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## Natural Cycles and the Stars

### Seasonal Calendars

Aboriginal and Torres Strait Islander peoples' knowledge of the interdependence of natural systems and cycles is, fortunately, quite well documented. One such account comes from George Augustus Robertson, a one-time Chief Protector of Aborigines, who regularly camped out with Tasmanian Aboriginal people during the 1830s. He reported that he had a deep respect for the Aboriginal people's ability to read the clouds, the moon and the stars, thereby forecasting the weather in one of the most changeable climates in Australia.

'I have seldom seen them to err', he wrote in one of his numerous reports.<sup>1</sup> This particular facility was also noted among groups in western Victoria:

great reliance is placed by the natives on certain signs, as indicating a change in the weather ... They notice the appearance of the sun, moon, stars and clouds, the cries and movements of animals, etc. A bright sunrise prognosticates fine weather, a red sunrise, rain; a red sunset, heat next day; a halo around the sun, fine weather; a bright moon, fine weather; the old moon in the arms of the new, rain; the new moon lying on its back, dry weather; a halo around the moon, rain; a rainbow in the morning, fine weather; a rainbow in the evening, bad weather; a rainbow during rain, clearing up; when mosquitoes and gnats are very troublesome, rain is expected; when the cicada sings at night, there will be a hot wind next day ... They believe that, in dry weather, if any influential person takes water into his [sic] mouth, and blows it towards the

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1 Quoted in Blainey 1975:22.

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setting sun, saying 'Come down, rain,' the wind will blow and the rain will pour for three days.<sup>2</sup>

Of such importance was a knowledge of the stars in denoting the particular seasons of the year, that it was considered to be one of the principal branches of education.<sup>3</sup> In some parts of the continent, contemporary management strategies have been put into place taking this knowledge and experience into account. The depth and detail of this knowledge best shows in localised contexts. There is great diversity in natural phenomena that give clues to seasonal change, which in turn determine the timing of activities and changing foci of social, economic, domestic and ceremonial practices.

Aboriginal people traditionally had no methods for accurately measuring and recording the annual circuit of the sun, but various indices were chosen to indicate the progression of time and season. Cairns<sup>4</sup> hypothesises that message sticks and rock engraving could have been used to record the timing of ceremonies, tribal meetings, menstruation and gestation cycles, but evidence is sparse and controversial. Yet the changing parade of stars and star patterns was a clear and well-recognised index of seasonal changes at least. 'The appearance of certain constellations heralds or coincides with particular terrestrial events and is in some cases believed to be responsible for them.'<sup>5</sup>

The northern aspects of any Australian night sky show a changing order of stars, whereas the southern aspects show the same stars but in differing positions because of Australia's apparent location beneath a revolving south celestial pole. 'When the rising of a star is expected (on the Torres Strait Islands), it is the duty of the old men to watch. They get up when the birds begin to cry and watch till daybreak... The setting of a star is watched in the same way.'<sup>6</sup>

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2 Dawson 1981:98.

3 Dawson 1981:99.

4 Cairns 1993:140, 145.

5 Lowe and Pike 1990:110.

6 Rivers in Haddon et al 1912(4):224.

Food gathering and hunting locations and practices changed according to the seasons. The Victorian Mallee Aboriginal people, for example, knew by the appearance in the northern sky of the star known to Europeans as Arcturus (*Alpha Bootis*) that the prized larvae of the wood-ant were coming into season. When Arcturus, known as *Marpeankurrk*, set with the sun, the larvae were finished.<sup>7</sup> This observation was also tied to a notion that *Marpeankurrk* was an ancestor who originally discovered the larvae and after death became a star in order that she could indicate to the people when the larvae were coming into season. The appearance at sunrise of Arcturus was also a signal in Millingimbi in Arnhem Land and indicated that the spike thrush (*rakia*)—a type of water chestnut (*eleocharis* sp.)—was ready for collection.<sup>8</sup> The availability of this same corm or groundnut was signalled differently just a few kilometres further east.

In north-east Arnhem Land, the ‘lily star’ (planet Venus to Europeans) when low in the western sky just after sunset indicated the time of the *rakia*. The pied magpie-geese with their hard hooked beaks also came in flocks to feed on these groundnuts, so they became easily available food to the local Aboriginal people, who moved in family groups to the plains near the sea. The corms of the spike thrush were also softened considerably when they were taken directly from the gullets of the pied geese. Many Aboriginal groups joined together on the coastal plains to enjoy the profusion of food. As a result, it also became a time for mutual ritual activity.<sup>9</sup> In the south, Vega (*Alpha Lyra*) was significant to the Boorong people of the Victorian Mallee, as it indicated when the mallee-hen’s eggs are available for collection (during October) as food.<sup>10</sup>

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7 Massola 1971:44, Stanbridge (1857) in MacPherson 1881:72.

8 Mountford 1956:495.

9 Wells 1973:21–30.

10 Stanbridge (1857) in MacPherson 1881:72.

Other fragments suggest that Aboriginal people of eastern New South Wales<sup>11</sup> (particularly around the Clarence River)<sup>12</sup> as well as groups in the Western Desert<sup>13</sup> saw the Pleiades, (see Diagram 1) when appearing in the east early in the evening, as heralding warm weather. When this open star cluster set with the sun, people of the Western desert saw it as a temporary departure, leaving only for the winter. Its heliacal rising coincided with the coming of the dingo pups and marked the beginning of a new cycle (late autumn). The cycle began with the cold weather, then dry times, followed by hot times and then the time of the rains, which were generally regarded as 'the good time'. In 'good times', camps with a good view, on soft ground without prickles, near supplies of firewood, could be set up almost anywhere. Water was abundant, with claypans and other temporary storages being full. Everything was green and growing in lush abundance. After rains, all old tracks were washed away and every new track was a fresh mark on a clean sheet, so animal tracking was much easier. The coming of the dingo pups came earlier in Arnhem Land, and Orion rising at dawn (about June) signalled this propitious event.<sup>14</sup>

The Pleiades, when they were in the sky before dawn in the Great Sandy Desert of Western Australia, were seen as a signal of the onset of the coldest nights. According to local myth, the Pleiades women dropped water on the people sleeping below, causing them to shiver with cold.<sup>15</sup> This is much the same for the Adnyamatana people of the Flinders Ranges of South Australia. At this time (July), they also signified *malkada*-time, the time of initiation for boys<sup>16</sup>. A similar tradition existed among the Aranda and Luritja groups of Central Australia. Here they were seen as a group of women and were also associated with

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11 Massola 1971:44.

