

6 *Navigation and the heavens*

MEREDITH OSMOND

1 Introduction

For as far back as the four or five thousand years that we can trace them culturally, Austronesian speakers have preferred to live close to the sea.¹ They have typically been sailors and fishermen. For as long as their settlements were confined to southeast Asia and northwest Melanesia, virtually all their sailing would have been between intervisible or near-intervisible islands. However, in the late second millennium BC, Austronesian speakers living somewhere in the region of the Bismarck Archipelago—speakers of the language now known as Proto Oceanic—began to move out eastwards, to the Solomons and beyond. Over the next few hundred years their descendants explored and settled many of the major island groups of the southwestern and central Pacific. The dates of these early movements are discussed in Chapter 2.

Building on the experience of their Austronesian ancestors in island southeast Asia, and aided by an increasingly sophisticated canoe-building technology (see vol. 1, Ch.7) these ocean navigators accumulated a body of knowledge that enabled them to sail freely beyond sight of land while retaining their orientation of home. Irwin (1992) has persuasively argued that even purely exploratory voyages into unknown waters were guided by knowledge of the prevailing wind system, ensuring that any push eastwards against the prevailing wind carried with it a good chance of a safe return.

More complex navigation skills had to be brought to bear once new and distant island groups were settled, a development which typically involved some regular trafficking between the old homeland and the new. These skills lay in recognising the regular patterning of naturally occurring phenomena such as star movements, wind systems, currents and swells as they applied to each new sea route, and in developing strategies that could be used in the committing to memory of these features.

¹ An earlier version of this chapter was published in Palmer and Geraghty, eds (2000).

I am particularly grateful to Malcolm Ross, whose work on time expressions has thrown further light on Oceanic knowledge of heavenly bodies. Thanks are also due to Andrew Pawley and Jeff Marck for their advice during the writing of this chapter, and to Ann Chowning and Fred Damon for additional data.

Malcolm Ross, Andrew Pawley and Meredith Osmond. *The lexicon of Proto Oceanic*, vol. 2: *The physical environment*, 155–191.

Pacific Linguistics and ANU E Press, 2007.

© This edition vested in Pacific Linguistics and ANU E Press.

The best scholarly minds of Europe had spent centuries developing ways of representing a curved world on a flat map and ways in which explorers could locate changing positions on their flat maps by using compass, sextant, chronometer, almanacs and various mathematical tables. When Europeans first ventured into the Pacific they had to grapple with the almost inconceivable notion that Pacific Islanders could navigate their canoes successfully over distances sometimes as great as a thousand miles without benefit of compass or chart or in fact any aids beyond what they held in their heads and what they could sense. In the mid-1960s, David Lewis, an experienced ocean yachtsman, aware that in some parts of the Pacific this skill was still practised, determined to seek out any remaining old-time navigators and sail with them where possible, to try to comprehend and record their navigational strategies. His resulting book, *We, the Navigators* (1972),² is the most complete record we are likely to get of this body of knowledge, rapidly disappearing with the increased presence of motorised boats and Western navigational technology. He was also at pains to record, in the languages of the navigators themselves, the names of the physical features on which they relied, the stars, different kinds of wave movements and so on. He took particular care to describe and name concepts for which Western navigation theory lacks any equivalent. He has thus provided us with an (admittedly small) list of words from Puluwat and Kiribati in Micronesia, Ninigo (= Seimat) in the Western Admiralties, and a number of Polynesian languages, principally those of Tonga and Tahiti, and two Polynesian outliers, Pileni, in the Santa Cruz group, and Tikopia.

The purpose of this chapter is to reconstruct the earliest possible Oceanic words from which are descended existing terms and meanings associated with the field of navigation. For the most part they are terms of the physical world, of the night sky and the ocean seascape. Also explored are terms such as the Polynesian *kaveŋa* (star or other object for which one steers) and the Micronesian *etak* (a ‘moving’ reference point) which refer to concepts incompatible with Western navigation theory. For some of these we may be able to offer a Proto Oceanic (POc) origin. Undoubtedly, as navigation skills developed and were refined in the Pacific, new terms would have been required, or old meanings extended. There is a further complication in that we are not dealing with one homogeneous environment. Take just one example—the night sky. There is no change to the night sky as one travels east or west apart from changes to the times of star rise and star set. But the sky visible from the northern hemisphere is a different sky from that of the southern hemisphere. That part of the globe which we are chiefly concerned with here extends from roughly 15°N (Saipan) to 20°S (Tonga), with the presumed POc homeland in the Bismarck Archipelago lying just a few degrees south of the Equator. Similarly, the patterning of winds, currents and swells varies with latitude and with distance from land mass, ocean depth etc., as well as with the seasons.

2 The sky and the horizon

For early Oceanic navigators, as for the Arabs, the Phoenicians, the Vikings and other early navigators, the fundamental sources of position finding were the heavenly bodies.

² *We, the Navigators* was reissued in 1994 in revised format, including a glossary of terms. Subsequent references to the volume in this chapter are to the 1994 revision.

2.1 Sky, heavens

The most soundly based reconstruction for sky is POc **laŋit* (see also p.142). In some Oceanic languages its meaning has been extended to include weather, apparently both as a general category and as a specific reference to kinds of weather, rain, wind etc.

PMP **laŋiC* ‘sky’ (Dempwolff 1938)

PMP **laŋit* ‘sky’

POc **laŋit* ‘sky’

Adm: Tench	<i>raŋiti</i>	‘rain’
Adm: Titan	<i>laŋ</i>	‘sky, heaven’
NNG: Manam	<i>laŋ</i>	‘sky, heavens’
NNG: Hote	<i>leŋ</i>	‘heaven, sky; air’
MM: Bali	<i>laŋiti</i>	‘sky’
MM: Tigak	<i>laŋit</i>	‘rain’
MM: Nehan	<i>laŋit</i>	‘sky’
MM: Haku	<i>laŋic</i>	‘rain; sky’
SES: Kwaio	<i>laŋi</i>	‘sky, heaven’
SES: Arosi	<i>raŋi</i>	‘rain’
NCV: Raga	<i>laŋi</i>	‘wind’
NCV: Lewo	<i>laŋi</i>	‘wind’
Mic: Marshallese	<i>laŋ</i>	‘sky, heaven; weather’
Mic: Woleaian	<i>raŋi</i>	‘sky; typhoon, rainstorm, wind’
Fij: Bauan	<i>(lomā)laŋi</i>	‘sky, heavens’ (<i>loma</i> ‘inside’)
Pn: Tongan	<i>laŋi</i>	‘sky, heavens’
Pn: Samoan	<i>laŋi</i>	‘sky, heavens’

The sky was typically conceptualised as something spanning a flat world from horizon to horizon. In both Micronesia and Polynesia it was regarded as a dome or a series of domes resting on the earth and forming concentric horizons on its surface (Lewis 1978:121). Tongans identified both *laŋi*, the sky, and *vavā*, which was the space between earth and sky. Some communities referred to the sky in legendary terms, conceiving it, for instance, as the home of the ancestors or of the Polynesian demigod, Maui.³ In Kiribati the heavens, *karawa*, could be subdivided into a lower heaven of birds and clouds where things appear small, *karawa merimeri*; and a heaven of the stars, *karawa uatao*. For a Kiribati navigator, however, the night sky was a vast roof. He never called it *karawa*, the usual Micronesian term for the heavens, but referred to it as *uma ni borau* ‘the roof of voyaging’ (Grimble 1931:197).

