling in the land where their last major encounter with other figures of the Dreaming took place; but there were also many mythological figures associated with the creation of the sky and specific constellations. Amongst the Boorong people of western Victoria, it was believed that Gnowee, the sun, was made by Pupperimbul, one of the Nurrumbunguttias, or old spirits, who were removed to the heavens before the advent of *homo sapiens*. The earth was in perpetual darkness until Pupperimbul prepared an emu egg which he threw into space, where it burst, flooding the sky with light. Variations of this story are found in many areas of eastern Australia, but in Boorong mythology, Gnowee is closely related by kinship to other celestial bodies: Chargee Gnowee, Venus, is the sister of the sun and wife of Ginabongbearp, Jupiter (Stanbridge, 1861: 301). Thus the celestial bodies reflect family relationships, thereby both dignifying the latter as an integral part of the cosmos and familiarising the sky.

The Needwoonee people of southwest Tasmania identified neither the sun nor the moon with the creation of Trowenna (Tasmania), but rather a star, Moihernee (or Moinee), once the star child of Parnuen, the sun, and Vena, the moon. Moinee shaped the land into rivers and islands and then pulled the first man, Parlevar, out of the ground, but during a fight with his brother Dromerdene (Canopus) both the star sons fell from the sky, Moinee to the earth where he can be seen as the tall standing stone at Cox Bight in the southwest of the island, and Dromerdene into the sea at the adjacent inlet, Louisa Bay (Plomley, 1966: 118; Coon, 1976: 320–1).

OWNING STORIES

Because understanding of the sky, as of everything, was conceptual rather than perceptual, accessible only through initiation into the lore of the community not through individual observation and rational endeavour, knowledge was the province of the elders, to be passed on to initiates at such times as they were considered ready to receive it. Readiness was determined not on intellectual ability but on cultural maturity assessed across a wide range of skills. Thus both the stories and, even more, the understanding of what they meant, were 'owned' by the fully initiated men and women and passed on in stages to the youths and girls. Some stories were the exclusive secret-sacred property of initiated men; they had male heroes as the central characters and were to be sung and danced only in strict isolation from women. On the other hand, some stories, notably those focussing on the Pleiades, were the preserve of women. These often involved motifs of pursuit, rape and sexual fears and fantasies. Others were categorised as being mainly for men, with women playing inferior roles in their dramatisation and vice versa. Others again were shared equally by men and women. However, this alleged screening of knowledge has been challenged by the work of the anthropologist Isobel White who concluded that

'in this question of knowing or not knowing, it is not the actual knowledge that matters, but what one is permitted to know' (White, 1975: 126).

Besides having such gender divisions, the stories evolved by separate groups were often quite distinct from those of neighbouring areas, particularly when the cultural focus was different. Coastal peoples have numerous sky stories involving fishing, canoes and storms, while these aspects are understandably absent from the stories of inland groups. But even groups living in close proximity may evolve quite distinct stories. Thus the Meriam people who live on three islands at the eastern end of Torres Strait place great emphasis on the vast constellation of Tagai which embraces the European constellations of Sagittarius, Scorpio, the Southern Cross, Lupus, Corvus and part of Hydra. Tagai represents a fisherman standing in a canoe (the body and tail of Scorpio), holding a three-pronged fishing spear (the Cross) and a fruit (Corvus) (Sharp, 1993: 3-4). Tagai is part of a myth involving twelve crewmen (the Pleiades and three stars of Orion's belt) and the procession of Tagai through the sky was associated with the ushering in of the 'seasons' of the Meriam year, involving fishing, gathering and ceremonial performances. However, the people of Mabuig and Muralag Island in the western part of Torres Strait, while retaining the significance of Tagai, also developed a range of other myths involving the constellations of Baidam, the shark (Ursa Major, Arcturus and Gamma Corona Borealis), Bu, the trumpet shell (Delphinus), Dogai, a frightening female (Altair and Beta and Gamma Aquilae), Dideal (Orion) and Usal (the Pleiades).

Modifying this separate local evolution of myth was the sharing of non-secret-sacred stories at meetings of clan groups and by Aborigines passing along trade routes and sharing some of their cultural inheritance. We can see evidence of this in the progressive changes in stories in locations across the continent. Myths involving the Pleiades, characterised as the Kungkarunkara women with their dingoes, have been recorded in slightly varied form and with minor name changes across the Western Desert and into Central and South Australia. The name given to the Seven Sisters changes from Kunkarunkara to Kunkarangkalpa and the name given to their pursuer (Orion) varies from Jula to Njiru to Nirunja (Mountford, 1976: 462).

OBSERVATIONAL ACCURACY

The Aborigines' knowledge of the 'crowded' southern sky was probably the most comprehensive possible for people dependent on naked eye astronomy. They made accurate observations, not only of first and second order stars, but even of the more inconspicuous fourth magnitude stars, and in so doing devised and memorised a complex seasonal calendar based on the position of the constellations in the sky. Pattern was apparently more important in recognition than brightness, for the Aborigines often identified a small cluster of relatively obscure stars while ignoring more conspicuous single stars. Thus the people of Groote Eylandt off the coast of Arnhem Land gave the name Unwala, the Crab, to the small cluster of relatively insignificant stars, Sigma, Delta, Rho,

Zeta and Eta Hydrae, with an average visual magnitude of 4.4 (sixth magnitude stars are on the threshold of visibility to the naked eye), while disregarding the adjacent, very bright stars Procyon (Alpha Canis Minoris) and Regulus (Alpha Leonis) which have visual magnitudes of 0.36 and 1.35 respectively but which are not part of an obvious group (Mountford, 1956: 479) (Figure 2). The Boorong people of western Victoria apparently focused their attention on linear patterns of three or more stars. Unlike the familiar Greek designations, based on a join-the-dot pictorial image, the Aborigines rarely identified a group of stars with a simple outline of a figure, but rather with the whole cast of characters in a story, the relationship being conceptual rather than visual.

Colour was also an important factor in the Aboriginal designation of stars. The Aranda people of Central Australia distinguish red stars from white, blue and yellow stars. They classify the bright star Antares (Alpha Scorpii) as *tataka indora* (very red) while the stars of the V-shaped Hyades cluster, which represent for them two rows of girls, are divided into a *tataka* (red) group and a *tjilker* (white) group. The former are said to be the daughters of the conspicuously red star Aldebaran, Alpha Tauri (Maegraith, 1932: 25). Along the Clarence River in Eastern NSW, Aldebaran commemorates the story of Karambal, a man who stole another man's wife and hid from his pursuers in a tree. The angry husband set fire to the tree and the flames carried Karambal into the sky where he still burns, as a warning to intending adulterers (Mathews, 1905: 78).

The Aboriginal Australians also differentiated between the nightly movement of the stars from east to west and the more gradual annual shift of the constellations. Anthropologists have recorded that the Aranda and Luritja peoples around Hermannsburg in Central Australia could predict the position of the constellation they named Iritjinga, the Eagle hawk (a quadrangular arrangement comprising Gamma and Delta Crucis and Gamma and Delta Centauri) with great accuracy throughout the whole annual cycle. These peoples also knew that certain stars lying to the south, namely Iritjinga and the Pointers of the Southern Cross, are visible throughout the year, although their position in the sky varies. This amounts to a realisation that stars within a certain

● PROCYON



● REGULUS

Figure 2 Aboriginal constellation of *Unwala*, the Crab, comprising stars in the head of the constellation Hydra, with the adjacent but unnamed stars, Procyon and Regulus.

distance of the south celestial pole never fall below the horizon (Maeraith, 1932: 24).

What the Aborigines did with this astronomical knowledge, and the reasons they cultivated it, were fundamentally different from the structure and motivation of western science and provide an interesting contrast with what we imagine is the self-evident methodology and culture-free knowledge of western science. Their careful astronomical observations were motivated not by inherent curiosity but by their belief that the stars had an intimate pragmatic and relational role in their culture. One role was economic: the need to establish predictive correlations between the position of the constellations and other natural events important to the survival of the community such as the availability of particular foods or the onset of particular weather conditions. A second function, equally necessary to preserve the group's identity, was a socio-moral one: the association of the various constellations with a complex system of moral guidance and education in tribal lore. Thirdly, the Aborigines regarded the stars as an integral part of both the physical landscape and a philosophic system, each element of which helped to explain, reinforce and legitimate the others and guarantee their continuity.

COSMOLOGY

Although there were regional differences, most Aboriginal groups across the mainland of Australia shared the basic cosmology described below for the Tiwi people of Bathurst and Melville Islands, situated some 50–60 km north of Arnhem Land. Their complex four level model of the universe is not unlike the three decker view prevalent in medieval Europe, although the significance attached to the various levels is very different.

In the Tiwi system, the earth, known conceptually as *kaluwartu*, is imagined as a flat disk surrounded by water and covered by a solid sky dome, *juwuku*, like an inverted basin. Beyond this is a utopian upper world or *tuniruna*, blessed with adequate rainfall and abundant food. Some groups imagined it as a land of beautiful flowers that never faded. There the spirits of the dead are carried, and we see them as stars shining through holes in the cover. There are two seasons in *tuniruna*, the wet and the dry, as there are in the tropical latitudes where the Tiwi live. During the dry season on earth, Pakataringa, the man of thunderstorms, Tomituka, the woman of monsoonal rains and Pumaralli, the lightning woman, live in this upper world, but during the wet season they descend to the sky world and send storms and rain onto the earth (Mountford, 1958: 170–1; Sims, 1978: 166).