12 Mathews 1905:77–78.

13 Tindale in Hiatt 1978:158–159.

14 Elkin 1974:32.

15 Lowe and Pike 1990:110.

16 Tunbridge 1988:16.

frost.<sup>17</sup> Among the Muruwuri people from inland New South Wales and Queensland border areas (as with their Western Desert counterparts), the Pleiades, when rising about three hours before dawn, were seen to be women who urinated regularly creating ice (or frost) before sunrise.<sup>18</sup> The Adnyamatana people in South Australia viewed the Pleiades women as having a pouch like that of the kangaroo. The pouch was believed to be filled with fine white frost crystals which streamed from the women as they crossed the sky.<sup>19</sup>

When the constellation known to Europeans as Scorpius (see Diagram 3) attained a particular position in the night sky, the people of Groote Eylandt knew that the wet season was about to cease and the south-easterlies were due.<sup>20</sup> When it was high in the early morning sky, people at Yirrkala knew that the Malay fishermen would soon arrive on their yearly visit to collect trepang (sea cucumbers).<sup>21</sup>

A most explicit example of the coordination of seasonal activities and star cycles is recorded by Sharp (1993). Her detailed study of the Meriam people of the eastern Torres Strait indicates the great significance of star knowledge and of one constellation in particular. *Tagai* (or *Togai*) is a mythical ancestral hero who belongs to all Torres Strait Islanders. He is represented in the night sky as an island-man and is envisaged as standing in a canoe. In his left hand, he holds a fishing spear, the three-pronged head of which is represented by the Southern Cross (*Crux Australis*). In his right hand, he holds an apple-like fruit, known as a Eugenia, represented by the constellation of the Crow (*Corvus*). The vast constellation of *Tagai* consists of the European constellations of Sagittarius, part of Telescopium, Scorpius, Lupus, Centaurus, the Southern Cross, *Corvus*, part of Hydra and one star of Ara. *Tagai* himself is composed of Centaurus and Lupus (his eyes

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17 Strehlow 1907:23–24.

18 Mathews 1982:13–14.

19 Mountford 1939:103–104.

20 Mountford 1956:94.

21 Mountford 1956:504.

are *Gamma* and *Mu Centauri*, *Phi Centauri* is his chin, *Eta Centauri* is his navel, and *Kappa Centauri* and *Beta Lupi* are his testes). He stands in front of his canoe which consists of the body and tail of Scorpius, the canoe's anchor is represented by Sagittarius and part of Scorpius and Telescopium is a sucker-fish below the canoe (see Diagram 2 and Drawing 1). In addition, there are twelve crewmen, six of whom are represented by the Pleiades group and the other six represented by the stars in the belt of Orion.<sup>22</sup> The rhythm of the Meriam people's lives followed the movement through the night skies of this large constellation. The stars of *Tagai* ushered in seasonal and ceremonial changes and acted as a guide to voyaging, cultivation and fishing.

The myth itself tells the story of *Tagai* and his twelve crewmen who consisted of *Usiam* (the Pleiades), and *Seg* (the three stars in the belt of Orion) (see Diagram 1). These crewmen stole the food and drink which had been prepared for a voyage. As a result, they were all thrown overboard into the sea by *Tagai*, their images set into star patterns forever.

The *Seasonal Calendar* of Meriam life reflected the changes in the seas, the winds, the stars and the land, and moved through cycles of abundance and scarcity, renewal and harvest, wet and dry. As island cultures (there are three islands - Mer, Daua and Waier), dependent on sedentary agriculture and fishing, they allowed the winds and tides to set the pace. Seasonal changes dictated the social agendas in Meriam life: differing food availability affected diets, activities changed and variations in mood, hopes and expectations were the lot of everyone.

There were four main seasonal times - *kerker-naiger*, *koki*, *ziai* and *sager* - each closely associated with the prevailing winds (see *Seasonal Calendar* following). Mid *naiger* (early October) began the cycle, when the constellation of *Tagai* rose in the east. Firstly at dusk, *Usiam* (the Pleiades) with *Seg* (Orion's belt) nearby, appeared in the north-east sky. *Usiam*-time (Pleiades-time) was the time of planting. It was regarded as a time of renewal, of re-beginning. It also marked the commencement of the ritual cycle, when, after preparations, voyaging expeditions to the Papuan mainland, other islands and Cape York took place for

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22 Sharp 1993:3,4; Rivers in Haddon 1912:219.

commodity and ritual exchanges. At the same time, a star known as *abud wer*<sup>23</sup> signalled the approach of the first rains. When the Southern Cross (*Crux Australis*) found the left hand of *Tagai*, it signalled to the gardeners that it was time to plant important yam varieties. Before the complete appearance of *Tagai*, garden preparations should have been completed.

In December, a total stillness and the appearance of a rainbow-like sunset signalled the arrival of *koki kerker*, generally a time of heavy rains, during which there was luxuriant growth. Planting continued using the tides and the moon to indicate the most propitious times. The prescriptive schedule indicated that when the tide was rising and flooding, planting should have been done and when the tide dropped, planting stopped. At new moon, vegetables that fruit above ground should be planted, and at full moon, plants with root food that grows down should be planted. When the full moon rises, sweet potato should be planted, making sure that it is positioned facing towards the full moon. The people took up residence in round houses on family lands along the sandy beaches for extra protection against the rains. Although vegetable products were scarce, bananas and coconuts were available, and fishing was very good, especially in the fish traps prepared by the people earlier in the cycle. Birds were hunted, particularly the frigate bird and the tern.

As the rains ceased with the cooler weather, it was *ziai kerker* (the month of March). It was signalled by the winds turning around to the south. Early vegetable foods were harvested and fishing yields were high.

*Sager kerker* was signalled when the rainbow fish appeared and the kingfisher returned to the islands in early April. Harvesting began in earnest, particularly of the yam, thirty varieties of which were grown by the Meriam people. The planet Venus was the sign of the height of the harvest. Fish continued to be plentiful. Eugenia, the red-skinned apple-like fruit (*Corvus* in *Tagai's* right hand), fruited and local ceremonies and feast offerings between reciprocal clans began. *Sager kerker*

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23 Not specified by Sharp.

also heralded the approach of one phase of the three-yearly cycle of rites of *Malo* (an ancestral hero of ecological significance). These rituals involved initiation ceremonies and preparation rites for maritime expeditions or *wauri*. The dances of the *Malo* rites symbolised the waves that would carry the voyagers, as friends of *Malo*, safely onto other places. This season was one of replenishment, when grass-vine and bamboo-thatched house-building and maintenance took place. Tools, weapons, fishing lines and nets were renewed and repaired.