2.2 Horizon

The line where sea meets sky is commonly referred to by a compound—either edge/walls/ base of sky, edge of sea, or similar. I have located two sets of cognates, one

³ For instance, a Kiribati creation myth describes how the face of heaven was originally like hard rock stuck to the earth, but was prised apart and then held up by four women, who became like mighty trees (Grimble 1972:39–41). The legend is echoed in Hawaii, where the sky dome is supported by four pillars and in Tahiti where the sky rests on ten pillars (Makemson 1941:199).

limited to Polynesia, the other to Micronesia. The first reflects PEOc **tapa* ‘side’ (p.255) + **qi* ‘non-specific possessor particle’ + **laŋit* ‘sky’. The Tongan form and the East Uvean borrowing of that form reflect the replacement of the PPn preposition **ʔi* by an unexplained *ʔaki*.

PPn **(tafa)tafa-qaki-laŋi*, **(tafa)tafa-qi-laŋi* ‘horizon’ (**tafa* ‘side, edge’, *laŋi* ‘sky’)

Pn:	Tongan	<i>(tafa)tafa-ʔaki-laŋi</i>	
Pn:	E Uvean	<i>tafa-ʔaki laŋi</i>	‘horizon, limit, edge’
Pn:	Samoan	<i>tafa-tafa-ʔi-laŋi</i>	
Pn:	Maori	<i>taha(a)-raŋi</i>	
Pn:	Tikopia	<i>tafa-tafā-raŋi</i>	
Pn:	Tokelauan	<i>tafa-tafā-laŋi</i>	

Similarly, PChk **pai-laŋi* may be from POc **baRa* ‘fence’ (see vol.1, p.60) + *qi* + *laŋit* lit. ‘fence of sky’.

PChk **pai-laŋi* ‘horizon’ (Marck 1994)

Mic:	Mortlockese	<i>payiləŋ</i>	‘horizon’
Mic:	Satawalese	<i>ppayileŋ</i>	‘horizon’
Mic:	Puluwatese	<i>(yɔrop) pāələŋ</i>	‘horizon’
Mic:	Chuukese	<i>(ɔrop)peyirer</i>	‘horizon’ (<i>ɔroppa</i> + <i>rer</i> ‘rim of heaven’)

Two SE Solomonic languages describe the horizon in terms of the sea rather than the sky. Lau and Kwaio both have *ʔaena asi*, literally ‘foot/leg of the sea’. Other terms retain the more usual second element meaning ‘sky’ but vary the first element:

PT:	Motu	<i>guba dokona</i>	‘horizon’ (<i>guba</i> ⁴ ‘sky’ <i>doko</i> ‘end’)
SES:	Lau	<i>ʔaena salo</i>	‘horizon’ (<i>ʔaena</i> ‘foot’, <i>salo</i> ⁵ ‘sky’)
SES:	Arosi	<i>waʔa-ni-aro</i>	‘horizon’ (lit. ‘beginning of the sky’)
Mic:	Chuukese	<i>epi-reŋ</i>	‘horizon’ (<i>epi</i> - ‘bottom’, <i>reŋ</i> ‘sky’)
Mic:	Marshallese	<i>kapin laŋ</i>	‘horizon’ (<i>kapi</i> ‘bottom’, <i>laŋ</i> ‘sky’)
Mic:	Kosraean	<i>pe kɔʃa</i>	‘horizon’ (<i>pe</i> ‘side’, <i>kɔʃa</i> ‘sky/heaven’)
Mic:	Kiribati	<i>te tataŋa ni mainiku</i>	‘eastern horizon’ (lit. ‘roof-plate of east’)
		<i>te tataŋa ni maeao</i>	‘western horizon’ (lit. ‘roof-plate of west’)
			(Grimble 1931:198)
Fij:	Bauan	<i>vū-ni-laŋi</i>	‘horizon’ (lit. ‘base of sky’)
Fij:	Wayan	<i>vū-ni-laŋi</i>	‘horizon’
Pn:	Hawaiian	<i>kumu-lani</i>	‘horizon’ (lit. ‘base of sky’)
		<i>pōʔai-lani</i>	‘horizon’ (lit. ‘sky circle’)
		<i>kūkulu-o-lani</i>	‘horizon’ (Åkerblom 1968:15) (<i>kūkulu</i> ‘pillar, post, side, edge, horizon’ denotes the four pillars which were the principal supports of the heavenly dome (Makemson 1939:19))

⁴ From PNGOc **guba(r,R)* ‘storm cloud’ (see Chapter 5, §5.2), but in at least two Papuan Tip languages, Motu and Mekeo, the meaning has become generalised to ‘sky’.

⁵ Reflexes of POc **qaRoq* ‘clouds’ (generic) typically serve as the term for sky in SE Solomonic languages.

It is a peculiarity of Kiribati that features of the sky are typically referred to in terms of roof parts. This is because instruction in navigation was traditionally carried out in the *maneaba* or meeting house, with the great roof substituting for the sky. The night sky was *uma ni borau* ‘the roof of voyaging’; the eastern and western horizons were *tataŋa*, the term for the two large horizontal beams on which the rafters are placed; the meridian was marked by *taubuki* ‘ridge of house roof’ with the spot at which it was supported by a central pillar indicating the position of the zenith star, Rigel. The roof framework was a network of named criss-crossing rafters which served as a kind of grid reference that could, in the imagination, be transferred to the night sky. A Kiribati navigator could thus estimate and identify altitudes of stars within a degree of two (Grimble 1931:197–198).

3 Sun

The sun is the main direction indicator during daylight, but its position must be related to the time of year. Actual points of sunrise and sunset move over a horizontal arc that gets progressively larger the further one is from the equator. Åkerblom (1968:15–17) and Makemson (1941:85) offer linguistic and archaeological⁶ evidence of Polynesian familiarity with the sun’s apparent annual movement, a familiarity that it would be necessary in any event to presuppose to explain navigators’ facility in using the sun as a bearing indicator. Polynesians have terms for the ecliptic, the path along which the sun appears to move over a year. For the Pukapukans, it was *te ala o te la*, literally ‘the path of the sun’. Hawaiians called it *ke ala ula a ke kuʻukuʻu*, ‘the bright road of the spider’. Hawaiian terms have been recorded for the sun’s southern limit, *ke alanui polohiwa a Kanaloa*, literally ‘the black-shining road of Kanaloa’, and for its northern limit, *ke alanui polohiwa a Kane*, literally ‘the black-shining road of Kane’.⁷ In Pukapuka, the terms for the solstices were *lua poto* ‘short pit’ and *lua loa* ‘long pit’, phrases which Beaglehole suggests refer to the short days of winter and the long days of summer respectively. Tahiti has corresponding terms—*rua poto* and *rua maoro*. Maori has the one term, *mārua roa* ‘long pit’ for both solstices, and applies the term also to the month or season during which the sun is at its furthestmost points (Makemson 1941:85). The only Micronesian terms I have located have been recorded in a Gilbertese myth by Arthur Grimble, in which a tree, *Kai-n-tiku-aba*, whose right side is *te-au-mean* ‘northern solstice’ and left side is *te-au-maiaki* ‘southern solstice’, springs from the spine of *Na Atibu* (Grimble 1972:43). In his Gilbertese dictionary, Sabatier defines *au* as ‘used to indicate sun’s position north or south of the equator’; *mean* is the directional ‘north’ and *maiaki* ‘south’.

At its highest point each day the sun is also an accurate indicator of due north (unless you happen to be at the particular latitude for which the sun is then directly overhead). As Lewis points out, the north–south axis can be accurately ascertained at noon by the shadow of a vessel’s mast, which points either due north or south depending on the latitude and the season (1994:384).⁸

⁶ Archaeological evidence comes from identification of probable solar observation sites on, for instance, Mangareva and Easter Island (Åkerblom 1968:17).