The sky dome is supported by uprights whose nature varies according to the materials of the region. In the Australian Alps, the props are trees (Worms, 1986: 109), but in coastal New South Wales the sky dome is supported by wooden pillars guarded by an old man (Willey, 1979: 34). People from the area of the Great Australian Bight told Daisy Bates that the sky was held up by a great tree, Warda, which it was essential to protect lest the sky fall down (Isaacs, 1980: 141). In other areas the sky dome was held from above by star

people and the emu whose nest is the Coal Sack, or by two guardians of the circumcision ceremony who live in the constellation of Scorpius and who turn the whole sky over (Mountford, 1976: 450).

In many legends the sky dome is also envisaged as having an aperture, permitting two way access between the earth and the sky world above it. Many of the Ancestral Beings, and sometimes humans, climbed up to this aperture using a spear, a hair cord, a tree or a rainbow, to become individual stars or constellations. The idea of a cord between the earth and the sky world has been interpreted by Worms as a metaphor for the umbilicus, signifying the life giving and life sustaining connection between the temporal earth and the eternal sky world (Worms, 1986: 104). But such a notion accords ill with the fundamental Aboriginal beliefs about the Dreaming, in which the land itself is inhabited by the eternal ancestral spirits. Unlike European notions of heaven, the sky world is no more or less sacred than the earth.

While the ascent of Ancestral people or animals to the sky world is the more common process of connection between these worlds, there are also stories of sky beings descending to earth in some specific spot. Gosse Bluff, an immense meteorite crater west of Alice Springs, is said by indigenous people of the area to have been formed when one of the Ancestral women dancing in formation as the Milky Way put down her baby in its bark *coolamon* carrier. The baby and carrier fell from the sky, causing the huge crater. The distraught mother and father, the morning and evening stars (sic) are still looking for their child.

Beneath the earth is a lower world, known to the Tiwi as *Yilaru*. Though subterranean and dark, *Yilaru* carries none of the adverse moral associations of the medieval Hell. Topographically it is believed to comprise two high stony ranges separated by a deep valley along which the Sun woman travels on her nightly journey from west to east. People from the Great Australian Bight area in South Australia believed that this lower world, known there as *Jimbin*, was the place where the spirits of unborn children lived (Ker Wilson, 1977: 21–2).

ROCK ART SOURCES

There are two main avenues to assessing what Aboriginal communities believed about the stars before the disruption (all too often extinction) that followed European contact. These are rock art (engraving or painting) that has endured for more than a century and oral culture. Both have their limitations.

Hugh Cairns claims that:

while specific interpretation is precarious, most rock art sites in Australia provide elements that can be interpreted generally in terms of sky mapping. Furthermore, there can be some interpretative feedback between this evidence and the artefacts through special examples such as the natural but enlarged hole in the rock face which represents and 'is' the Morning Star and the body painted menstruation 'crescent' (Cairns, 1993: 141).

Cairns has studied patterns of drilled cup-like holes, transverse grooves and enhanced natural indentations found in natural tessellated pavement rock in a bushland area north of Sydney in close proximity to engraved representations of figures believed to be ancestral sky heroes, Daramulan and Biame. He takes

the view that these marks, which he estimates at 6000 to 4500 years old, resemble particular star groups in the Milky Way from the Southern Cross and Scorpio to Orion and the Pleiades, but in the absence of any surviving oral tradition or record it is doubtful practice to extrapolate from 'resemble' to 'represent'. Ultimately Cairns bases his argument on a negative: 'ethnographic evidence shows that knowledge and perception, throughout Australian Aboriginal cultures, is expressed in the form of art. It would be extraordinary indeed if important meaning, including astronomical realities, were not in evidence in the rock engravings and paintings of indigenous Australia' (Cairns, 1993: 149).

Some support for the notion of carved astronomical signs, although of a different kind, comes from astronomer Paul Murdin's suggestion that the so-called 'sunbursts' carved on sandstone near Broken Hill in western New South Wales may record supernova events. The sunbursts are circular designs formed by holes pecked in the rock about 5 mm apart. Some show a central dot with rayed lines surrounding it; some show a circle with the rays emerging like a child's conventional drawing of the sun; some show concentric circles with the rays emerging from the centre. It is the latter that Murdin suggests as candidates for identification with the supernova of 1066 or the Vela supernova of 12,000 years ago. However, Murdin also admits that the argument for such an identification is weak. It depends more on a belief that some such depiction *should* exist, in parallel with the depiction of Leonids in the winter counts of the North American Indians of Dakota and of the Crab supernova of 1054, than any supporting evidence of such an identification (Murdin, 1981: 477-8).

On the other hand, Grahame Walsh, who has made an exhaustive study of Aboriginal rock art across Australia, gives several examples of sites where the rock engravings and/or paintings depict figures associated with the Lightning Brothers, signified by their rayed headdresses and stone axes symbolising lightning, or the onset of the wet season - the Wandjina of the Western Kimberley, large eyed, mouthless figures also with lightning rays emerging from their heads like halos. Yet Walsh finds no examples of rock where the figures are related to celestial bodies (Walsh, 1988).

NAVIGATION

Given their accurate knowledge of the stars, it is strange that, unlike the Polynesian peoples, the Aborigines seem not to have used the stars for purposes of navigation (Maegraith, 1932: 25). Coastal peoples have stories linking the appearance of particular constellations to storm seasons when it is dangerous to venture far from the shore, but no stories are known to indicate stellar reference points for journeying. Although the Meriam people at the eastern end of Torres Strait undertake voyages by outrigger canoe to other nearby islands, and many coastal groups embark on fishing expeditions, Aborigines seem rarely to have undertaken long sea voyages since arriving in Australia, so their failure to use stars for navigation is less surprising than the corresponding lack of stories linking star patterns to land journeys.

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Intrigued by this apparent anomaly, David Lewis undertook research in 1972 and 1973 on the route finding abilities of indigenous people in the Western and Simpson Deserts. After travelling some 7,800 km with local Aboriginal men, Lewis concluded that although the men showed an intimate knowledge of the terrain during daylight hours, recognising even the most insignificant landmarks as having spiritual significance and being able to locate themselves and keep their direction without difficulty, they were unable to do so at night. They made no attempt to refer to the stars for orientation and showed considerable anxiety at being abroad in the dark (Lewis, 1976: 273-4). This confirms the much earlier observation of Maegraith that men at the Hermannsburg Mission exhibited a 'dislike of moving about after dark', so much so that he himself had difficulty in finding local people to help with his astronomical observations (Maegraith, 1932: 21-5). He concluded that their detailed knowledge of the stars was derived from observations within the safety of the camp and that 'no Central Australian native can find his way by night by reference to the stars, although in the daytime he possesses the utmost skill in respect of location' (Maegraith, 1932: 25). Although hostile raids on other clans were usually undertaken at night, they were well planned beforehand over known terrain, requiring little or no navigational skills. If Maegraith was correct in this, the implication would seem to be that recognition of place, while it may be intimately associated with an awareness of a spiritual power emanating from the area, is triggered, at least in the first instance, visually.

MYTHS

The mythical narratives referred to in the following sections are all traditional in the sense of being distinctly Aboriginal, with little or no evidence of introduced elements derived from contact with Europeans. This does not necessarily mean that they have remained unchanged over long periods of time, although oral tradition tends to preserve the details of a story more closely than the print tradition (Ong, 1982), and the high value that Aboriginal people place on their heritage reinforces the faithful transmission of details. (Morieson, 1996: 40-2). Many of the stories referred to were recorded in writing in the late nineteenth or early twentieth century before the Aboriginal communities were disrupted. Those taken from the anthology *The Speaking Land* (Berndt and Berndt, 1989) were recorded prior to the 1960s. The Berndts recall that when these stories were being related to them, 'there were always listeners present or nearby, who knew the stories and did not hesitate to comment on them or amend them when they were being told, or immediately afterward' (Berndt and Berndt, 1989: 403). In such a context narrative innovation is emphatically discouraged.

The myths, while extremely varied, have certain motifs in common. Nearly all focus on the deeds of the Ancestral Beings enacted against a natural environment that was changed by them in some way - topographically, in the case of the Earth, or by the creation of celestial bodies. The Ancestors are characters of great spiritual and physical power who have the ability to change

shape, to transform themselves, and to perform remarkable feats. In addition, the narratives often depict these mythic beings as being engaged in conflicts resulting from failure on the part of some individual or group to observe the obligatory social codes. Thus, like the deities of Greek myth, they are shown as having human failings, as being motivated by greed, lust, anger, irrationality, wilful disobedience towards kinship laws, etc. The myths describe situations that could easily take place in the lives of the audience – misadventures in social relations, indiscretions, malicious actions and personal idiosyncrasies. Consequently, most of the stories contain an implicit warning of the potential outcome of such misdeeds. Thus these mythic beings are actually characters of contradiction (Berndt and Berndt, 1989: 406–7): their deeds inspire awe but so far from being emulated they are, in most cases, held up as a reminder to observe the correct behavioural forms and avoid such conflict.