As the weather became drier and hotter from August onward, the early *naiger kerker* announced itself, especially when the turtles began mating. Fishing was poor and vegetables were scarce. Garden preparation, using slash and burn techniques took place, as well as preparation activities, including outrigger-canoe maintenance, for *wauri* voyages.

The *Seasonal Calendar* of the easterly based Meriam people makes an interesting comparison with the more westerly situated people of the islands of Mabuiag and Muralag in the Torres Strait.<sup>24</sup> There were four main seasons - *surlal*, *raz*, *kuki* and *aibaud* (see *Seasonal Calendar* following).

*Surlal* (mid-October to late November) began the yearly cycle and took its name from the readily caught copulating turtles, indicating their abundance as food. The *baidam* or 'shark constellation', which consisted of the seven major stars of Ursa Major together with Arcturus (*Alpha Bootis*) and *Gamma Corona Borealis*, appeared low in the evening sky close to the reef (see Drawing 3). It was the dry season and all was withered and dried up. The yams harvested in the previous season were still available for eating. The sounding of the first thunder acted to signal the time for re-planting of the many varieties of yams.

*Raz* (early December to late February) was described as the 'time of die', meaning the season when leaves died down. Early in the season cashew nuts fell and young yams began to sprout. The winds shifted around readily. In mid-season, large numbers of jellyfish appeared and the runners on the yams began to grow.

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24 As discussed by Rivers and Ray in Haddon 1912(4):26–28.





Seasonal Calendar of the Meriam People (based on information in Sharp 1993).

*Kuki* (early March to mid May) was the season when strong winds blew intermittently from the north-west, accompanied by deluges of rain. During the intervals between storms, there was no wind and the seas became calm and glassy. It was very humid. The yams were not ready to eat so vegetables such as *kolap* (Queensland bean) were eaten. The appearance of Altair (*Alpha Aquilae*), Beta and Gamma *Aquilae* (part of the *Dogai*, a female bogey constellation) heralded the beginning of the season. The appearance of the constellation *bu*, 'the trumpet shell' (*Delphinus*) was also significant (see Drawing 4). According to

one Mabuiag man, 'Dogai go first, *bu* come after. When *bu* go down blow comes, wind not strong.'<sup>25</sup>

*Aibaud* (late May to early October) was the harvest season, when roots were strong and food (especially taro, sweet potato and wild yam) was abundant. The south-west wind began to blow steadily. The season was marked by the appearance of Vega (*Alpha Lyrae*), *Beta* and *Gamma Lyrae*, also part of the *Dogai* constellation. The appearance of a star known as *kek*<sup>26</sup> (see Drawing 2) signalled the time for the performance of various ceremonies. According to one Mabuiag man, 'Kek come up and is sign (*mek*) for everything to be done, start meeting'. *Dideal*<sup>27</sup> and *Usal* (the Pleiades) also appeared. When the crab, *Getalar* appeared,<sup>28</sup> the *birubiru* birds migrated from Papua New Guinea south to Australia, as did the Torres Strait pigeons when *baidam*, the shark constellation (see Drawing 3), appeared heralding the beginning of another cycle. When only the tail of *baidam* was above the horizon, the north-west wind began to blow 'a little bit', but when the tail had gone down altogether, it was time to begin to plant yams. When *baidam* came up again, yams, sweet potatoes and bananas were known to have ripened.

*Tagai* or *Togai* was also significant in the more westerly islands of the Torres Strait (see Drawings 5 and 6). Legend had it that *Togai* and his brother *Koang* were sent out in a canoe to get turtle-shell for their (maternal) nephew *Kwoiam*. Both brothers could make fine weather but *Togai* excelled. On this particular voyage, the crew consisted of *Utimal* (probably the stars in Orion's belt), *Usal* (the Pleiades) *Kwoior* (star not determined) and *Keg* or *Kek* (Achernar). These men stole the water belonging to *Koang* and *Togai*. On a subsequent voyage, they were killed in revenge. The two old brothers told the dead men 'Usal, you go to New Guinea (*Daudai*) side, when you come up there will be plenty of rain. *Utimal*, you go to New Guinea side, you have to bring rain. *Kwoior*,

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25 In discussion with Rivers.

26 Probably Achernar (*Alpha Eridai*), according to Rivers.

27 Probably Orion, according to Rivers.

28 Probably a nebula, suggests Rivers.

different stars when you come up over *Buru* (Mangrove Island) just before the south-east monsoon sets in there will be rain in the morning, then the wind will shift and it will rain in the afternoon. And you, *Kek*, will come up in the south between *Badu* and *Moa*, and it will be cold weather. When you go round this way and when you come up, then the yams and sweet-potatoes will be ripe. You all have work to do.<sup>29</sup> The legend showed how these dead men were transformed into stars, their task being to usher in certain seasonal changes when they first appeared on the eastern horizon.

This notion of different stars ushering in different seasons (months or moons) is consistent with beliefs and ritual practices amongst the Kiwai Papuans in the Gulf District of Papua New Guinea.<sup>30</sup> There, *Tagai* (originally a Mabuiag or Saibai man from the Torres Strait) and his sons or younger brothers went spear-fishing. The youngest son or brother *Karongo* was reputed to be an idle fellow, behaviour which particularly irritated the other sons or brothers. *Tagai* finally became angry and speared *Karongo* hurling him into the sky to become Antares saying: 'You go down along ground (set below the horizon) first, before north-west he start blow'. Still in a rage, *Tagai* speared the others as well.