⁷ Kane and Kanaloa were important gods in the Hawaiian pantheon, Kane being associated with light, Kanaloa with darkness (Makemson 1941:21).

⁸ Through measurement of the angle by which the position of the sun at midday differs from the vertical, the sun can also be a precise indicator of latitude. This latter property, although depended upon by Western navigational technology for a daily position fix, would have been of less use to canoe navigators whose main need was regular bearing indicators.

Reconstruction of a POc term for the sun itself is not clearcut. Blust has reconstructed PMP **qajaw* or **qalejaw* as ‘day’, continued as POc **qajo* ‘day’. In this he has revised both the form and meaning of Dempwolff’s (1938) reconstruction PMP **ha(η)gav* ‘day, sun’. Here we have opted for ‘sun’ as the primary meaning of POc **qaco*, and, by extension, ‘daytime’. There is evidence both within and without the Oceanic region that the senses of ‘day/daylight/daytime’ and ‘sun’ were commonly interchanged.

PMP **qajaw* or **qalejaw* ‘sun, daylight’ (ACD)⁹

WMP: Itbayat	<i>araw</i>	‘sun’
WMP: Cham	<i>atdaw</i>	‘sun’
WMP: Saban	<i>sieu</i>	‘day’
WMP: Makasarese	<i>allo</i>	‘day; sun (in some expressions)’
WMP: Muna	<i>gholeo</i>	‘day’
CMP: Bima	<i>liro</i>	‘sun’
CMP: Ngadha	<i>leza</i>	‘sun; day; daylight; daytime; heat of the sun’
CMP: Roti	<i>ledo</i>	‘sun’
CMP: Leti	<i>lera</i>	‘sun; day;’
CMP: Yamdena	<i>lere</i>	‘sun; day’

POc **qaco* ‘sun, daytime’

Adm: Ponam	<i>al</i>	‘sun’
Adm: Seimat	<i>al</i>	‘sun’
NNG: Bariai	<i>ado</i>	‘day, sun’
NNG: Takia	<i>ad</i>	‘sun’
	<i>ad-ad</i>	‘daytime’
NNG: Kaiwa	<i>as</i>	‘daytime’
PT: Molima	<i>ʔasu</i>	‘sun’
MM: Nakanai	<i>haro</i>	‘sun; day’
MM: Tigak	<i>ias</i>	‘sun’
	<i>(gan)ias</i>	‘daytime’
MM: Nalik	<i>ias</i>	‘sun’
SES: Bugotu	<i>aho</i>	‘sun’
SES: Gela	<i>aho</i>	‘sun; good weather; put in the sun; experience good weather’
SES: Lau	<i>sato</i>	‘sun’
SES: ’Are’are	<i>rato</i>	‘sun, sunshine, no rain, good weather’
SES: Sa’a	<i>sato</i>	‘sun, sunshine, fine weather’
NCV: Mota	<i>loa</i>	‘sun’
NCV: Lonwolwol	<i>jal</i>	‘sun’
NCV: Paamese	<i>ealo</i>	‘sunshine’
NCV: Namakura	<i>ʔal</i>	‘sun’
Mic: Marshallese	<i>al^{uu}</i>	‘sun’
Mic: Woleaian	<i>yaro</i>	‘sun’

⁹ Blust (ACD) glosses this ‘day’, but the gloss given here appears more consonant with the data.

PPn **qaso* ‘day, as period of time’

Pn:	Tongan	<i>ʔaho</i>	(N) ‘day’; (V) ‘be day or daylight’
Pn:	Rennellese	<i>ʔaso</i>	‘time, day, season’
Pn:	Samoan	<i>aso</i>	‘day’
Pn:	Tokelauan	<i>aso</i>	‘day’
Pn:	Tuvalu	<i>aho</i>	‘day (as time span)’
Pn:	Tikopia	<i>aso</i>	‘day (as time span)’

Proto Nuclear Polynesian shows a split between **qaso* ‘day, as a period of time’ and **qaho* ‘daytime, daylight’.

PNPn **qaho* ‘daytime, daylight’

Pn:	Samoan	<i>ao</i>	‘day (contrasted with night); daylight’
Pn:	Rennellese	<i>ʔao</i>	(N) ‘day, daylight’; (V) ‘be daylight’
Pn:	Rarotongan	<i>ao</i>	‘day, daylight, dawn; world’
Pn:	Tikopia	<i>ao</i>	‘daylight’
Pn:	Maori	<i>ao</i>	(N) ‘daytime as opposed to night’; (VI) ‘dawn, become day’

PAn **daqani* ‘day’ (ACD)POc **raqani* ‘daytime, daylight’

Adm:	Ponam	<i>ran</i>	‘day’
Adm:	Drehet	<i>laŋ</i>	‘daytime’
NNG:	Yabem	<i>-leŋ</i>	‘be daytime’
PT:	Kiriwina	<i>yam</i>	‘daytime’
PT:	Sinaugoro	<i>layani</i>	‘daytime’
PT:	Motu	<i>rani</i>	‘daytime’
MM:	Nalik	<i>ran</i>	‘daytime’
MM:	Petats	<i>len</i>	‘daytime’
MM:	Haku	<i>lan</i>	‘daytime’
MM:	Uruava	<i>rani</i>	‘daytime’
MM:	Roviana	<i>rane</i>	‘day’
MM:	Maringe	<i>na-rane</i>	‘day’
SES:	Bugotu	<i>dani</i>	‘morning, daylight’
SES:	Gela	<i>dani</i>	‘day, daylight’
SES:	Lau	<i>dani</i>	‘day, daylight’
SES:	Sa’a	<i>dani, dani</i>	‘daylight’ (<i>ŋ</i> for <i>n</i> unexplained)
SES:	Kwaio	<i>dani, dani</i>	‘day’ (<i>ŋ</i> for <i>n</i> unexplained)
SES:	’Are’are	<i>tani</i>	‘daylight’
SES:	Arosi	<i>dani</i>	‘daylight, day’ (<i>ŋ</i> for <i>n</i> unexplained)
NCV:	Mota	<i>(ma)ran</i>	‘light, daylight, morning, day; be light; tomorrow’s light; the morrow’
NCV:	Raga	<i>rani</i> <i>(ma)rani</i>	‘day, light, become day; morning’ ‘morning light’
NCV:	Tamambo	<i>rani</i>	‘daylight’
NCV:	Big Nambas	<i>na-ran</i>	‘daytime’

NCV:	Lonwolwol	<i>ren</i>	‘be light (of sky, weather etc.); weather, light, daylight’
NCV:	Paamese	<i>lani</i>	‘daybreak’
SV:	Lenakel	<i>n-ian</i>	‘day’
SV:	Kwamera	<i>(ia)ran</i>	‘day’
Mic:	Marshallese	<i>ṛ^uān</i>	‘day, date’
Mic:	Ponapean	<i>rān</i>	‘day’
Mic:	Puluwatese	<i>rān</i>	‘day’
Mic:	Woleaian	<i>zan</i>	‘day, date’
Pn:	Maori	<i>raŋi</i>	‘day, as period of time’ (<i>ŋ</i> for <i>n</i> unexplained)

The Southeast Solomonian forms above are irregular, initial *d*- reflecting **drani*.