CALENDAR

As hunter-gatherers, dependent for their survival on a foreknowledge of environmental changes, the Aboriginal Australians noted, in particular, the correlation between the movements and patterns of stars and changes in the weather or other events related to the seasonal supply of food. As might be expected, the significance attributed to these sidereal occurrences varied with the diet and lifestyle of different groups. Thus, on Groote Eylandt, in the north of Australia, the appearance in the evening sky towards the end of April of the two stars Upsilon and Lambda Scorpii in the 'sting' of the constellation Scorpius indicated that the wet season had ended and that the dry southeasterly wind or *marimariga* would begin to blow. At nearby Yirrkala, however, the importance of Scorpius was linked to the connection between its appearance in the morning sky in early December and the imminent arrival of the Malay fishermen who came in their canoes to collect trepang or *bêche de mer* which they sold to the Chinese (Mountford, 1956: 504).

In winter, the most spectacular individual stars in the southern sky are the red giant Arcturus (Alpha Bootis) and Vega (Alpha Lyrae). When Arcturus could be seen in the eastern sky at sunrise, the Aborigines of Arnhem Land knew that it was time to harvest the spike rush or *rakia*, a reed valuable for making fish traps and baskets for carrying food, and a local legend about Arcturus served as an annual reminder of this. (Mountford, 1956: 495). On the other hand, amongst the Boorong people of Victoria, Arcturus was personified as the spirit being Marpeankurrk, mother of Djuit (Antares) and Weet-kurrk (a star in Boötes, west of Arcturus). Marpeankurrk was celebrated as the one who showed the Aborigines where to find *bittur*, the pupa of the wood ant or termite, a staple item of diet, rich in protein, during August and September. When Arcturus was in the north at evening, the *bittur* was coming into season; when it set with the sun, the *bittur* was gone (Stanbridge, 1861: 301). The orange red colour of Arcturus may also have suggested the reddish brown head of this ant (Morieson, 1996: 94–5).

To the Boorong, the constellation *Lyra* represented the spirit of Neilloan, or

the Mallee hen which, according to tradition, taught them how to find its eggs, an important source of food in October. 'When the Loan eggs are coming into season on earth, they are going out of season with her. When she sits with the sun [in late September] the Loan eggs are in season' (Stanbridge, 1861: 302; Morieson, 1996: 100–1). Other notable events, like the ripening of tubers and bulbs and the appearance of migratory birds and animals, were correlated with specific positions of Orion, the Pleiades and the Southern Cross at different seasons of the year. For the Pitjantjatjara people in the Western Desert region, the appearance of the Pleiades in the dawn sky in late autumn was particularly important as the sign that the annual dingo breeding season had begun. Fertility ceremonies were then performed for the dingoes, or native dogs, and some weeks later the tribe raided the lairs, culling and feasting on the young pups (Tindale and George, 1976: 48–9). Such stories clearly evolved to ensure that these nutritional associations were not forgotten and to stress their importance for the continuing survival of the race.

MYTH AND MORALITY

No less important for the physical preservation of the community was its unique sense of identity. This depended on the oral transmission of traditional beliefs which explained the role of the Ancestors in creating local landforms, establishing totems and prescribing social laws and ritual observances necessary to preserve the natural order. Myths incorporating these fundamental beliefs were essentially metaphors that integrated the strange and the frightening by relating them to the familiar. Explanations which emphasised pattern, order and law, rather than unpredictable effects, reinforced the sense of the organic relationship believed to exist between natural phenomena and social behaviour. Many of the stories that inculcated this connection involved the constellations, which acted as visual mnemonic links. David Mowaljarli from the Kimberley region has said that for him everything is written twice – on the ground and in the sky (Mowaljarli and Malnic, 1993: 5). Thus the night sky served as a periodic reminder of the moral lessons enshrined in the myths. Like the stained glass windows of medieval cathedrals, they provided, in effect, an illustrated textbook of morality and culture, relaying the accumulated wisdom of the community.

Although anyone could observe the celestial bodies, the meaning which the tribe attributed to these observations was strictly conceptual rather than perceptual. It could not be understood by personal experience or by the intellect, but only through initiation into tribal lore which stressed the intimate, causal association between physical events and the human dramas of good and evil. The anthropologist A. P. Elkin concluded that, although by the twentieth century, knowledge relating to sky culture heroes remained a fundamental part of initiation rituals only in eastern Australia, it had once held a central position throughout the continent, before being ousted by earth-based totemic spirits. Thus in the Northwest, the heroes who taught the indigenous peoples how to make the bull roarer and introduced initiation ceremonies dwelt in the sky. In

the east, the sky hero goes by different names in different areas – Baiame, Daramulum, Nurunderi, Bunjil, Goin, Biral – but is nearly always associated with bringing the cultural group to its present territory and with giving it distinctive laws and initiation rituals, including the sacred name of the sky hero himself (Elkin, 1976: 252–3). Lessons about compassion, brotherhood and respect for the land as Mother, the prohibition of incest and adultery, and taboos on killing totemic animals were also periodically reinforced by being enacted in the sky world, thereby simultaneously establishing the universal validity of these ethical laws. Thus in many stories subversive characters are rendered harmless by being translated into the sky world, where their recurrent appearance serves as a deterrent to others and hence ensures another means of safeguarding order.

While many of the stories attempt to explain and reinforce laws and prohibitions, others seem, like many of the Greek and Roman myths, to reinforce a sense of arbitrariness on the part of the powers that ordain the universe. The quarrels and petty prejudices of the Graeco-Roman pantheon have their counterpart in the violations of law and totem that occur in the Aboriginal myths, suggesting that their purpose is not so much to reinforce a moral principle as to counsel resignation, even fatalism about events.

The anthropologist Lester Hiatt affirms that the interpretation of Australian myths has emanated from four separate, though not necessarily incompatible, ideas about the nature and purpose of their subject matter: myth as history; myth as charter; myth as dream and myth as ontology (Hiatt, 1975: 16–17, 20).

The myth-as-history view interprets stories as metaphors for past events, such as invasion and consequent conflict, social obligations such as observing the taboo on eating a totem animal, or particular events such as an eclipse or meteor shower.

The myth-as-charter view, essentially functionalist, sees myths as conservative socialising forces designed to reinforce adherence to existing values. I have taken this approach in attempting to understand a number of the stories recounted below. However, it must be acknowledged that this approach, while readily applicable to stories where wrongdoing is punished, appears to run into difficulties with narratives of apparently unpunished immorality. Ted Strehlow remarked of many northern Aranda myths, 'The lives of the totemic ancestors are deeply stained with deeds of treachery and violence and lust and cruelty: their "morals" are definitely inferior to those of the natives of today' (Strehlow, 1968, 38). The Berndts, however, have argued that it would be unduly moralistic in a Western, individualistic sense to infer that the telling of such stories might encourage actual wrong doing (Hiatt, 1975: 6). In the context of a ritual group performance, where the celestial configurations appear to be an integral part of the singing, dancing and acting, the solemnity of the occasion would almost certainly reinforce the moral element of the story.

The myth-as-dream approach, favoured mainly by Róheim, has attempted to interpret Australian myths in Freudian terms. The most likely candidates for such treatment are the many myths of extravagant sexual fantasy, such as the Scorpio myth recounted below, and the many myths that focus on the

pursuit of the Seven Sisters (the Pleiades) by a male figure or figures, usually associated with Orion (see the section on the Pleiades below).

The myth-as-ontology approach, as followed by Elkin, Eliade, Stanner and Lévi-Strauss, interprets the stories as efforts to account for natural or seemingly anomalous facts.

Through myth and ritual the Aborigines, like most cultures, struggled with coming to accept a universe that defied a neat and consistent explanation and exhibited only an uncertain mix of good-with-suffering, order-with-tragedy (Stanner, 1959–63: 70). In a sense, this approach can be invoked to account for the persistence of those narratives that seem to permit wrong doing to pass without punishment.

STORIES RELATING TO DIFFERENT CONSTELLATIONS

The many and diverse Aboriginal myths associated with the heavenly bodies include stories about the sun, the moon, the Milky Way, the Magellanic Clouds, Mars, Venus and the several constellations which form distinctive patterns in the southern sky – notably the Southern Cross and its pointers, the Pleiades, Orion's belt, Scorpio, Gemini and Aldebaran. The representative selection of these myths which follows suggests something of the all-encompassing framework of which they are a part. Some are clearly origin myths but others incorporate narratives of violation of the law, with or without punishment.

THE SUN AND MOON

Amongst the many Aboriginal variants of creation stories the life-giving spirit is most frequently associated with the sun. Amongst the Murray River people the origin of the sun is linked to the tossing of a giant emu egg into the sky where it struck a heap of dry wood and burst into flame, bringing light to the hitherto dark world. Thereupon, the Great Spirit Baiame, seeing how much the world was improved by sunlight, decided to rekindle the woodpile each day (Isaacs, 1980: 143).