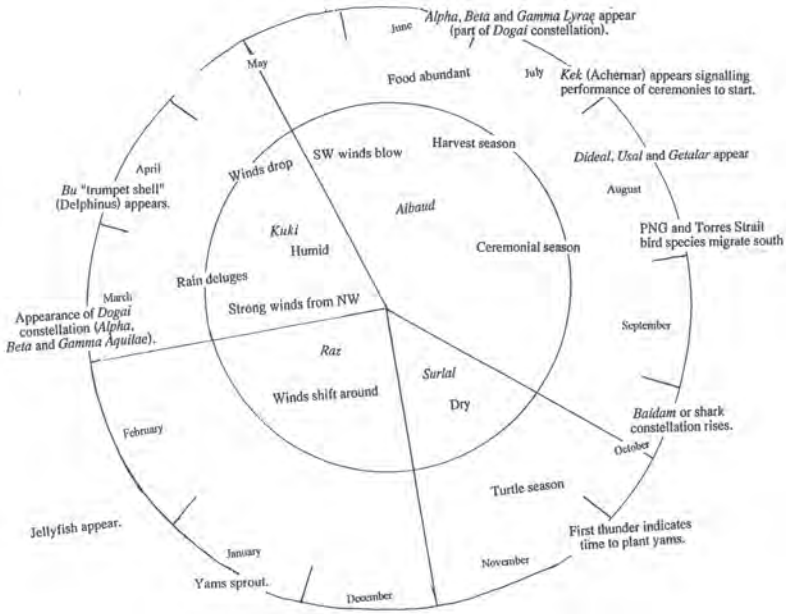
The next son or brother killed became Wega (Vega): 'Time belong you, you give him plenty fish, fine water all time'. And the next was turned into Atair (Altair), *Tagai* saying to him, 'Brother belong you, he give fish, you give plenty fish too. People no can sleep inside house, sleep underneath house, because belly he full, wind he no blow inside house, too hot'. The fourth son or brother was not designated a star, only a month (or moon); *Tagai* said to him, 'You belong blow, north-west he blow, rain wind; no give no chance (blows incessantly)'. The fifth became *Keke* (Achernar), *Tagai* saying 'I chuck away you, you go head he come up, you make him that wind blow'. The sixth son or brother became *Utiamo* (the Pleiades) with the ultimatum 'You fellow belong south-east, more south-east'. The next became Orion with 'You fellow belong south-east, more south-east he blow, no give chance (it blows

29 Rivers in Haddon et al 1912 (4):26.

30 Landtman 1917:482-484.

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incessantly). The last crewman became Capella, Sirius and Canopus: ‘More south-east he come, you make him come more blow, rain, wind make him more cold’.



Seasonal Calendar of the Mabuiag and Muralag Island People (Rivers and Ray Haddon et al. 1912 [4] [5]).

Having killed off all his crew, *Tagai* himself became the Southern Cross. He met his sons or brothers and said to them all, ‘Me go first, you follow behind me. I make him wind blow first, behind (then) you fellow make him.’ Ursa Major was considered to be the shape of the shark (*Baidamu*) and also part of *Tagai*’s crew. *Tagai* was reputed to have said to him: ‘That time fin belong you go down, more wind, more high water he come. Tail belong you he go down: make more high water. Head belong you come up, make plenty “fast turtle” (the copulating season of the turtles comes in). Look sundown: Oh, that star he no more stop, he been go away. Wait two, three day, look before daylight:

Oh, head belong Baidamu come up morning time'. The final star in the narrative was the morning star, to whom *Tagai* said: 'You come first, daylight come behind, you stand up close to daylight'. In one account of the myth, *Tagai* himself went up to the sky as a shooting star. His month (about October) is very hot and dry.

Another *Seasonal Calendar* of interest is the Gagadju (Kakadu) cycle (see *Seasonal Calendar* following). This particular seasonal model has been taken up by the Australian National Parks and Wildlife Department in its Management Plan of the Kakadu National Park.

In the coastal lowlands of the East Alligator River, there are six seasons - *gunumeleng* (October to December), *gudjewg* (January to March), *bang-gereng* (April), *yegge* (May-June), *wurrngeng* (June-July) and *gurrung* (August-September).<sup>31</sup> Movements of the people in this area are initiated by changes in food supply, comfort and ceremonial ritual, all of which are directly influenced by seasonal change.

*Gunumeleng* is the extremely hot and humid pre-monsoon season. Winds swing around wildly and storm clouds build up. Waterholes and billabongs dry up and the mud cracks. As the drought is broken by fierce thunderstorms and lightning, insects and frogs, reptiles, birds and mammals are fattened on the new plant growth. The Bunitj people move their camps away from the flood plains.

*Gudjewg* is the monsoon season, the 'big wet'. The wetlands fill and spring-tides move over the lowlands. There are no electrical storms, just prolonged, heavy rain and strong winds. There is an abundance of growth, and a profuse flowering. Lorikeets swarm over flowering eucalypts, magpie geese nestle in sedgeland and barramundi move into the grasses making them easy to spear. Other fish are plentiful and mangrove worms are deliciously fat.

*Bang-Gereng* is the season of light winds. There is still much water on the lowland areas and creeks run clear and profusely from sandstone. Most plants are fruiting and animals have given birth to their young. The end of the seasons is marked by a change in the flattening of

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31 Outlined by Bill Neidjie of the Bunitj clan, Gagadju language group, Neidjie et al 1985:18–23.

the native sorghum, giving the season its other name of ‘season of the knock-em-down storms’.

*Yegge* is the season when nights grow cooler and it is frequently misty in the early mornings. Winds blow constantly from the south-east, drying out the grasslands. Fires near campsites and green feed areas are lit, and the masses of insects which move before the fires are preyed upon by kites and wood-swallows. Many birds fly south as the season begins to dry out. Snakes and flying foxes are particularly favoured foods of the Bunitj people at this time of the cycle.

*Wurrngeng* is the cold weather time. Estuary food, mud and fiddler crabs become important and barramundi and mullet move into the more settled waters as the south-east wind picks up. Fires burn by day and heavy dews fall at night.

*Gurrung* is the time when the south-east winds warm the land, as the hot-dry season begins. The pandanus fruit ripen, snakes lay their eggs and when the stringybark flowers, honey is in abundance. Sharks and rays are fat and turtles lay their eggs on the sandy beaches. Well-fed emus, brolga, magpie geese, bandicoots and wallabies are hunted as food. The bush is dry and smoky as the thunderheads build up.

And so it happened that ‘geography and seasonality ruled Aboriginal lives through their effect on access and food supply ... not so much controlling the shortage of food but the maintenance of variety. Seasonal changes usher in new foods.’<sup>32</sup>

Again, it would appear particular stars signalled the seasonal changes for, according to Neidjie, whose Gagadju forebears have inhabited the area continuously for the last 25 000 years: ‘I look at star, I know just about time for wet season / may be time for dry season / I know from star. Well now that star over here, so look out for wet season. That star right down in December. When that wet come, that star come back. I say “Well, dry season coming”. The rain finish him up. October ... up high. November ... getting low. December ... right down.’<sup>33</sup>

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32 Fox in Neidjie et al 1985:25.

33 Neidjie (1985:55) does not indicate the particular stars to which he is referring.



Seasonal Calendar of the Gagadju People (based on information in Neidjie et al., 1993).