The preceding cognate set may ultimately be connected with the following one. However, it is clear that reflexes of POc **raqani* ‘daytime, daylight’ are synchronically distinct from reflexes of POc **[dr,r]aqā* ‘sun’s heat, sunlight’; ‘(sun) shine; **[dr,r]aqā-ŋi* ‘shine on, be hot, be bright’, in contemporary Oceanic languages which reflect both etyma.

POc **[dr,r]aqā* (N) ‘sun’s heat, sunlight’; (VI) ‘(sun) shine, be hot, be bright’; **[dr,r]aqā-ŋi* (VT) ‘shine on’

NNG:	Mapos Buang	<i>rŋ(ah)</i>	‘daytime’ ¹⁰
PT:	Motu	<i>rarai(a)</i>	(VT) ‘shine, of sun and moon’
MM:	Tigak	<i>gan(ias)</i>	‘daytime’
SES:	Bugotu	<i>raŋi</i>	(VI) ‘shine, of sun’
SES:	Lau	<i>rā</i>	‘sunlight’
		<i>rara</i>	(VI) ‘shine, be hot, warm’
		<i>raraŋi</i>	(VT) ‘shine upon’
SES:	‘Are’are	<i>rārā</i>	‘scorch, singe, of sun and fire’
SES:	Sa’a	<i>rā, rārā</i>	(V) ‘shine brightly’; (N) ‘the sun’s light, radiance’
SES:	Arosi	<i>rā</i>	(V) ‘be hot, bright; shine’
		<i>rārā(na)</i>	(N) ‘sunshine, heat of sun or fire’; (VI) ‘shine, be hot’
		<i>rāŋi</i>	(VT) ‘shine on’
Fij:	Wayan	<i>drā</i>	(VI) ‘(sun, moon, star) shine’

PPn **laqā* ‘sun’

Pn:	Tongan	<i>laʔā</i>	(N) ‘sun’; (VI) ‘be sunny’
Pn:	Niuean	<i>laā</i>	‘sun’
Pn:	Samoa	<i>lā</i>	‘sun’
Pn:	Rennellese	<i>gaʔā</i>	(N) ‘sun’; (V) ‘sun, sunbathe, dry in the sun’
Pn:	Maori	<i>rā</i>	‘sun’
Pn:	Tahitian	<i>rā</i>	‘sun’
Pn:	Rapanui	<i>ra</i>	‘sun’

¹⁰ The Mapos Buang and Tigak etyma are possibly from **raqaŋi qaco* ‘shine on + sun’.

Evidence for the transitive form **raqa-ŋi* above comes from the Bugotu, Lau and Arosi forms as well as the Motu, where **ŋ* is regularly reflected by *Ø*.

The following set focuses on effects of the sun's heat as opposed to its light, and extends to heat from fire.

POc **raraŋ* (VI) 'be warm, hot, of sun; be warmed or heated by fire or sun', **[ra]raŋ-i* (VT) 'warm, dry s.o., s.t. by sun or fire'

PT:	Molima	<i>lala</i>	'wilt leaves over a fire'
MM:	Tolai	<i>raŋ, raraŋ</i>	(VT) 'scorch, dry, warm, by sun or fire'
SES:	Bugotu	<i>raraŋi</i>	(VT) 'heat'
SES:	Tolo	<i>raŋi-</i>	'warm or dry s.t. on the fire'
SES:	'Are'are	<i>rara</i>	(VI) 'be warm, hot, of sun'
		<i>rarani-</i>	'warm oneself by fire or sun'
NCV:	Mota	<i>rara</i>	'dry before a fire'
Mic:	Marshallese	<i>ɽ^{uu}aŋ-ɽ^{uu}aŋ</i>	'warm oneself by the fire'
Mic:	Woleaian	<i>çaŋ</i>	'get warmed up near fire'
Fij:	Rotuman	<i>rara</i>	'warm (self or child) by the fire'
Fij:	Wayan	<i>rara</i>	(VI) '(patient subject) heated, warmed'; '(pot) fired, baked'; '(fish) smoked'
		<i>rarani</i>	(VT) 'warm s.t.' (<i>n</i> for exp. <i>ŋ</i>)
Fij:	Bauan	<i>rara</i>	(VI) 'warm oneself at a fire'
		<i>raraŋ-</i>	(VT) 'reheat food by a fire, sear banana leaves'
Pn:	Tongan	<i>ā</i>	'heat (sticks or leaves) over a fire'
Pn:	E Futunan	<i>lala</i>	'smoke fish'
Pn:	Rennellese	<i>gaga</i>	'smoke, as fish on a fire; warm, as hands over a fire'
Pn:	Rarotongan	<i>rara</i>	'dry (leaves) in sun, dry over a fire; smoke fish over a fire'

Yet another contender for the POc term for sun is **sinaR*, which Blust (1998) glosses as 'shine'. While some reflexes from across Oceania support 'shine', others lean towards the meaning 'sun'. This may, however, be the result of independent parallel development.

PMP **sinaR* 'ray of light' (Dempwolff 1938)

POc **sinaR* (V) 'shine'; (N) (?) 'sun'

Adm:	Mussau	<i>sinaka</i> ¹¹	'sun'
Adm:	Tench	<i>sinaka</i>	'sun'
Adm:	Lou	<i>sinsin</i>	'sun'
PT:	Motu	<i>dina</i>	'sun; day'
MM:	Lavongai	<i>sinaŋ</i>	(N) 'sun'; (V) '(sun) shine'
MM:	Tigak	<i>siŋan</i>	(V) '(sun) shine' (metathesis)
SES:	Lau	<i>sina</i>	'shine, give light'
SES:	Kwaio	<i>sina</i>	'sun'
SES:	'Are'are	<i>sina</i>	(V) 'shine, brighten'; (N) 'light, brightness'
SES:	Sa'a	<i>sineli</i>	'shine'

¹¹ Mussau/Tench *-k-* as a reflex of POc final **-R* is irregular.

SES:	Arosi	<i>sina</i>	‘sun’
NCV:	Mota	<i>siŋa</i>	‘shine’
Mic:	Chuukese	<i>ttira</i>	(V) ‘shine’; (N) ‘ray, brightness, beam’
Mic:	Puluwatese	<i>tin</i>	‘shine, as the sun’
Mic:	Mortlockese	<i>tin, tina-</i>	‘shine: used for fire, moon, lantern’
Mic:	Satawalese	<i>ttin</i>	(V) ‘shine’; (N) ‘ray, brightness, beam’
Fij:	Rotuman	<i>sina</i>	‘light, lamp, star’
Fij:	Wayan	<i>siŋa</i>	‘day, daylight, sun’
Fij:	Bauan	<i>ōina</i>	‘lamp, torch’

Building on its ‘shine’ meaning, POc **sinaR* has given rise to a number of Polynesian terms which, with the addition of *mā-*, a stativising prefix, refer to the moon:

PPn **mā-sina* ‘moon, month’

Pn:	Rennellese	<i>māsina</i>	‘moon, month’
Pn:	Tongan	<i>māhina</i>	‘moon, month’
Pn:	Samoa	<i>māsina</i>	‘moon, month’
Pn:	E Futunan	<i>māsina</i>	‘moon, month’
Pn:	E Uvean	<i>māhina</i>	‘moon, month’
Pn:	Maori	<i>māhina</i>	‘moon, month’

4 Moon

The moon is of little value as a navigational aid. Its typical role is as a marker of periods of time. Reflexes of POc **pulan* ‘moon’ are widespread throughout the Admiralties, the Western Oceanic region, Southeast Solomons, Vanuatu and Fiji.