In contrast to the Greeks, the American Indians and the Quechua Indians of Peru, all of whom designated the sun as male and the moon as female, nearly all the Australian Aboriginal peoples regarded the sun as female and the moon as male. There were a few exceptions. The Aborigines of Southwest Tasmania regarded the sun as male and the moon as Vena, his wife (Plomley, 1966: 118), and Woorredy, an elder of the Bruny Island people, told George Augustus Robinson that the Moon Woman came from the Northwest and stopped at Oyster Bay. Once when she was roasting abalone the Sun Man came along and swept her away, tumbling her into the fire before she rolled into the sea. Badly burnt in the process she retains the 'scorch marks' of this encounter in the form of black spots on her surface (Plomley, 1966: 118). The waxing and waning of the moon also suggested to some Aboriginal people the phases of a lunar pregnancy which they attribute to various male figures. The Karruru of the Nullarbor Plain regard the moon as being the wife of the Morning Star (Venus) but the Aborigines of the Encounter Bay area of South

Australia attribute her pregnancy more generally to liaisons with a series of human males (Meyer, 1846: 11–12). People from the Murrumbidgee area also regarded the moon as female (Peck, 1933: 55–64).

More typically, however, the sun is represented as a woman who daily awakes in her camp in the east and lights a fire to prepare the bark torch she will carry across the sky. This fire provides the first light of dawn. In some versions her daughter wishes to accompany her but the mother refuses this request as two suns in the sky would set the land on fire (Mountford, 1956: 502). Before beginning her journey she decorates herself with powder made from crushed red ochre, colouring the clouds red in the process (Mountford, 1958: 40, 172; Sims, 1978: 166). At evening, having travelled across the sky to the western edge of the world, she renews her powder, spilling red and yellow in the sky again, before beginning her long passage underground back to her camp in the east (Mountford, 1956: 502). The Wotjobaluk people of Victoria say that Gnowee, the Sun Woman is searching for her lost son (Massola, 1968: 106). It was probably this underground journey which was instrumental in the classifying of the sun as female, for her torch is thought to bring warmth and fertility to the interior of the Earth, causing the plants to grow. However, in the legends of Milingimbi, Arnhem Land, where the sun sets in the sea, she becomes a great *Warrukay* fish and swims under the Earth to return in the east next morning (Isaacs, 1980: 145), while the moon becomes a *Jukal* fish, passing beneath the earth during the day (Mountford, 1956: 502).

The moon, when regarded as male, is generally accorded greater status. Thus an eclipse of the sun is interpreted as indicating that the Moon man is uniting with the Sun woman (Warner, 1937: 538). In many stories the sun and moon are joint protagonists involved in some repeated event signified by the phases of the moon. Many myths tell of the Sun Woman falling in love with the Moon Man and pursuing him across the sky. Although he is sometimes eclipsed, he always manages to escape from her but never permanently, for she instructs the spirits who hold up the edges of the sky to turn him back whenever he tries to slide down to Earth. In other versions the moon is despondent because, although he continually searches for a wife to accompany him on his nightly journeys, he is too fat and slow to win the affection of the beautiful girls he encounters.

In addition, diverse legends have evolved to account for his waxing and waning. Aboriginal Australians in coastal areas noted the correlation between the phases of the moon and the tides. At Yirrkala in Arnhem Land and on Groote Eylandt, when the moon is new or full and sets at sunset or sunrise respectively, the tides are high; when the moon is in the zenith at sunrise or sunset, the tides are low. The Aborigines believe that the high tides, running into the moon as it sets into the sea, make it fat and round (Figure 3). (Although the new moon may appear thin, they deduce from the faint outline of the full circle that it is really round and full of the water that flowed in at high tide.) On the other hand, when the tides are low, the water pours from the full moon into the sea below and the moon consequently becomes thin (Mountford, 1956: 484).

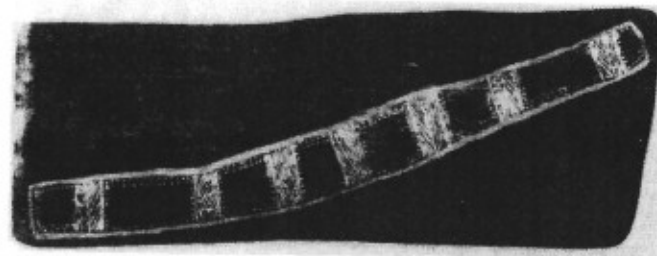
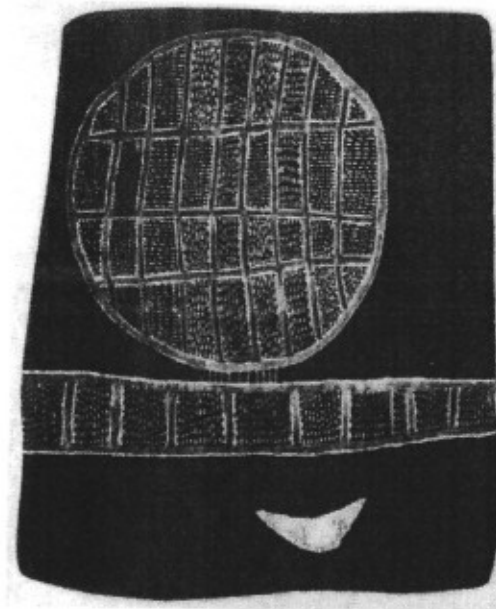


Figure 3 A bark painting from Groote Eylandt showing the full moon. The lines on the lower edge indicate water running into the moon from the sea (horizontal band). The new moon is shown at the bottom as a crescent. (Mountford Collection, State Library of South Australia.)

The appearance of a ring or halo around the moon usually indicated the onset of rain and was interpreted as the Moon Man building himself a shelter as protection before the downpour. The Tiwi of Melville Island associate this phenomenon closely with their own customs and believe that the Moon man is taking part in a *kulama* ceremony, the ring being the mound of earth around the ceremonial circle inside which the star people are singing and dancing the *kulama* songs (Mountford, 1958: 175).

In most areas the moon was regarded as more mysterious, and hence more dangerous, than the sun and thus functioned as a warning against immoral

activities. Because of the association of the lunar cycle with the menstrual cycle, the moon was linked with fertility, and young girls were warned against gazing at the moon unless they wished to become pregnant (Isaacs, 1980: 145). Indeed in several legends of Western Australia and Arnhem Land, staring at the moon may bring death. The association of the moon with death is complex, however, for in some areas the moon was also linked with immortality, since he dies each month and is then reborn. Thus Arnhem Land people believe that the moon brought death to the world (Warner, 1937: 523; Mountford, 1956: 495), whereas the Tiwi hold that the moon, Tjapara, tried to stop another Ancestral figure, Purukupali, from imposing death on all living creatures (Mountford, 1958: 177).

THE MILKY WAY

The Milky Way, which spreads in a broad arc of diffused light across the southern sky, was commonly regarded by the Aborigines as a river in the Sky World (Mountford, 1956: 487, 491) in which the large bright stars are fish, the smaller stars are water lily bulbs, and the Coal Sack is a large plum tree (Figure 4). The darkness and clarity of the sky also allowed them to see clearly what northern hemisphere peoples could rarely glimpse, the dark regions which



Figure 4 A bark painting from Milingimbi showing the Milky Way. The central design represents the main portion of the Milky Way, and the rectangles on each side are isolated portions of the galaxy or branches of it. The bright stars are large fish and turtles living in the sky river. (Mountford Collection, State Library of South Australia)

divide the southern Milky Way and, in particular, the dark region which Europeans first saw when they journeyed south and which they named the Coal Sack. Various legends, many of them involving a moral lesson, have evolved in different areas to account for the formation of the Milky Way and the dark regions. The Aranda and Luritja peoples of Central Australia believed that the Milky Way divided the sky people into two tribes and hence served as a perpetual reminder that a similar division of lands should be observed by local neighbouring tribes (Maegraith, 1932: 19–20).

One story originating in the area around Port Bradshaw in northeast Arnhem Land on the Gulf of Carpentaria associates the Milky Way with an act of adultery and subsequent vengeance, thereby conveniently employing a natural phenomenon as a recurrent warning against wrongdoing. When Binyu, a young hunter whose tribal totem was the crow, tried to seduce the wives of his tribal brother – two sisters of the catfish totem – a tribal war broke out, during which the girls, and later Binyu himself, were killed. Returning to his totemic form of a crow, Binyu sought vengeance by once more attacking the two girls (who had then reverted to the shape of catfish) and succeeded in eating them, leaving only the bare bones. When the outraged husband hurled the shining fish bones after the departing crow, they flew end over end up into the sky, like Aboriginal throwing sticks, to become the myriad stars of the Milky Way. The dark patch, the Coal Sack, is the crow, and two especially bright stars nearby are the two catfish women, still waiting for their lover.

A Queensland version of the origin of the Milky Way associates it with Purupriki an Orpheus-like hero (Antares), as famed for his songs and dances as for his hunting. When Purupriki sang, the people danced to the rhythm until they dropped with exhaustion, and declared that if he wished he could make even the stars dance. Rising early one morning to hunt, he found a tree full of flying foxes and speared the leader. Unfortunately, the rest of the flying foxes awoke and descended upon Purupriki in vengeance, carrying him with them up to the sky. Unable to find him, his people decided to perform his dance in the hope that he would return, but without him they could not capture the rhythm. Then they heard the sound of singing in the sky. As the rhythm grew louder and more pronounced, the stars, hitherto randomly dispersed, began to dance and arrange themselves in time to Purupriki's song (Roberts and Mountford, 1974: 32). Thus the Milky Way serves as a reminder that the tribal hero should be celebrated with traditional songs and dancing.