With the change in seasons, came the movement in the people's lives:

All these places for us ... all belong Gagadju. We use them all the time. Old people used to move around, camp different places. Wet season, dry season ... always camp different place. Wet season ... we camp high place, get plenty goose egg. No trouble for fresh water. Dry season ... move along floodplain, billabong got plenty food. Even food there when everything dry out. All Gagadju used to visit ... used to come here to billabong ... dry season camp. Plenty file snake, long-neck turtle. Early dry season ... good lily. Just about middle dry season ... file snake, long-neck turtle, lily flowering. Everybody camp,

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like holiday. Plenty food this place. Good time for ceremony, stay maybe one or two weeks.<sup>34</sup>

Another example of a *Seasonal Calendar* comes from the Yarralin people of the Victoria River Valley in the Northern Territory. In this version, the lower atmosphere phenomenon of the rainbow acts as the signal to seasonal change and is associated with all manifestations of water and water resources. The seasons themselves are conceptualised as being the actions of the sun, the winds and the Rainbow Snake. Deborah Bird Rose explains:

At this time (the late dry season - October and November) the earth has become so hot that it can hurt people's feet to walk on bare soil. the wind is blowing from the south-east - hot, dry and dusty. the country is parched, the animals have grown thin, the waterholes and billabongs are drying up. The sun, which is necessary to life, is beginning to destroy life ... As the blossoms (of the open savannah eucalypts) dry up, the flying foxes move to the river, roosting in the trees along the permanent waterholes. When the Rainbow snakes see the flying foxes, their Dreaming allies, hanging above them, they know it is time to move.

Now the rainbow is young and restless. It gets up out of the water, opens its mouth, and shoots out lightning and saliva. The saliva is rain and it contains tadpoles. The first rain alerts the lightning people. Lightning women flash their lightning with ever-increasing frequency, aroused by the Rainbow snake. The rain brings steam up from the hot earth; steam collects into clouds which carry more rain. Tadpoles turn into frogs who sit up and call for more rain. The wind shifts, coming now from the north-west.

These early rains arouse other species. Various grubs, as well as frogs, are "boss" for rain: they call on the rainbow to bring more. As the rain increases, the floodwaters rise, signalling the presence of the mature rainbow. The water becomes dark

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34 Neidjie et al 1985:41-42.



and muddy, forming whirlpools which are the rainbow in action. Careless people and animals can be sucked into these pools, drowned and perhaps eaten by the rainbows.

After a few months the rainbow has expanded its influence enormously: floods abound, the sky has been cloudy for a long time; the sun has been eclipsed by the rain. The flying foxes are said to have gone underwater to join the rainbow, and frogs stop calling for rain. The rainbow has been roaming abroad and is becoming “old and tired”.

The sun now asserts itself, burning the rainbow. At the same time, the wind shifts to the east and breaks the rainbow’s back. Burnt and broken, it retreats to the rivers. The east wind clears the skies and brings up cold weather. Dingoes and their litters, kangaroos and turkeys become fat; the whole emphasis of the world shifts from water to land, from rain to sun, from river resources to land resources. When the country dries out, the white gum trees blossom and the flying foxes return. Cold weather recedes as the sun takes over the sky and heats up the earth, and the whole cycle begins again.

It is curious that despite severe extremes in the cycle, the Yarralin people view the country as a land of abundance and plenty for those who know how to use it. Predation on various species, for example, depends on precise knowledge about their particular ecosystem, as well as how much food they already had, how many people there were to feed at any time, what the condition was of the animal or plant population and whether the animal or plant was restricted because of its perceived relation as their ‘countrymen’ or ‘flesh’.<sup>35</sup>

Among the more southerly Yaraldi (Jaralde) of the Murray River and Lakes region of South Australia, four seasons are distinguished: *riwuri* (spring), the time of growth and mating from August to October; *Iuwadang* (summer), the time of warmth from November to January; *marangani* or *marangalkadi* (autumn), the time of the Crow from

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35 Rose 1992:100.

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February to April; and *yutang* (winter), the time of the cold from May to July<sup>36</sup> (see *Seasonal Calendar* following).

The 'red star' Mars (*Waiyungari*, a mythical ancestor who eloped with the two wives of another great ancestor, *Nepeli*) was seen to be responsible for spring and personified sexual activity and fertility. *Waiyungari* was also the 'patron of all hunting' and therefore the object of ritual activity. *Marangani* was the name of the Crow, also an important mythological figure, regarded as being propitious for fishing and responsible for the ebb and flow of tides, and one whose season coincided with the juxtaposition of certain stars. During the coldest time, the people retreated into huts with skin cloaks and rugs. It was envisaged that the Crow spent little of his time in the sky, so busy was he in the huts of various women. When the people considered that the westerly winds should have abated, the old men would go out and examine the moon: if it appeared clearly, they knew the gales would soon recede.

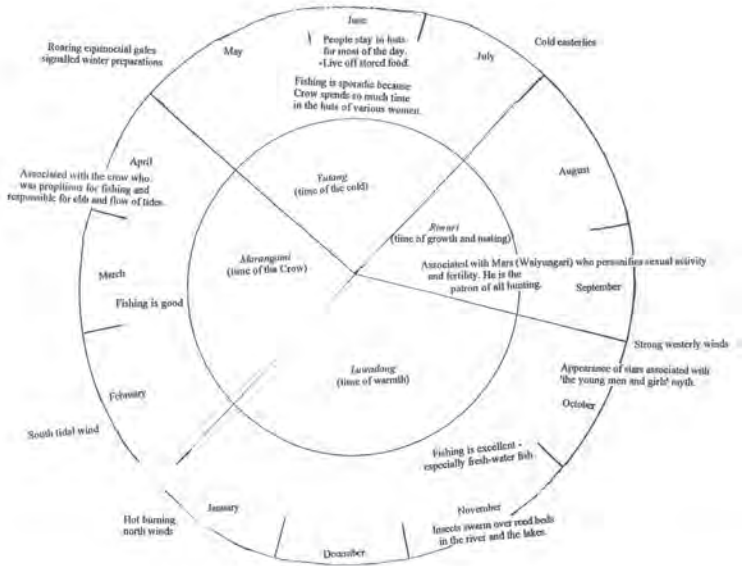
Another significant group of stars known as 'the young men and girls' appeared in September and October and disappeared in March-April. During this time, the particular star clusters drew closer together and were said to be 'playing together'.<sup>37</sup> The husband and wife anthropologists, Berndt and Berndt, comment that 'while this was regarded as mirroring the normal association of males and females, it also symbolised the antithetical nature of that relationship which served as an interruptive influence on the initiatory sequence'.<sup>38</sup> The seasons, then, are associated with the appearance and disappearance of mythological heroes and heroines represented as stars, whose interwoven stories link

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36 Berndt and Berndt 1993:76.