PAn **bulaN* ‘moon, month, menstruation’ (ACD)

PMP **bulan* ‘moon, month; menstruation’ (Dempwolff 1938)

POc **pulan* ‘moon, month’ (ACD)

Adm:	Lou	<i>pulan</i>	‘moon’
Adm:	Mussau	<i>ulana</i>	‘moon’
NNG:	Kove	<i>pula</i>	‘rise, shine, of sun, moon, stars’ (Chowning)
PT:	Motu	<i>hua</i>	‘moon, month’
MM:	Tigak	<i>ulan</i>	‘moon’
SES:	Bugotu	<i>vula</i>	‘moon, month’
SES:	Gela	<i>vula</i>	‘moon, month’
SES:	Lau	<i>fula</i>	‘the moon (but only in naming a month)’
SES:	Kwaio	<i>fula</i>	‘moon (mainly in compounds)’
		<i>fula(bala)</i>	‘full moon, night when it is light from moonrise to dawn’
		<i>fula(ʔalo)</i>	‘rainbow’
SES:	Sa’a	<i>hule</i>	‘phases of the moon; full moon’
		<i>hule i lade</i>	‘name of a month, July’
SES:	Ulawa	<i>hula(ahola)</i>	‘six nights of the moon’s course, including the full moon and two nights each way’

SES:	'Are'are	<i>hura</i>	'moon, lunar month'
		<i>hura(?aro)</i>	'rainbow'
SES:	Arosi	<i>hura</i>	'moon, month. It is said there were twelve native months beginning July (the planting) and ending in the following June'
NCV:	Mota	<i>vula</i>	'moon, month, season marked by moon'
Fij:	Bauan	<i>vula</i>	'moon, month'

In Polynesia **pulan* is reflected as a verb, PPn **pula* 'to glow' (with PPn **p* instead of expected **f*), and the moon is referred to by reflexes of PEOc **ma[d]rama*.

PEOc **ma[d]rama* 'moon'

SES:	Lau	<i>madama</i>	'moon'
Mic:	Mokilese	<i>maram</i>	'moon'
Mic:	Chuukese	<i>maram</i>	'moon'
Mic:	Ponapean	<i>maram</i>	'moon, moonlight'
Mic:	Puluwatese	<i>maram</i>	'moon'
Pn:	Rarotongan	<i>marama</i>	'moon'
Pn:	Tikopia	<i>marama</i>	'moon'
Pn:	Tahitian	<i>marama</i>	'moon'

5 Stars

Although the sun serves as a direction marker, particularly at sunrise, noon and sunset, the stars are the critical signposts in guiding navigators across open sea. The age-old method of star navigation consists in laying a course direct to a given destination by keeping the bow of the vessel pointed towards a star near the horizon whose bearing corresponds to the direction of the destination. As one star rises higher or sets, another of similar declination will be selected to take its place. For this purpose, the stars have obvious advantages over the sun. In the first place, the apparent movement of the stars is more stable than that of the sun. Although they rise each night four minutes earlier than on the previous night, they do so always at the same point on the horizon relative to a stationary observer. Second, the number and position of significant stars or star groups is on a scale that permits virtually an unlimited number of sequential stars or 'star paths' to be identified and memorised. Third, familiarity with the night sky as a whole can mean that even if the night is cloudy, the appearance of only a few stars can orient a skilled navigator.

It has already been pointed out that the northern hemisphere sky differs from that of the southern hemisphere. Polaris, for instance, that significant pointer of the northern sky, drops out of sight as one reaches the Equator. However, there are many stars common to a band of sky visible between, say, 15°N and 15°S, an area which includes New Guinea and its islands; almost all of Micronesia; the Solomons; northern Vanuatu; and part of Polynesia including the northern Cook Islands, Tuvalu and Tokelau but not Fiji or Tonga. Some star groups including the Southern Cross and its Pointers, the Pleiades, Orion's Belt and the triangle which Westerners refer to as Taurus are also recognized and named as units by Oceanic people. Many other patterns in the sky have been identified and named by them according to familiar shapes or to illustrate legends. One non-western constellation

has been identified at POC level, and several others at the level of Proto Micronesian. I have reconstructed the following terms for stars and star groups. All known cognate sets are included, as well as other terms that carry information about the significance of particular stars to the naming community.

5.1 Star (generic)

PAn **bituqen* ‘star’ (ACD)

POc **pituqun* ‘star’

Adm:	Titan	<i>pítuy</i>	‘star’
NNG:	Lukep (Pono)	<i>pitiki</i>	‘star’
NNG:	Takia	<i>patui</i>	‘star’
PT:	Misima	<i>pútum</i>	‘star’
PT:	Muyuw	<i>utun</i>	‘star’
PT:	Motu	<i>hisiu</i>	‘star’
MM:	Nehan	<i>pitopit</i>	‘star’
SES:	Arosi	<i>hiʔu</i>	‘star’
NCV:	Mota	<i>vitu</i>	‘star’
NCV:	SE Ambrym	<i>hitu</i>	‘star’
Mic:	Kiribati	<i>itoi</i>	‘star, constellation’
Mic:	Woleaian	<i>fîsî-</i>	‘star’
Mic:	Puluwatese	<i>fū</i>	‘star; point of the compass; canoe course plotted by the stars’
Mic:	Marshallese	<i>icu</i>	‘star, comet, planet’
Mic:	Mokilese	<i>ucu</i>	‘star’
Mic:	Ponapean	<i>usu</i>	‘star’
Fij:	Rotuman	<i>hefu</i>	‘star’
Pn:	Rennellese	<i>hetuʔu</i>	‘star, constellation’
Pn:	Tongan	<i>fetuʔu</i>	‘star; daisy’
Pn:	Hawaiian	<i>hōkū</i>	‘star’
Pn:	Tikopia	<i>fetū</i>	‘star, constellation’
Pn:	Anutan	<i>petū</i>	‘star’

5.2 Individual stars and star groups¹²

5.2.1 Venus (*Morning Star, Evening Star*)

The planets ‘wander’ in their movements and are of little use as guiding stars. The only one to feature regularly in wordlists is Venus. The POC name for Venus continues a PMP etymon.

¹² In addition to regular dictionary sources, the following sources for star names were used: Feinberg (1988) for Anutan, Christian (1899) for Ponape, Lamotrek and Mortlockese, Thomas (1987) for Satawalese and Capell (1969) for Sonsorolese. Makemson (1941) was an invaluable source for many Polynesian terms.

PMP **mantalaq* ‘the morning (evening) star: Venus’ (ACD)

PMP **(t)ala(q)* ‘star’ (Dempwolff 1938)

POc **ma-dala* ‘the morning star’ (Blust 1972)

Adm:	Lou	(<i>ko</i>) <i>mtal</i>	‘Morning Star/Evening star:Venus’
Adm:	Titan	(<i>ápa</i>) <i>tal</i>	‘Morning Star which appears about 5 a.m.’
Adm:	Loniū	(<i>kopo</i>) <i>matan</i>	‘the Morning Star’
NNG:	Kove	<i>motala</i>	‘star, generic’
		<i>motala waro aia</i>	‘Morning Star’ (lit. ‘star sun-for’) (Chowning)
NNG:	Labu	<i>metana</i>	‘the morning star’
SES:	‘Are’are	<i>matara ni tani</i>	‘Morning Star’ (<i>tani</i> ‘daylight’)
SES:	Sa’a	<i>madala</i>	‘the morning star’
SES:	Arosi	<i>madara</i>	‘the morning star’
Mic:	Mokilese	<i>mālāl</i>	‘the morning star’

As in English, Venus often appears to have separate identities as Morning and Evening Star. The following illustrate:

Morning Star:

(i) compounds from ‘star’ + ‘daytime’