Around Yirrkala on the coast of Arnhem Land, the Milky Way is linked to a story of two brothers who drowned while canoeing in the Sky River. Their bodies, floating in the water, are two dark patches in the Milky Way in the constellations of Serpens and Sagittarius, while the canoe is a line of four stars near Antares (Mountford, 1956: 495–7) (Figure 5).

THE SOUTHERN CROSS

Because of its conspicuous, almost diagrammatic shape, the Southern Cross is linked with various characteristic objects in different areas. Around Caledon

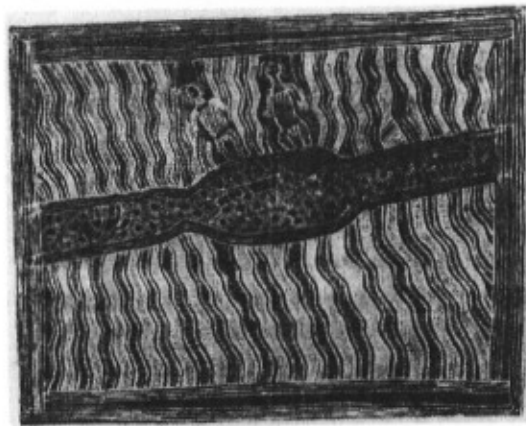


Figure 5 Bark painting from Yirrkalla representing a story of two brothers who drowned while fishing when their canoe was caught in a storm. The central panel shows the two brothers, first in the canoe (at left), then struggling in the water near the black rock that capsized their canoe. In the top panel they have become two dark patches in the Milky Way within the constellation of Serpens and near Sagittarius. The canoe is a line of stars near Antares, and the rock is near Theta Serpentis. (Mountford Collection, State Library of South Australia.)

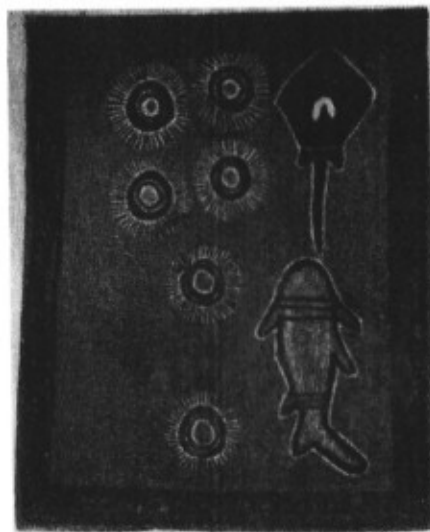


Figure 6 Bark painting from Caledón Bay showing the Southern Cross as a stingray and the pointers as a shark which is chasing the ray. (Mountford Collection, State Library of South Australia.)

Bay on the east coast of Arnhem Land, it is taken to represent a stingray being pursued by a shark – the Pointers (Mountford, 1956: 496) (Figure 6). On Groote Eylandt, where fish is the staple diet, the four stars of the Cross represent two brothers, the Wanamoumitja (Alpha and Beta Crucis), and their respective camp fires (Delta and Gamma Crucis) where they cook a great black fish, *alakitja* (the Coal Sack), which they have caught in the Milky Way (Figure 7). The Pointers are their two friends, the Meirindilja, who have just returned from hunting (Mountford, 1956: 485–7) (Figure 8). On the other hand, Aborigines of the Western Desert saw in the kite shape of the Southern Cross the footprint of Waluwara, the wedge tailed eagle (*Uroaetus audax*) while the pointers represented his throwing stick and the Coal Sack his nest (Mountford, 1976: 450–1). In the Ooldea region of South Australia, the Cross is the foot of Warragunna, an eaglehawk, whose two nephews wounded his foot because he refused to share food with them (Ker Wilson, 1977: 52–4). Here the Cross functions as a reminder of the requirements of kinship and the obligation to share food.

Another legend concerning the Southern Cross relates it to the advent of



Figure 7 Bark painting from Groote Eylandt showing the two brothers Wanamoumitja (Alpha and Beta Crucis) who have speared a large fish, *alakitja* (the Coal Sack), which was swimming in the Milky Way. The brothers cook the fish on their two campfires (Delta and Gamma Crucis). (Mountford Collection, State Library of South Australia.)

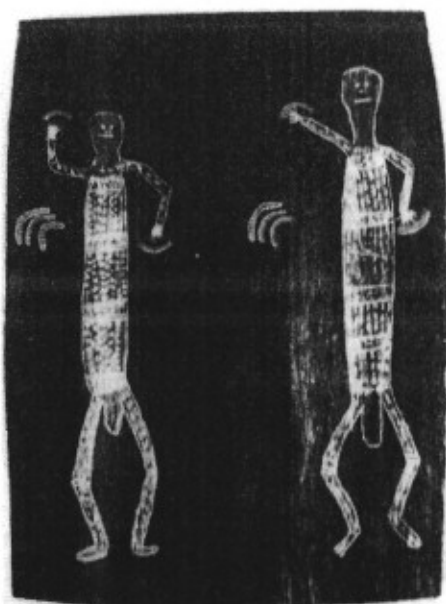


Figure 8 The Meirindilja men (Alpha and Beta Centauri, the Pointers of the Cross), two friends of the Wanamomitja brothers. They have just returned from a hunt and are beating their boomerangs together. (Mountford Collection, State Library of South Australia.)

death in the world. It is said that the Great Spirit Baiame created two men and a woman and taught them what plants to eat and how to dig for roots. When a drought came and the plants withered, the woman urged the men to hunt an animal for food. One man agreed and killed a kangaroo, but his companion refused to eat one of Baiame's creatures. He went off alone into the desert and fell exhausted beneath a white eucalyptus tree. The Yowi, spirit of death, reached down from the tree and dragged him up, disturbing two white cockatoos that were nesting there. Thereupon the whole tree ascended into the heavens. The four bright stars of the Southern Cross, Yaraan-do, are the eyes of the man and the Yowi, and the two pointers of the Cross are two cockatoos trying to return to their nest in the tree (Reed, 1965: 34-6).

VENUS

The planet Venus, thought of as the morning star, was an important sign to the Aborigines, who arose at early dawn to begin their hunting. It, too, was personified and frequently associated with death. In northeastern Arnhem Land, a local legend suggests a realisation that the morning and the evening star are the same entity. Barnumbir, the morning star, lives on Bralgu, the Island of the Dead, and is so afraid of drowning that she can be persuaded to

light her friends across the sea at night only if she is held on a long string by two old women, who at dawn pull her back to shore and keep her during the day in a basket (Figure 9). Being tied by the string, she can never rise high in the sky and is seen most clearly at dawn and dusk when she is close to home. Because of the connection with Bralgu, the morning star ceremony is an important part of the ritual for the dead. Barnumbir is represented by a totem stick to the top of which is bound a cluster of white feathers, denoting the star, with long strings ending in smaller bunches of feathers to suggest the rays. When a person dies, his/her spirit is believed to be conducted by the star to Bralgu, its last resting place (Mountford, 1976: 93-6).

CANOPUS

At magnitude -0.72 the yellow white supergiant Canopus or Alpha Carinae is the second brightest star in the southern sky, but in all the stories in which it features it is linked with other nearby stars (an arch of five stars, with Canopus in the centre, represents the bird with outstretched and downward curving wings) or with the Magellanic Clouds. For the Boorong of the Victorian Mallee Canopus was War the male crow, brother of Warepil (Sirius) the Eagle. A small red star, probably Epsilon Carinae is the female crow. War was always regarded by the Boorong as especially friendly to humans. He told the heroic Brambrambult brothers where to find the man-eating Ngindyal and carried their weapons for them in the chase and as a Prometheus-like figure first brought fire to the people of the Mallee (Stanbridge, 1861: 303; Morieson, 1996: 118). War is also linked with Tchingal, the Emu (the Coal Sack, Alpha and Beta Centauri and the constellation of Scorpio), which pursues it across the sky but never catches up with the wily Crow (Mathews, 1904: 365-7). War is visible throughout the year but appears lower in the sky, at tree top level between July and September, the egg laying season of the crow (Morieson, 1996: 118).

COMA BERENICES

The Boorong people saw this constellation as a flock of small birds, Tourt-chinboiong-gherra, drinking rainwater from a small puddle in the fork of a tree, while the Magellanic clouds (Kourt-chin) are a male and female native companion (the jabiru bird or broлга, *Grus australasianus*) (Stanbridge, 1861: 302). Their name for the constellation, Tourt-chinboiong-gherra, can be translated as 'the star of the tree with water and birds drinking' (Morieson, 1996: 113).

ORION AND THE PLEIADES

One of the most widespread Aboriginal myth cycles is that concerning the Pleiades, one of the most conspicuous star clusters in the sky during the summer months. In Greek mythology, the Pleiades were the seven daughters of Atlas who, when pursued by Orion, begged to be delivered from the Hunter.