37 The particular star clusters involved are not clearly designated but could well be NGC 2516 and NGC 2351.

38 Berndt and Berndt 1993:164.



Seasonal Calendar of the Yaraldi (Jaralde) People (based on information in Berndt and Berndt, 1993).

The Karadjeri of north-western Western Australia also had a very extensive star mythology.<sup>39</sup> Most of the more important stars were regarded as the *bilyur* (spirits) of characters described in the myths. The myths were associated with seasonal change and in some cases, mythical creatures were causally connected to the changes. The change of season from dry to wet for example, was seen to be affected by *bulian*, a great water-serpent.<sup>40</sup> The eyes of *bulian* were seen to be two stars in the sky. And if *bulian* was annoyed, it was thought that he would produce change prematurely. The special association of the latter end of the dry season, and also the wet season, with *bulian* is expressed in the star mythology; all the stars representing *bulian* are clearly visible

39 Recorded by Piddington 1930:353.

40 A manifestation of the Rainbow Serpent, an important creation spirit across the continent.

at this time of the year.<sup>41</sup> The stars in Scorpius were also associated with *bulian* but set earlier, during the hot-dry season. This change in season took place in mid-December and was regarded as being very significant because it altered economic and social life to a great extent. There was usually no rain from May to December and after that, heavy rains fell during January and February.

## Marine Navigation

As Australian Aboriginal people were primarily hunters and gatherers, they were land based. However fishing, both ocean and river, for many groups provided important dietary components either as a staple or as a supplement. Knowledge of tides and winds as well as seasons was obviously significant for the successful preparation and undertaking of this activity especially if fish traps or canoes were used.

Sailing and voyaging by canoe, in one form or another, was also extremely important to some groups of Aboriginal people, clearly indicated by their having projected a canoe into the sky, represented by stars. Among the Lower River Murray people in South Australia, a mythical canoe no longer used on earth was thought to have been lifted up and placed in the Milky Way.<sup>42</sup> At Millingimbi and Yirrkala in Arnhem Land, all the stars of Orion, the Hyades, the Pleiades and those between these European constellations (see Diagram 3) were included in the Aboriginal constellation of *Tjilulpuna* known also as 'the canoe stars'. It is visible during the wet season. The *tjilulpuna* (fishermen) in the canoe (Orion) and their wives (the Pleiades) in a separate canoe were all out at sea, and when nearing Cape Arnhem, it is thought, a heavy storm swamped both the canoes and drowned all the people. The two canoes, the men, the women, turtle, fish and a whale they had caught, are now in the sky.<sup>43</sup>

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41 Piddington 1930:353.

42 Berndt and Berndt 1977:203.

43 Mountford 1956:493,498–500.

In north east Arnhem Land<sup>44</sup> there are two (unnamed) stars which are significant to navigators. These two stars are seen in myth as two fisherman-brothers, the elder of whom drowned while saving his younger brother. These stars are perceived to be spirit-guardians of the men who go out in canoes. When these stars present themselves as a shadow on the sea during the day or as a soft light on the water during the night, the fishermen out in their canoes read these as early warnings of coming storms. They turn into shore well before the ensuing thunder and winds.

For the people of the Torres Strait, the canoe of the hunter and spear-fisherman *Tagai*, is represented by the European constellation of Scorpius (see Drawings 5 and 6). Living in an island-sea culture, the Meriam people identify with the sea and perceive themselves as 'blue-water people'. Much energy goes into the preparation for voyages by outrigger-canoe to other islands for the purpose of exchange. The most significant aspect of the exchange is the *wauri*, shell armlets made from cone shell (*Conus millepunctatus*). These shell armlets are ritually given between exchange partners and, at their peak, the *wauri* exchanges resemble the *kula* of the Trobriand Islands further north.<sup>45</sup>

Around mid-October, when the Pleiades appear (a sign of fair weather and the time for sailing), the canoes set out from the islands. Yams, bananas and sweet potatoes that have been mixed with turtle fat, roasted, dried and placed in bamboo tubes are sealed and placed in the canoes. These are exchanged in a multitude of minor transactions for bird of paradise and cassowary feathers, dogs' teeth necklaces from *Op Deudai* (Papua New Guinea) and red and white ochre, emu feathers and emu leg bones (for digging sticks) from the island of Muri and *Keo Deudai* (Cape York). These expeditions were exceptionally dangerous and regarded as tests of strength. They moved from east to west, travelling leeward to Boigu, an island off *Op Deudai* (Papua New Guinea). This path from east to west is also the path taken by the stars; 'life mirrors the crescent-shaped path of the stars of *Tagai*, from springtime

44 Wells 1973:31–36.

45 Sharp 1993:6.

when *Seg* (Orion) and *Usiam* (the Pleiades) come up to the time of their decline.<sup>46</sup> Unfortunately, there are no details available about the navigation skills or voyaging star maps that were used by the Meriam people or other Torres Strait Islanders. It has been noted that what was required for voyaging was discernment which ‘engages the senses in a unity which takes in “everything”, as in “tracking” or “reading” the sea.’<sup>47</sup>

Fishing was an important activity among many Australian Aboriginal groups and when Arcturus (*Alpha Bootis*) appeared in the eastern sky, for example, many people knew it was time to make fish traps.<sup>48</sup>

The people of Groote Eylandt<sup>49</sup> and Yirrkala<sup>50</sup> in Arnhem Land had extensive knowledge about the relationship between tides and the waxing and waning of the moon. The people thought that when the tide was high, the water ran into the moon filling it up, making it fat and round. Conversely, when the tides were low, the water ran out of the moon, leaving it thin and small. When Charles Mountford, on one of his visits asked why the moon was still thin when the tides were high at new moon, it was explained to him that although only a small part of the moon was shining, like pearl shell, the dark body made fat by water flowing in from the high tide was present, but could not be seen.

For the Meriam people of the Torres Strait, the arrival of the wet season, *koki kerker*, in December signalled the time that fish could be caught in the stone fish-traps. Night was the time known in this particular season for having low tides, when men could venture out the time known in this particular season for having low tides, when men could venture out after dark in six-crew canoes into the traps, assured in the knowledge that there were plenty of fish to spear. They used coconut-leaf torches made by binding together two long coconut branches. They

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46 Sharp 1993:77.