PPn **fetuqu qaho* ‘Morning Star’ (> POc **qaco* ‘sun, daytime’)

Pn:	Tongan	<i>fetuʔu ʔaho</i>	‘Morning Star’
Pn:	Marquesan	<i>hetu ao</i>	‘star of dawn’ (Makemson 1941:207)
Pn:	Samoa	<i>fetū ao</i>	‘Morning Star’
Pn:	Tikopia	<i>fetū ao</i>	‘Morning Star’
Pn:	Anutan	<i>petū ao</i>	‘Morning Star: Venus’
Pn:	Hawaiian	<i>hōkū-ao</i>	‘Venus when seen in the morning’

PMic **fitū rāni* ‘Morning Star’ (> POc **raqani* ‘daytime, daylight’)

Mic:	Marshallese	<i>icu ɾʷan</i>	‘Morning Star’
Mic:	Ponapean	<i>usūn rān</i>	‘Morning Star’ (<i>rān</i> ‘day’)
Mic:	Kiribati	<i>itoi ni ʔaina</i>	‘Morning Star’ (<i>ʔaina</i> ‘day, daylight’)
Mic:	Chuukese	<i>fū rār</i>	‘Venus as Morning Star’

(ii) other compounds

NNG:	Gedaged	<i>boi tinan</i>	‘Morning Star’ (<i>boi</i> ‘star’, <i>tinan</i> ‘mother’ or ‘big’; cf. p.195) ¹³
NNG:	Manam	<i>goai zama</i>	‘Morning Star’ (<i>goai</i> ‘star’, <i>zama</i> ‘tomorrow’)
PT:	Motu	<i>hisiu bada</i>	‘Morning Star’ (<i>hisiu</i> ‘star’, <i>bada</i> ‘large’)

Evening Star (various compounds):

MM:	Roviana	<i>govete pisi</i>	‘Evening Star, Venus’ (<i>govete</i> ‘to flee, run away’, <i>pisi</i> ‘to sting or bite, as insects’)
SES:	To’aba’ita	<i>bubufaja</i>	‘Evening Star’ (<i>bubu</i> ‘look at’, <i>faja</i> ‘eat; food’)

¹³ POc **tina*, literally ‘mother’, sometimes carries the interpretation ‘big’ in contrast to ‘child/small’.

SES:	Lau	<i>būbūfaŋa</i>	‘Evening Star’ (<i>būbū</i> ‘look at, gaze’, <i>faŋa</i> ‘to have a meal, food’)
SES:	Arosi	<i>maŋai ŋau</i>	‘Evening Star’ (<i>maŋa</i> ‘eat’, <i>ŋau</i> ‘eat food’)
Pn:	Tikopia	<i>fetū ramaŋa</i>	Alternative name for evening star when standing in west, in monsoon nights (lit. ‘torchlight fishing star’)
Pn:	Hawaiian	<i>hōkū-kau-ʔōpae</i>	‘Evening Star’ (lit. ‘star for placing shrimp’)

5.2.2 *Big Bird (Constellation including Sirius, Canopus, Procyon, Betelgeuse, Rigel)*

One of the few constellations that I have been able to identify and trace back to POc is **manuk*, literally ‘bird’ (*manu* in Pn), referred to by Lewis, Gladwin and others as ‘Big Bird’ or ‘Giant Bird’. Most of the stars which fall within the Western constellations of Orion and Canis Major would also be included within the larger Manuk constellation. Lewis (1978:11) writes of following ‘the guiding star Betelgeuse in Orion, the northern wingtip of the Polynesian constellation Giant Bird, whose head is Sirius and whose nether wingtip Canopus.’ In his dictionary Firth describes Rigel, on Orion’s knee, as a central star of Manuk. Although Lewis and Firth refer to Betelgeuse as indicating Manuk’s northern wingtip, Feinberg (1988:104) and Thomas (1987:240) both mark it, from the point of view of Anuta and Satawal respectively, with Procyon. Both are feasible. Feinberg also notes (p.110) that on Nukumanu the Long Wing corresponds with Canopus but the Short Wing is marked by a star probably Monocerus.¹⁴

PMP **manuk* ‘bird’

POc **manuk* ‘bird, Bird constellation’

Adm:	Ninigo	<i>mān</i>	‘(constellation incl.) Canopus, Sirius, Procea’ (Lewis, 1994:406)
Mic:	Kiribati	<i>man</i>	‘Canopus’
Mic:	Mortlockese	<i>man</i>	‘Sirius’
Mic:	Satawalese	<i>mān</i>	‘(constellation incl.) Sirius’
Mic:	Puluwatese	<i>mān</i>	‘a scattered group of stars, Canopus, Sirius, Procyon’
Mic:	Woleaian	<i>mar</i>	‘Sirius-Procyon-Canopus star’
Mic:	Carolinian	<i>mān</i>	‘Sirius’
Pn:	Tikopia	<i>manu</i>	‘Rigel’ (part for whole) (Lewis, 1978:33)
Pn:	Anutan	<i>manu</i>	‘Bird constellation, consisting of Sirius (Manu’s body), Canopus (east wing), Procyon (north wing) and a few stars in between’

We also have various references to particular stars as Manuk’s head, Manuk’s body etc.

¹⁴ Gladwin (1970:148) writes that ‘on Puluwat the cardinal direction is east, under the rising of Altair, the “Big Bird”’. This is something of a puzzle because, although both Altair and Manuk rise just north of east, they rise many hours apart. Altair is definitely not a part of the Manuk constellation. It would seem that here we have an instance of a prominent star or star group being equated with a cardinal reference point.

Adm:	Ninigo	<i>mānifono</i> <i>mānitola</i> <i>mānihaiup</i>	‘Sirius’ (<i>fono</i> ‘head’) ‘Procyon’ ‘Canopus’ (Lewis 1994:406)
Mic:	Kiribati	<i>p^wāp^wā-ni-man</i> <i>man-ati</i>	‘Sirius’ (<i>p^wāp^wā</i> ‘chest’) ‘Rigel’ (<i>ati</i> ‘heart’)
Mic:	Puluwatese	<i>yinekin-mān</i>	‘Sirius’ (<i>yinek</i> ‘body, trunk’)
Pn:	Rennellese	<i>te tino-manu</i>	‘three bright stars at the end of Taurus’ (<i>tino</i> ‘body’)
Pn:	Anutan	<i>te kaokao o manu</i>	‘Manuk’s armpit: a group of four small stars near Sirius; said to pass almost directly over Tikopia when approaching from Anuta’
Pn:	Tikopia	<i>te tino a manu</i> <i>te opiŋa o manu</i>	‘Sirius’ (<i>tino</i> ‘body’) ‘Manuk’s armpit’ (Feinberg 1988:101) A Tikopian name but commonly used on Anuta.