Figure 9 Bark painting from Yirrkalla showing the two women with the basket holding Barnumbir, the Morning Star. Barnumbir is represented by a totem stick on top of which is bound a cluster of white feathers or down denoting the star, with long strings ending in bunches of feathers to suggest rays. (Mountford Collection, State Library of South Australia.)

In answer to their prayer they were turned into doves and flew into the sky where they formed the constellation named after them in Taurus. Although the keen sighted can distinguish more than the traditional seven stars in the constellation, Aboriginal legends concerning them bear an intriguing similarity to the Greek story. Most identify them with a group of young women, often reported to be seven sisters but without any intention of specifying an exact number (Buckley *et al.*, 1968: 113). Nearly all the stories portray the girls as fleeing from the unwanted and often illicit sexual advances of a male or males, usually identified with the constellation of Orion, who, in some versions, is castrated as a punishment. In some areas there are other candidates for the role of the pursuer: in east coast areas it was Aldebaran (Alpha Tauri) (Mathews, 1899: 29; Peck, 1933: 215–24; Massola, 1968, 108); in the Kimberley it was the Warragunna, the Eaglehawk (Southern Cross) (Kaberry, 1939: 12) or Tjakamarra (Venus) (Berndt and Berndt, 1989: 281–2); in Victoria it was Waa (Canopus or Alpha Carinae) (Dawson, 1881: 100). Each of these alternative pursuers, like Orion, rises after the Pleiades and appears to follow them across the sky, consistent with the common factor in all these narratives of the Seven Sisters, namely that they are running from the advances of the males.

The whole cluster of Pleiades stories forms part of a much larger group of myths of sexual conquest and submission that can be understood either as warnings against infringement of marriage laws or as expressions of sexual fears and fantasies. Isobel White concluded from her study of sexual conquest and submission in the myths of Central Australia that 'where the men's myths describe violent and illicit sexual encounters they represent male desires; when they describe mutilation they represent fears. The women's myths show women as more ambivalent, with desire for the gratification of sex accompanying fear of its consequences' (White, 1975: 138).

In some areas the relationship between the sisters and the male figure(s) is innocent and legitimate. Stanbridge recorded that the Boorong people of Victoria called the Pleiades Larnankurrk and described them as a group of young women playing music to Kulkunbulla (the Belt and Sword of Orion), seen as a number of young men dancing (Stanbridge, 1861: 302). This association relates to the ceremonies of the Boorong people where, 'when the moon rose ... the dance commenced ... the women and young girls formed a sort of orchestra, beating opossum rugs, and singing' (Kreffl, 1865: 367), while the men, painted and decorated with opossum skin thongs, danced, clashing boomerangs in time to the women's chant (Stanbridge, 1861: 296).

In many areas, however, the relationship between the male and female protagonists is unwanted by the women and involves pursuit, often violence, escape and sometimes punishment. In the Western Desert region, for example, the Seven Sisters, or Kunkarankara, were said by some informants to belong to the Two Men (Wati Kutjara) the two most revered mythical heroes of this region (Tindale, 1936: 172).

At Yalata and Ooldea the women's version of the Seven Sisters myth is performed for a girl's first menstruation and concerns the pursuit of the sisters by Njiru (Orion) who catches and rapes one of them. She dies but he continues

his pursuit, sending his penis along the ground (or underground) to rape one of the other women. The women set their dogs on to him and they bite off his penis, which assumes a separate identity as Jula, which also chases women (White, 1975: 130). Similar narratives were recorded from the northwest corner of the Western Desert, across the Mann, Petermann and Musgrave Ranges to Glen Helen and Yuendumu in Central Australia, and south to Ooldea (Mountford, 1976: 462), usually with reference to specific landforms in the area. Thus the group of rocks along the side of the Finke Gorge at Glen Helen in the Western MacDonnell Ranges is explained by the local people as being the Seven Sisters, clinging to the side of the gorge and hoping to escape the notice of their pursuer Nirunja (Orion). The eldest sister, keeping watch, became a particularly spectacular outcrop, while rows of vertically bedded rocks at the mouth of the gorge are said to have been created by the feet of the sisters as they performed their ceremonial women's dance (Mountford, 1976: 480-2).

Amongst the Pitjantjatjara people, the practical connection noted above between the dingo breeding season and the appearance of the Pleiades in the dawn sky in autumn is preserved in their local legend. According to this, the ancestral women or Kungkarungkara kept a pack of dingoes to protect them from the hunter, Njiru. However, he succeeded in raping one of the girls, who died (the obscure Pleiad). Still not satisfied, he continued to pursue the others, armed with a spear which came to have ritual phallic significance. Eventually the women assumed their totemic form of birds and flew into the sky to escape from him. Even then, he defied their dingoes and followed the women into the heavens where he can be seen in the stars of Orion's belt. Pairs of smaller stars which arise near the constellation of Orion are said to represent his footsteps as he pursues the Kungkarungkara (Mountford, 1976: 462-5).

In another version of the story told by the Kamilaroi people in eastern New South Wales, the Pleiades were seven sisters called the Meamei or Mayi-Mayi, who had long hair and bodies of ice. Before leaving the Earth, they travelled into the mountains causing springs to issue forth and feed the rivers so that there would be sufficient water for the people forever. A young hunter, Karambal, fell in love with one of the sisters and carried her off to be his wife. The other sisters sent cold wintry weather to force him to release her, but later, repenting of the hardship this caused the tribe, they made their way into the sky in search of the summer sun to melt the snow and ice. Thus the Pleiades appear in the summer each year, bringing the warm weather. Afterwards they travel west and winter returns as a reminder to men that it is wrong to carry off women who belong to a totem forbidden them. Karambal ascended with them into the sky and still pursues them as the star Aldebaran, which follows close to the Pleiades (Ridley, 1875: 141). In related versions of the story a family of young men, the Berai-Berai (the stars of Orion) pursued the Meamei, wishing to marry them, but an old man, Wurunna, stole two of the girls before they escaped to be reunited with their sisters as the Pleiades (Parker, 1953: 105-27).

In another story from eastern Arnhem Land the Seven Sisters (Yogamanda) are the daughters of the moon, Pingal, who nurtures incestuous lust for them.

However his wife (an unnamed star) wishing to prevent this liaison, throws down a rope by which means the Sisters climb into the sky becoming the Pleiades, but still fleeing from the moon (Bozic and Marshall, 1972: 125-7). In the Kimberleys the Sisters are chased by Eaglehawk, the Southern Cross (Kaberry, 1939: 12). In all these myths, whether men's or women's stories, the Seven Sisters are depicted as running from the unwelcome and usually forbidden advances of a male figure. Isobel White points out that such a scenario bears little relation to the actual exploits of the peoples who relate them with such gusto (White, 1975: 134-40), and the Berndts have pointed out that the sexual fantasies and evil doings depicted in these myths cannot be interpreted as a 'pattern for living' (Berndt and Berndt, 1970: 244) nor even as cautionary tales since most of the crimes are unpunished. White suggests that these myths, where ordinary existence suddenly becomes absurd or horrible, are like nightmares acting out the suppressed desires or fears of the participants in the ceremony (White, 1975: 137-8).

At Yirrkala on the coast of Arnhem Land, these motifs of pursuit and rape are replaced by domestic harmony. There the constellation of Orion is said to be a canoe full of fishermen, the Tjirulpan, while their wives, the Pleiades, are in another canoe, all having arrived from another land to the east. On their way the men caught a turtle and the women two large fish, but as they were nearing the shore a heavy storm capsized the canoes and drowned the people. The two canoes, the men and women, the turtle and the two fish (adjacent clusters of stars in the Milky Way) are all visible in the sky for the whole of the wet season (December to March) (Mountford, 1956: 500). In its basic form this legend carries a warning against the dangers of fishing when storms are imminent, but in northeastern Arnhem Land it carries the added moral message that the fishermen drowned as a punishment for catching catfish, forbidden to this tribe by totemic law. On nearby Groote Eylandt, the three stars of Orion's belt are three fishermen, the Burum-burum-runja, and the Pleiades are their wives, the Wutaringa women. The stars of Orion's sword are the fish that they have caught and their campfire (Mountford, 1956: 482) (Figure 10).

To the Aborigines around Milingimbi, the stars of Orion, the Hyades, the Pleiades and many adjacent stars are all part of the Aboriginal constellation of Tjilpuna (the Canoe Stars) which dominates the evening sky during the wet season. The three stars of Orion's belt are seen as three fishermen, the Tjilpuna, sitting in one end of a canoe; their wives, the Pleiades, sit at the other end. The fish they have caught is the constellation of the Hyades, while the fish in the sea are other groups within the Milky Way (Mountford, 1956: 493) (Figure 11).

THE MAGELLANIC CLOUDS

Although relatively insignificant (and best located with the peripheral vision), the Magellanic Clouds feature in many Aboriginal legends involving close relationships. On Groote Eylandt they are believed to be the camps of an old couple, the Jukara, who have grown too feeble to catch their own food. Other star people catch fish and Lily bulbs for them in the Milky Way and bring them



Figure 10 Bark painting from Groote Eylandt illustrating the myth of the three fishermen, Burum-burum-runja (Orion's belt). The top star of Orion's sword is their fire, and the next two are fish they have caught. Above them are their wives sitting in their circular grass hut. (Mountford Collection, State Library of South Australia.)