47 Sharp 1993:78.

48 Bhathal and White (1991:9) do not specify the location of these groups.

49 Mountford 1956:484.

50 Mountford 1956:495–96.

speared the fish with bamboo-shafted and hardwood-pronged spears. A little later in the year, when the weather cooled and the winds turned around to the south, various varieties of sardine became available and were harvested in conical bamboo baskets. Shell fish were harvested at low tide from early April onwards.

## Terrestrial Navigation

For a nomadic peoples, terrestrial spatial orientation and route finding are crucial skills and are usually very highly developed. David Lewis's investigations of land navigation among desert-dwelling Aborigines assured him that they show 'extraordinary activity of perception of natural signs and ability to interpret them, and almost total recall of every topographical feature of any country they had ever crossed'. Lewis travelled in the Western and Simpson Deserts over 7800 kilometres, 1000 kilometres of which was completely trackless terrain, accompanied by local Aboriginal men.<sup>51</sup>

In pre-contact times, people moved relatively frequently in particular areas over a certain range, the boundaries of which fluctuated.<sup>52</sup> Having travelled extensively with Aboriginal men, Lewis came to appreciate that the primary reference in physical orientation was the spiritual world, which manifested itself in terrestrial sacred sites and Dreaming tracks of the ancestors: the entire spiritual-physical world forms a coherent integrated whole. However, this highly developed spatial orientation capacity, relying on the emotionally charged spiritual and temporal aspects of the environment, he found to be primarily, a

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51 1976:271. In 1972, Lewis travelled the Simpson Desert area with two Antikarinya (Andagarinja) men. In 1973, he travelled the Western Desert area, west of Papunya, with an Anmatjara man and a Pintupi man. In 1973, he travelled over much the same area as in 1973, but more extensively, and was accompanied by thirteen Pintupi and two Loritja (Luritja) men.

52 Berndt 1958:89–91.

daytime phenomenon. By night, without firesticks or other lights to show up the terrain, the Aboriginal men, despite their familiarity with the area and having travelled over the same ground during that day, became extremely disoriented. They showed an 'inability to keep direction by the stars' and moreover, did not attempt to use stellar references to update or check their mental maps as evening fell.<sup>53</sup>

Travelling after dark produced tense anxiety in the Aboriginal men and they kept the windows of the vehicle tightly wound up to deny access to dingos (*devil-devil papas*). It appears that nocturnal travelling was only undertaken under circumstances of severe necessity and always with firesticks carried at the rear of the line, walkers taking great care not to impair their night vision and their consequent ability to 'read the ground'.

Lewis tempers his remarks about the men's inability to use the stars in nocturnal orientation by commenting that his informants agreed they could use stars to guide them, if necessary, in a strange country at night. One man pointed to Orion as a potential guide, another pointed to Venus. Maegraith, in his survey of star lore of the Aranda and Luritja peoples of the Central Desert suggests that the Aboriginal people at the Hermannsburg Lutheran Mission in 1932 showed a distinct 'dislike of moving about after dark',<sup>54</sup> and that the difficulty he had in obtaining volunteers to help with his astronomical investigations, (they refused to rise in the early hours of the morning) was due, in part, to their fear of the dark.<sup>55</sup> Their detailed star knowledge had been gained by watching the stars from the shelter of the camp. Maegraith goes so far as to assert that 'no Central Australian native can find his [sic] way by night by reference to the stars, although in the daytime he [sic] possesses the utmost skill in respect of location.'<sup>56</sup>

Nonie Sharp, in her extensive study of the Meriam people, notes that despite the cultural significance and depth of their star knowledge, 'in

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53 Lewis 1976:273–74.

54 Maegraith 1932:23.

55 Maegraith 1932:21–25.

56 Maegraith 1932:25.



each Islander household a lamp burned at night to ward off the powers of evil.<sup>57</sup> Among the Yolngu<sup>58</sup> of Yirrkala in Arnhem Land, night was also perceived as a time of potential harm. People there need protection from *Galka* (sorcery), which is at its most powerful at night time. Ralph Piddington, an early anthropologist, writing of the Karadjeri people of Western Australia, implies that these Aborigines were also reluctant to venture out in the early hours of the morning. He says that the Karadjeri 'think of the various stars in terms of the time of year at which they are clearly visible ... during the early part of the night ... apparently this is the time of the night which is most important to them.'<sup>59</sup>

In many places throughout the country, it seems that Aboriginal people believed there were spirits abroad and their intentions were to injure or kill those who travelled alone, particularly at night.<sup>60</sup> In the Central and Western Desert areas, for example, there was reputed to be a large spirit dingo, *mamu*, who captured and ate the spirits of children who wandered. Sometimes the *mamu* succeeds in catching one of these little spirits as a meal for itself and its ghoulish companions. Should this happen, a child bereft of its *kuran* (spirit) would be expected to be listless and out of sorts the following morning. Only a traditional healer could control these dangerous night spirits.<sup>61</sup> In Arnhem Land, spirit people who have barbed spines growing from their elbows and knees, *nadubi*, could creep up on a solitary traveller and propel a spine into his or her body. On Groote Eylandt, dreaded spirits, *gurumukas*, are particularly active on dark nights and an Aboriginal person, if alone, risks being bitten on the back of the neck by the *gurumuka's* long projecting teeth. *Gurumukas*, however, are thought to avoid the light of campfires and Aboriginal people walking in groups.<sup>62</sup>

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57 Maegraith 1993:XIII.

58 Reid 1986:61.

59 Maegraith 1932:394–95.

60 Roberts and Mountford 1974:168.

61 Mountford 1948:51 cf. Lewis 1976:274.

62 Roberts and Mountford 1974:168.

Mathews, however, suggests that the evening chilliness rather than the darkness as such was a relevant consideration among Aboriginal people moving around at night. On frosty winter nights, Aboriginal people that he observed around New South Wales and Victoria tended to stir in the early hours, about three or four hours before sunrise. 'The people have had their first sleep, and the cold begins to make itself felt. The men and women, especially those who are old, sit up and replenish their fires. While doing this, their attention is naturally directed to the sky.'<sup>63</sup> Among the Ngeumba people for example, in the cold mid-winter nights when the Pleiades rose about 3 or 4 am, Mathews reports that the old men took glowing coals and threw them from bark shovels up towards the spirit-women whom the stars represented, so that they (the Pleiades-women) would not make the morning too cold. Ngeumba women, moreover, were forbidden to look at the winter Pleiades because such an act was thought to increase the severity of the frost. If they broke this taboo, the women's eyes became bleary and they risked suffering uterine troubles.<sup>64</sup>