Procyon (or Betelgeuse) and Canopus are widely referred to as the north wing and south/east wing respectively in Micronesian Satawalese, where reference to Manuk is included, and in the Polynesian Outliers of Anuta, Tikopia and Pileni, where the Manuk reference has been dropped.¹⁵

Mic:	Satawalese	<i>paīne-māne-mefuŋ</i> <i>paīne-māne-meir</i>	‘Procyon (lit. ‘northern wing of Manuk’) ‘Canopus (lit. ‘southern wing of Manuk’)
Pn:	Anutan	<i>te kapakau paka-tokerau</i> <i>te kapakau paka-tonja</i>	‘Procyon, the ‘north wing (of Manuk constellation)’ (<i>kapakau</i> ‘wing’, <i>tokerau</i> ‘north’) ‘Canopus, Manuk’s east wing’ (<i>kapakau</i> ‘wing’, <i>tonja</i> ‘south/east’)
Pn:	Tikopia	<i>kapakau faka-tokerau</i> <i>kapakau faka-tonja</i>	‘Betelgeuse’ ‘probably Canopus’
Pn:	Pileni	<i>trekapekau ki taumako</i> <i>trekapekau ki ndeni</i>	‘Betelgeuse’ (Taumako is an island east northeast of Pileni) ‘Canopus’ (Ndeni is an island southwest of Pileni) (Lewis 1994:408)

Individual stars within a constellation are frequently named because of their significance as seasonal or navigational markers, and at times because of a mythical association. It appears, however, that communities have at times retained familiar star names but applied them to different stars, stars more appropriate markers of a season or sea route as the location varied. Reflexes of the following PPn reconstruction applied, in compound form, to a number of bright stars and planets, as well as to the months and seasons over which the stars presided (Makemson 1941:254). In Eastern Polynesia, references are typically to Sirius.

¹⁵ Carolinian and Woleaian use comparable terms, respectively *pāy efēŋ* and *paɪ yefan* ‘north wing’, and *pāy yēr* and *paɪ yeɪz* ‘southern wing’ but apply them to the northern and southern wings of the constellation Aquila.

PPn **takulua* ‘a bright star’

Pn: Tongan	<i>takulua-tua-ʔalofi</i>	‘name of a large star’
	<i>takulua-tua-fanua</i>	‘name of a large star’
Pn: Tahitian	<i>taʔurua-faupapa</i>	‘Sirius’
Pn: Tuamotuan	<i>takurūa</i>	‘star name: may be Venus, Jupiter or Saturn’
Pn: Maori	<i>takurua</i>	‘Sirius; winter’ (Åkerblom 1968:19)
Pn: Marquesan	<i>takuʔua</i>	‘Sirius; July’
Pn: Hawaiian	<i>kaulua</i>	‘Sirius; June-July or February-March’

In Hawaii, Sirius is also known as *hōkū-hoʔokele-waʔa*, literally ‘canoe-guiding star’.

We have another PPn reconstruction whose reference is apparently to a star or stars within the constellation of Orion.

PPn **tākelo* ‘name of a star or stars, possibly in Orion constellation’

Pn: Tongan	<i>takelo</i>	‘two stars in the northern sky’ (Makemson 1941:253)
Pn: Tahitian	<i>taʔero</i>	‘Mercury’
Pn: Maori	<i>tākerō</i>	‘an unidentified star; Mercury’
Pn: Tuamotuan	<i>takero</i>	‘Orion’s Belt’ (Makemson 1941:253)
Pn: Marquesan	<i>takeo</i>	‘a star; June-July’
Pn: Hawaiian	<i>kāʔelo</i>	‘a star, perhaps Betelgeuse; name of a wet month’

A Kiribati name for Betelgeuse is *kāma-n-nuka*. *Kāma* is the name of a mythical being, *nuka* ‘middle’ (Grimble 1931:241). Rigel is known there as *te taubuki* literally ‘ridge of house roof’.

5.2.3 *Orion’s Belt*

It is hardly surprising that names for the group of three bright stars in a row should typically focus on the number. Terms in the southeast Solomons, Polynesia and Micronesia all contain reflexes of POc **tolu* ‘three’. In ‘Are’are, Sa’a and Arosi in the southeast Solomons they are named by the term for a three-man canoe *taʔe-oru*. Makemson (1941:198) gives the Tongan name as *alo-tolu*, identified in Churchward’s dictionary as *ʔalo-tolu* ‘three persons paddling together’. Tikopia and Anutan have *ara-toru*, ‘path of three’, a reference to an origin legend in which the three brothers of the demigod Motikitiki died and ascended to the sky when their outrigger was severed from their canoe following an argument (Feinberg 1988:11). In Maori they are referred to as *tau-toru* ‘three men’ (Åkerblom 1968:82), while in Tokelauan according to Macgregor (1937:90), and also in East Futunan, the group is called simply *tolu* ‘three’. Pukapukans call them *toluʔa maui* ‘Maui’s three’, and the Rennellese *toguʔa māui*, the reference being to Maui, a legendary Polynesian hero, and his two brothers. The Carolinian name *eliʔwel* is the term for three (*eli*) plus the classifier for general objects. Woleaian has *yeri-ʔyer* (*yeri* ‘three’). The North New Guinea language of Gedaged is an exception. Their term is *nitul*, which is also the term for a fish holder—the hooked string or branch used to string up fish. Fred Damon (pers. comm.) reports that in Muyuw the term for Orion’s Belt is *kiyad*, the term for the pole that stretches from one side of a canoe to the outrigger, attached in three places.

5.2.4 Pleiades

The Pleiades, or Seven Sisters, are a group of stars of moderate brightness which, because of their number and closeness to each other, form a small bright patch in the sky. Makemson believes that the Polynesians carried the Pleiades year with them into the Pacific from the ancient homeland of Asia, although she offers no specific evidence for this (1941:76). However it is the case that until recent times the Pleiades served as significant calendar stars throughout the Oceanic world, their reappearance each year marking the beginning of the annual seasonal cycle. In a number of languages of the north coast of New Guinea (Gedaged *baḷas*, Biliau *barahas*, Takia *baras*) the stars are thought of as young unmarried women, associated with health and fertility rituals. When the constellation reappears in mid-June, it is time to prepare the fields for planting yams. Speakers of Muyuw, a Papuan Tip language, are supposed to plant their yams by *Gumeaw*, the Pleiades (Damon 1990:36). Åkerblom reports that the Polynesian year begins in Tahiti when the Pleiades rise on the eastern horizon in the evening (late November). But in Pukapuka, Mangareva, Marquesas and parts of New Zealand the seasonal cycle begins when the Pleiades appear on the eastern horizon shortly before sunrise (about the end of May) (Åkerblom 1968:97). Teuira Henry in 1928 described the Tahitian year as consisting of two seasons, *matarī-i-nia* ‘Pleiades above’, the forerunners of the season of plenty, and *matarī-i-raro*, ‘Pleiades below’, the season of scarcity (quoted in Makemson 1941:92). A Maori term for the constellation is *ao kai* ‘season of food’ (Makemson 1941:200). Kiribati also recognizes two seasons, one marked by the appearance of the Pleiades, the other by Antares (Grimble 1972:223).

Blust has reconstructed PMP **buluq*, POc **puluq* ‘a constellation, the Pleiades’ with a single WMP reflex (from Sundanese) in addition to the Oceanic reflexes below. Many Polynesian languages use reflexes of PPn **mataliki*.

PMP **buluq* ‘a constellation, the Pleiades’ (ACD)

POc **bulu(q)* ‘a constellation, the Pleiades’ (ACD has **puluq*)

MM:	Nakanai	<i>vulu</i>	‘Pleiades’ (v for exp. b) ¹⁶
MM:	Roviana	<i>bibolo</i>	‘Pleiades’ (o for expected u)
SES:	Kwaio	<i>bulu-bulu</i>	‘star; firefly’
SES:	Lau	<i>(bu)bulu</i>	‘star’
SES:	‘Are’are	<i>puru-puru</i>	‘star, firefly’
SES:	Arosi	<i>buru</i>	‘Pleiades’ (<i>buru-buru</i> ‘firefly’)

cf. also:

SES:	Gela	<i>buru-buru</i>	‘Pleiades’ (r for exp. l)
------	------	------------------	---------------------------

Ann Chowning (pers. comm.) has pointed out that, in common with the Southeast Solomonian terms above, an alternative Nakanai name for the Pleiades, *matatabu*, and their Sengseng name (*li-m(e)lek*), although unrelated, also denote fireflies.