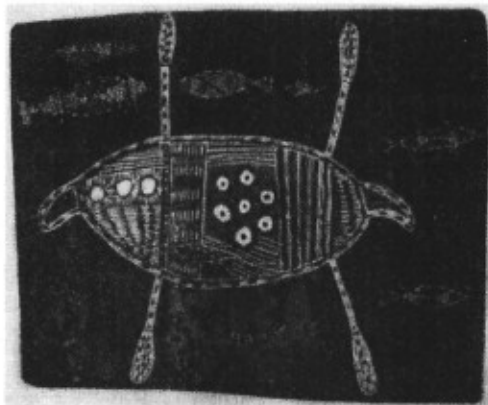


Figure 11 Bark painting of the Aboriginal constellation of Tjilulpuna, the canoe stars. The Tjilulpuna (Orion's belt) are in the left end of their canoe, while their wives (the Pleiades) are in the middle. The paddles are long lines of stars stretching north and south including some of the stars of Gemini and some of Eridanus. The fish in the canoe is the constellation of the Hyades. The fish outside the canoe are groups of stars in the Milky Way. (Mountford Collection, State Library of South Australia.)

to the Jukara to cook on their fires. The Large Magellanic Cloud is the camp of the old man and the Small Cloud that of the woman. The space between them is their cooking fire, while a bright star called Angnura (probably Achernar – Alpha Eridani, magnitude 0.49) represents their meal (Mountford, 1956: 484–5). This story suggests a celestial model of compassion for the aged (Figure 12).

At Yirrkala on the coast of Arnhem Land, the Magellanic Clouds are said to be the homes of two sisters, each of whom has a dog. The elder sister and her dog live in the Large Cloud and the younger sister and her dog in the Smaller Cloud. During the middle of the dry season the elder sister leaves her younger sister, but during the wet season she is persuaded to return so that they can go out together collecting yams (Mountford, 1956: 500) (Figure 13). This story reflects the observed fact that at this latitude, 12°S, only the Small Cloud is visible during the dry season (April to September), whereas both Magellanic Clouds can be seen during the wet season. To the Boorong the Magellanic Clouds are *kuuru kuuron* and *gnaerang kuuron*, a pair of brolgas (Dawson, 1881: 99).

For the Pitjantjatjara of the Western Desert, on the other hand, the Magellanic Clouds are two sky heroes, the Kungara bothers, whose camp fires



Figure 12 Bark painting from Groote Eylandt showing the Magellanic Clouds. The lower design (the Large Cloud) is the camp of the old man Jukara and the upper design (the Small Cloud) that of his wife. The oval between them is the fire (Achernar) on which they cook the food the other star people bring them. (Mountford Collection, State Library of South Australia.)

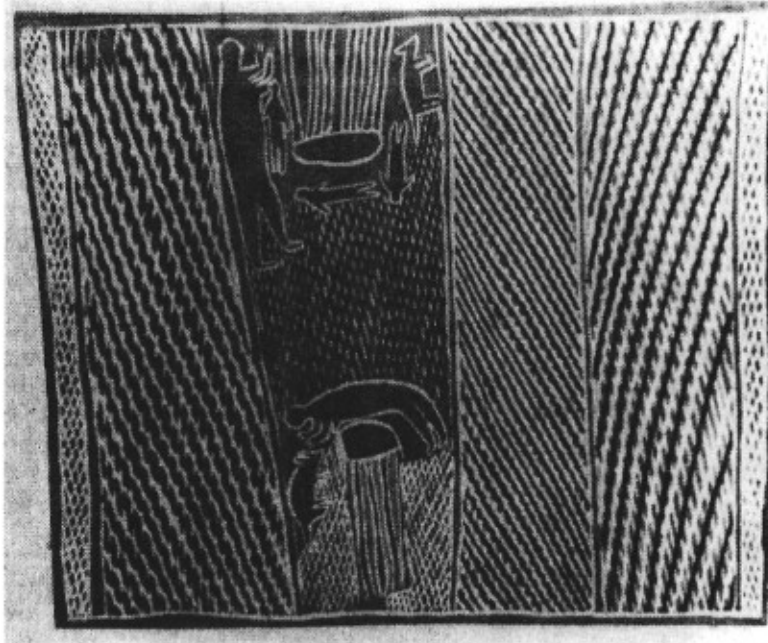


Figure 13 Bark painting from Yirrkalla showing the Magellanic Clouds as the two sisters. The lower portion is the older sister, Nujai, with her dog; the upper part shows the younger sister, Narai, with her dog. The oval figure is their fire, and the parallel lines are the burning logs. (Mountford Collection, State Library of South Australia.)

are Achernar (Alpha Eridani) and Canopus (Alpha Carinae). The Kungara decide on the fate of a dying person's spirit or *kuran* for, if the person has been evil, the elder Kungara (the Large Cloud) spears the *kuran* and takes it to the younger brother's camp fire, where it is cooked and eaten. But if the dying person has led a good life the elder Kungara protects the spirit from his younger brother (Mountford, 1948: 168).

SCORPIUS

The constellation of Scorpius is prominent in the southern sky. In the Western Desert it carried a moral message, 'being associated with two lovers who violated the tribal laws of initiation. In the complex, illustrated story related to the anthropologist Charles Mountford, a girl was strongly attracted to a youth who was undergoing circumcision as part of his initiation and was therefore forbidden to be seen by women for the prescribed time. The girl however approached him and persuaded him to engage in sexual intercourse. Unfortunately the youth's penis was so swollen from the circumcision that they were unable to separate so the resourceful girl, knowing they would be killed if discovered, took the youth in her arms and flew into the sky. They were pursued by the boy's guardians (Lambda Scorpii is the older guardian and paired stars in the Milky Way are their footsteps) and the star cluster below the constellation represents their throwing sticks and boomerangs flung at the fugitives. The boy and girl are small paired stars to the right. M7 is the boy's ceremonial headdress, which was knocked off during the chase (Mountford, 1976: 457-60) (Figure 14).

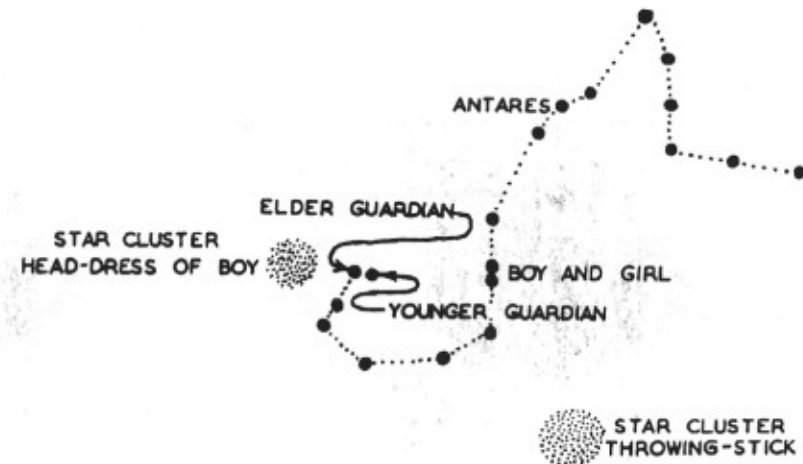


Figure 14 Diagram showing the initiate and the girl in the constellation Scorpius. (After Mountford, *Nomads of the Australian Desert*.)

THE SPACES BETWEEN

The European zodiac focused on the constellations and, with the single exception of the very conspicuous Coal Sack, a dark nebula near the Southern Cross, ignored the dark patches of the sky. Aboriginal myths, on the other hand, also attempted to account for the spaces between the stars. The Coal Sack itself featured prominently: the nest of the wedge-tailed eagle (Mountford, 1976: 450); as a waterhole surrounded by sky heroes; as a *torong* (the fabulous horse-like bunyip) (Dawson, 1881: 99), and as the boat of fishermen drowned in the sky river (Milky Way). For people of the western Kimberley a dark patch between Alpha and Beta Centauri is Galalang, an ancestral hero, and the two stars are feathers from his headdress (Worms, 1986: 129). The Ngadadjara people of the Warburton Ranges in Western Australia saw in a long line of dark patches along the Milky Way between Alpha Centauri and Alpha Cygnus a great totem board made by two ancestral heroes, the Wati Kutjara, while they were accompanying the Seven Sisters (Tindale, 1936: 169), and many other small dark areas in the sky are incorporated into myths.

Perhaps the most striking of Aboriginal constellations to Western eyes is the giant emu, known by the Boorong as Tchingal. Recognition of it depends on seeing shapes of dark nebulae outlined against the brilliance of the Milky Way. The Coal Sack represents Tchingal's head and beak, his long neck is indicated by the Pointers of the Cross (Alpha and Beta Centauri), and his body by the dark space just short of Scorpius (Morison, 1996: 109–11).

EXTRAORDINARY OCCURRENCES

If we assume that the myths discussed above evolved for one of the reasons outlined above: to fill a calendrical function, to explain the origins of natural phenomena, to reinforce behavioural norms and ritual obligations or to act out subconscious fears and fantasies, then irregular celestial events would seem to be of less interest as the raw material for myth. This conforms with the apparent paucity of actual stories incorporating non-recurrent phenomena. There were 'explanations' for eclipses, meteors, comets and aurorae, but they seem not to have been integrated into narratives such as might be acted out, danced or sung. Moreover, the explanations almost invariably involve regarding the event as a portent of death or disaster, present or imminent, so that they, too, can be seen as expressions of the wish to preserve and reinstate the order of the universe. Once the death or disaster has occurred, normality will be restored.