Yet when faced with dire necessity, fears of differing kinds were dissipated. Revenge expeditions or execution parties for example, were usually carried out by small groups of men 'usually at night and in operations which were well planned, based on good intelligence and timed to allow for the strike and return before dawn.'<sup>65</sup> There is also a reference by Dawson, a one-time Protector of Aborigines, to the importance of star knowledge among western Victorian groups for 'their night journeys'. Unfortunately, he does not elaborate upon the nature of these night journeys, but he does say that the constellation of Hydra was of 'great service to the aborigines in their night journeys, enabling them to judge the time of the night and the course to be taken in travelling.'<sup>66</sup>

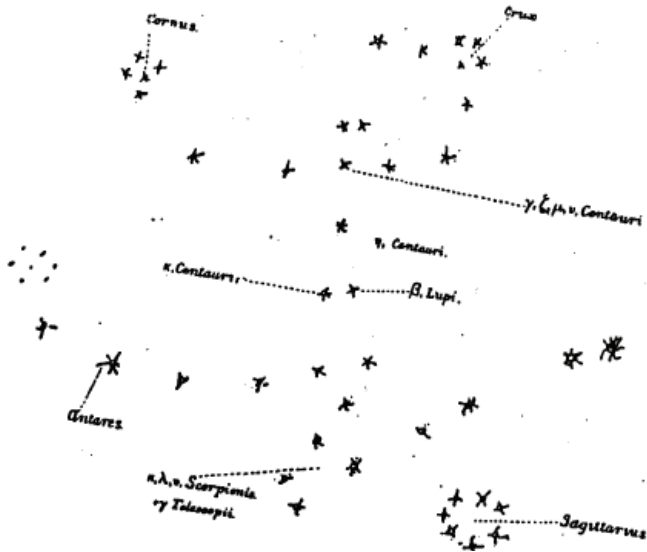
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63 Mathews 1905:78.

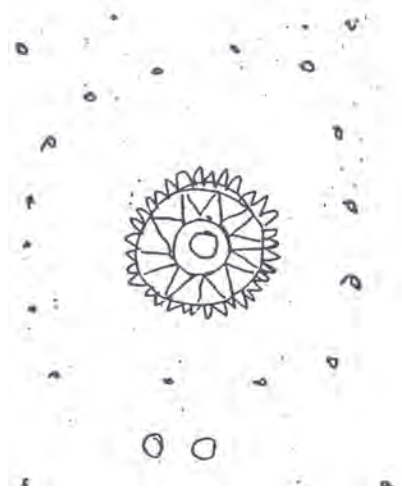
64 Mathews 1905:78–79.

65 Reynolds 1983:100.

66 Dawson 1981:101.

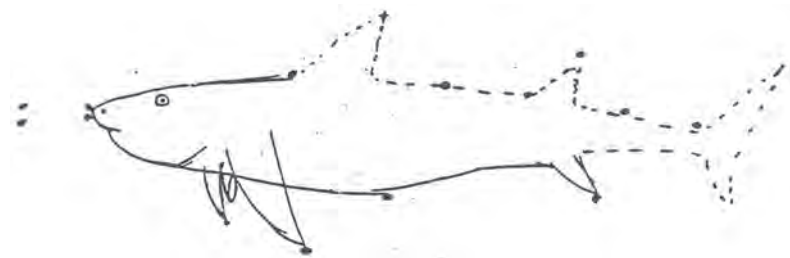


Drawing 1: The *Tagai* Constellation by Waria from Mabuig (from Haddon, Cambridge University Press, 1912)



Drawing 2: *Kek* (Achernar) by Gizu from Mabuig (from Haddon, Cambridge University Press, 1912)

## Night Skies of Aboriginal Australia



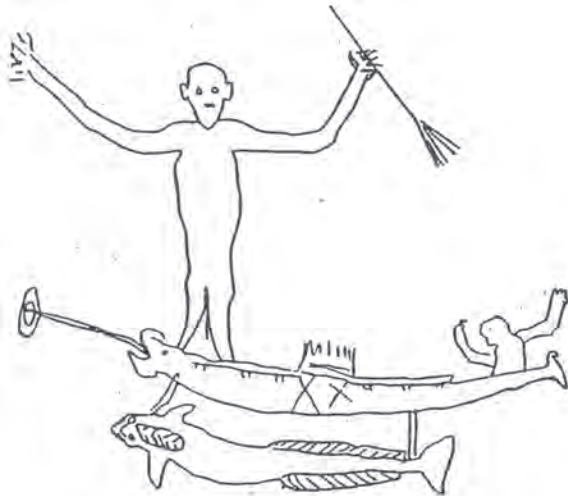
Drawing 3: The *Baidam* constellation by Naii from Mabuiag (from Haddon, Cambridge University Press, 1912)



Drawing 4: Drawings of constellations by Gizu from Mabuiag (from Haddon, Cambridge University Press, 1912)  
A *Dogai wauralaig* or *I* (Altair)  
B *Dogai kukilaig* or *Metakorab* (Vega)  
C *Bu* (Delphinus)

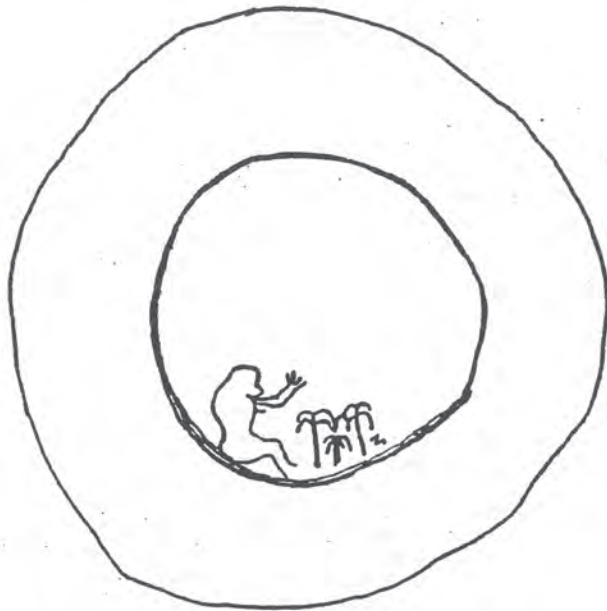


Drawing 5: The *Tagai* Constellation by Mariget from Mabuiag (from Haddon, Cambridge University Press, 1912)



Drawing 6: *Tagai* and *Kareg* in their canoe by Gizu from Mabuiag (from Haddon, Cambridge University Press, 1912)

Night Skies of Aboriginal Australia



Drawing 7: The Moon with a halo, *Kubuwai*, by Gizu from Mabuia (from Haddon, Cambridge University Press, 1912)