Eclipses

An eclipse of the sun is a dramatic event. For the Aborigines, who would not have predicted it, it was a source of great fear. The Aranda people of Central Australia explained it as the Arungquilta, an evil influence, arriving from the west and attempting to set up camp in the sun, thereby obliterating its light. The Arungquilta could be evicted only by powerful magic exerted by skilled

healers and it was their efforts that restored the sun's light (Johnson, 1998: 87). In other Aranda explanations, an eclipse could be caused by a great black bird, *tia*, standing in front of the sun (Spencer and Gillen, 1966: 415–6). The Ngadjuri people of the Eyre Peninsula in South Australia regard a solar eclipse as being caused by two lizard men killing an old woman and her dogs. The sun is returned when one of the lizard men throws a boomerang to the east (Tindale, 1974: 135). In these cases the event is said to be triggered by some evil spirit or wrongdoing. That is, a violation of the moral order produces a discontinuity in the natural order, and this, in itself, is consistent with an overall universal order. In northwest Arnhem Land, on the other hand, a solar eclipse is integrated into the natural order itself, albeit in unpredictable terms; it is explained as the Moon Man copulating with the Sun Woman and temporarily obscuring her light (Warner, 1937: 538). Such an explanation requires no counter-magic in order to restore normality.

Eclipses of the moon are less dramatic and less fearful since the Moon Man nearly disappears every month. Lunar eclipses are usually explained in terms of the Moon Man's turbulent love life, as when his lover, the Sun Woman, finally overtakes him for a short time.

Meteors

Different Aboriginal groups have provided various interpretations for meteors. In northeastern Arnhem Land, because of their speed and unpredictability, they are believed to be sky canoes carrying the spirits of the dead to their permanent home (Peck, 1933: 169; Piddington, 1932: 394). Amongst the Yarralin people of the Northern Territory and the Kwadjji people of Cape York, shooting stars are believed to mark the passage of a dead person's breath or spirit to his own land if he has died far from home (Rose, 1992: 70; Montagu, 1974: 155).

To the Tiwi of Bathurst and Melville Islands, meteors are more sinister; they represent the gleaming eyes of the one-eyed spirit men, the Pipinjawari, who steal bodies and suck the blood of their victims, and their evil eyes are seen blazing as they streak across the sky looking for their prey (Mountford, 1958: 32). The Aranda and Luritja peoples of Central Australia regarded meteors as snakes, Kulaia, with fiery eyes that flew through the sky and landed in waterholes where they lay in wait for the unwary (Strehlow, 1968: 30). In these and most other stories, the advent of meteors is associated with some unfortunate event, usually an imminent death, a sign from already deceased relatives (Roth, 1984: 8), or a lurking enemy (Roth, 1984: 8). However, other groups regarded them as a sign to a prospective father that a spirit child was 'moving on the sky-path to be born to his wife' (Harney and Elkin, 1949: 142).

In areas of New South Wales, meteors were associated with fire and linked to the waratah plant, *Telopea speciosissima*, a member of the *Protea* family, which is resistant to fire and whose brilliant red flowers seemed to the Aborigines like sparks from a fire. This was why, in the early years of white settlement, some Aborigines brought waratahs to the European blacksmiths:

they identified the sparks from the anvil with the sparks from meteors and hence with the waratahs (Peck, 1933: 168).

Comets

Comets were widely believed to be flaming spears hurled across the heavens by ancestral figures. The Pitjantjatjara people of the Western Desert, for example, called them *wurluru*, and associated them with a powerful sky hero who occasionally flung his spear across the sky. Similar beliefs were prevalent among the Aranda and Luritja people of Central Australia (Strehlow, 1968: 30). Early last century Aborigines living near Adelaide told Edward Eyre, the noted explorer, that a particularly spectacular comet was an omen that sorcerers from the north were about to destroy the town, especially all the Europeans and their houses (Reynolds, 1983: 89).

Aurora australis

This spectacle is visible only in southern areas of the continent and, like the other erratic phenomena discussed above, it was normally associated with impending disaster of some kind. Gippsland Aborigines of Victoria attributed it to the fire of an ancestral hero warning of catastrophes (Worms, 1986: 112), while the Dieri of the Lake Eyre region saw it as 'a charcoal fire of indignation' (Dawson, 1881: 101).

NEW MYTHS

All the stories recounted above can be considered traditional myth stories, with little if any evidence of elements deriving from European contact. They were believed to be true accounts of events and therefore, in a sense, historical constructions. Those associated with the Ancestors of the Dreaming are regarded as having an eternal quality, that is, like the Dreaming, they are believed to be true not just in the past but for all time. This should not necessarily be taken to mean that they have remained unchanged over countless generations. Nevertheless, as anthropologists Ronald and Catherine Berndt conclude: 'the nature of the mythology suggests that we are in the presence of a body of literature that is associated with a continuing tradition; that its narrative form and structure have persisted and been insulated to some extent from outside interference because of the high value that Aborigines place on their heritage' (Berndt and Berndt, 1989: 402). For indigenous peoples whose traditions have been eroded or even totally lost through the dispersal of the original clan groups, the traditional songs and dances could not be performed and the young people were therefore ignorant of these stories, leaving them culturally and spiritually deprived of their birthright.

However, Aboriginal storytellers are now also telling new stories which may include events contingent on contact with non-indigenous peoples. For example the Yanuwa song 'Little Eva at Moonlight Creek' from the Gulf of Carpentaria in the Northern Territory records the crash of a US Air Force B-24 bomber

called *Little Eva* at Moonlight Creek on 1 December 1942 and the involvement of the local Yanuwa and Garrawa people in searching for survivors (Duwell and Dixon, 1994: 3-21).

Visitors to Alton Downs, a cattle station on the Birdsville Track in Central Australia, are impressed that Aboriginal stockmen recount not only traditional stories like those already outlined, but modern versions incorporating artificial satellites whose tracks and time of appearance they know with great accuracy (J. B. McGuire, 1997).

RELATION TO WESTERN ASTRONOMY

From the sample of myths described here, it will be apparent that, with the possible exception of meteors (and even they can be regarded as recurrent events), the Aborigines were mainly concerned not with extraordinary occurrences, but with the regular patterns of natural phenomena. The legends served to integrate a potentially alien universe into the moral and social order of the community, by 'humanising' species and natural objects and ascribing to them behaviour patterns and motivations which accorded with those of the group.

Such a philosophy served a number of important social functions. In the first place it engendered a level of confidence about the place of human beings in the universe, not as superior beings but as equal partners; in this it fulfilled a role comparable to that of technology which also offers a level of some control over the environment. Secondly, it cultivated respect for the inanimate as well as the animate, since all were regarded as partaking of the same spiritual identity and maintaining enduring links with the Dreaming. Thirdly, the legends provided a justification for the customs, rites and morality of the group, as these were believed to be reflected and re-enacted in the sky world.

The most radical difference between the vitalistic beliefs which underlie these myths and the materialistic philosophy of western science concerns the relationship of the observer to the observed. Within the framework of Newtonian science, the observer is theoretically regarded as independent of, and distinct from, the object observed and this object, in turn, is uninfluenced by the observer. Hence, the relationship between physical objects can be validly expressed in mathematical terms which remain true irrespective of the observer. The Aborigines, on the other hand, did not conceive of themselves as observers separated from an objectified Nature, but rather as an integral part of that Nature. The meaning of the stars, as of everything else in the environment, was neither self-evident nor independent of the observer; rather it depended on the degree of initiation into tribal lore which elucidated the links between tribal customs and natural phenomena. Without this knowledge the individual was disoriented and powerless in an alien universe.

The arrival in *Terra Australis* in 1770 of European astronomers, imbued with a mathematical and reductionist understanding of the world, was to have an effect on this mythical framework no less radical than the impact of white society on the land and status of the Aborigines themselves. Indeed the wholly Eurocentric intellectual structures of colonial scientists made it virtually impos-

sible for them to understand or evaluate Aboriginal astronomy or any other indigenous scientific knowledge. However, with the re-evaluation in Australia of Aboriginal social systems, there has been a corresponding movement in contemporary Western thought away from the belief that mechanism, reductionism and determinism are the only satisfactory ways of understanding the world. A progressive disenchantment with mechanism, now frequently seen as leading to an alienated and dysfunctional relationship with the natural environment, has elicited new models stressing complexity and relationship. The physicist Paul Davies writes that, 'Matter as such has been demoted from its central role, to be replaced by concepts such as organisation, complexity and information' (Davies, 1992: 23). The recent models of Lynn Margulis and Dorion Sagan (1987) which stress complex symbiosis, networks and relationships, the 'post-modern challenge to biology' issued by Charles Birch (1988) and N. Katherine Hayles's discussion of the 'cosmic web' as a metaphor of interconnection (Hayles, 1984) have all, in a practical sense, been anticipated by the social structures of the Aboriginal Australians and the integration of their knowledge systems within that framework.

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