In Polynesia and Micronesia a different term, translatable literally as ‘small face’ or ‘small eyes’ is widespread (POc **mata* ‘eye’, **liki* ‘small’). The Micronesian reflexes, however, refer not to the Pleiades but probably to Sagittarius.

¹⁶ Alternatively, Ann Chowning considers that *vulu*, may be derived from POc **pulu* ‘feather’, *vulu* also being the term for their yellow feathered headdress.

PEOc **mataliki* ‘name given to a significant star cluster’

Mic: Marshallese	<i>mæcət-rikrik</i>	‘a constellation, stars in Sagittarius’ (lit. ‘small face/eyes’)
Mic: Mortlockese	<i>meisik</i>	‘stars in Hercules’
Mic: Lamotrek	<i>mairik</i>	‘name for the fourth month’

PPn **mataliki* ‘Pleiades’

Pn: Tongan	<i>mataliki</i>	‘Pleiades’
Pn: E Futunan	<i>mataliki</i>	‘Pleiades; third month; June’
Pn: Pukapukan	<i>mataliki</i>	‘Pleiades’
Pn: Samoan	<i>mataliʔi</i>	‘Pleiades’
Pn: Tuvalu	<i>mataliki</i>	‘Pleiades’
Pn: Anutan	<i>matariki</i>	‘Pleiades’
Pn: Tikopia	<i>matariki</i>	‘Pleiades (sign of advent of trade wind season when appears on eastern horizon before dawn, also sign for turmeric extraction)’
Pn: Tahitian	<i>matariʔi</i>	‘Pleiades’
Pn: Maori	<i>matariki</i>	‘Pleiades, the first appearance of which before sunrise indicated the beginning of the Maori year (about the middle of June)’
Pn: Marquesan	<i>mataʔiʔi</i>	‘Pleiades; June’
Pn: Hawaiian	<i>makaliʔi</i>	‘Pleiades; month name; the six summer months collectively’

A number of similar terms for the Pleiades in Micronesian languages (Mortlockese *mariker*, Puluwatese *m^wariker*, Woleaian *m^wexazixez*, Carolinian *m^wærixær*) are not reflexes of the above, reflecting instead PChk **m^wakariker*.

5.2.5 *Southern Cross*

Blust, in his *Austronesian Comparative Dictionary*, lists a number of Western Malayo-Polynesian languages (Iban, Malay, Achenese, Simalur) in which the Southern Cross is called by the term for a stingray, in each case a reflex of PMP **paRih*. Makemson (1941:269) lists a Maori name, *te whai o titipa*, literally ‘the stingray of Titipa’ as referring to the Southern Cross or to a nearby feature, the Coalsack. Whether the reference to the star group is inherited with the term for a stingray, or is simply independent recognition of a familiar appearance we can only guess. Three Central Malayo-Polynesian languages which are either closely related or geographically contiguous (Fordata, Kei, Yamdena) contain reflexes of **paRih* which indicate Scorpio rather than the Southern Cross as the constellation in question. In several of the languages in the Solomons and Micronesia, the same term denotes both the Southern Cross and a triggerfish, also seen as similar to the constellation in shape. The Samoan term for the Southern Cross, *sumu*, although not cognate, is also the term for a triggerfish.

Although the Southern Cross is typically associated with the southern hemisphere, it is visible in the lower latitudes of the northern hemisphere, and is a significant navigational constellation for Micronesia. Specific terms indicate whether it is seen as upright, on either diagonal or lying horizontally on either side (Lewis 1994:103–106). A

PEOc reconstruction is proposed. The Hawaiian term, *newe*, may be a borrowing from the upright position Carolinian form (see below).

PEOc **bubu* ‘Southern Cross; triggerfish’

SES: Sa’a	<i>hoi pupu</i>	‘Southern Cross; triggerfish’
SES: Arosi	<i>hua i bubu</i>	‘Southern Cross; triggerfish’
Mic: Mokilese	<i>(lō)p^{wu}</i>	‘Southern Cross; triggerfish’
Mic: Woleaian	<i>p^{wū}</i>	‘Crux’
Mic: Marshallese	<i>p^{uu}ub^win ep̄n</i>	‘Crux, Southern Cross’ (<i>p^{uu}up^{uu}</i> ‘black triggerfish’)
Mic: Puluwatese	<i>p^{wu}up^w</i>	‘Southern Cross; k.o. fish, perhaps triggerfish’
Mic: Lamotrek	<i>pup</i>	‘Southern Cross. Also called the leatherjacket fish’
Mic: Carolinian	<i>b^{wū}b^w</i>	‘Southern Cross; triggerfish’
	<i>wenewenūb^w</i>	‘Southern Cross in upright position’

Other terms are descriptive, with the net metaphor and the cross shape or crucifix recurring.

SES: Sa’a	<i>ʔape</i>	‘Southern Cross’ (lit. ‘large square fishing net fixed on four upright poles’)
Fij: Bauan	<i>kalokalo-ni-ðeva</i>	‘Southern Cross’ (<i>kalokalo</i> ‘star’, <i>ðeva</i> ‘the south or southeast wind’)
Pn: Anutan	<i>te kupeŋa</i>	‘The Net: Southern Cross’
Pn: Tikopia	<i>te kau kupeŋa</i>	‘pole-net handle’ (<i>kau</i> ‘handle’ probably refers to the Pointers rather than the Cross, which is the net.)
Pn: Rennellese	<i>kau-kupeŋa</i>	‘Southern Cross; net handle, net frame’
Pn: K’marangi	<i>tina ti raŋi</i>	‘Southern Cross’ (lit. ‘sky mother’)
Pn: Tikopia	<i>te uru a taŋata</i>	‘Southern Cross’ (lit. ‘man’s head’)
	<i>rakau tapu</i>	‘Southern Cross’ (lit. ‘sacred timber’) (Lewis 1994:407)
Pn: Hawaiian	<i>hōkū-keʔa</i>	‘Southern Cross’ (<i>keʔa</i> ‘cross, crucifix’)

5.2.6 The Pointers

The Pointers, Alpha and Beta Centauri, are widely referred to by compounds translatable as the ‘two men’. The Sa’a form is derived from POc **m^waqane* ‘man, male’, while the Polynesian examples are reflexes of POc **tam^wataq* ‘living person’.

SES: Sa’a	<i>ro m^wane</i>	‘Pointers (to Southern Cross)’ (lit. ‘two men’)
Pn: Samoan	<i>lua taŋata</i>	‘Pointers: Alpha and Beta Centauri’ (Åkerblom 1968:27)
Pn: Tikopia	<i>rua taŋata</i>	‘Southern Cross’ (Lewis 1994:407)
Pn: Tokelauan	<i>na taŋata</i>	‘these two stars are guides for voyages from Tokelau to Samoa’ (MacGregor 1937:89)

Pn:	Anutan	<i>rua taŋata</i>	Lit. ‘double man’: ‘constellation consisting of two bright stars near the Southern Cross. Centaurus, also known as <i>te kau o te kupeŋa</i> ‘handle of fishing net’
-----	--------	-------------------	--

5.2.7 *Taurus (the Triangle, the Tongs), including Aldebaran*

No cognates are evident for the constellation, but there are semantically parallel forms in Sa’a, Lau and two Polynesian languages which all name the constellation with the local word for tongs. This may simply reflect independent recognition of a common household utensil shape.

SES:	Sa’a	<i>ireki</i>	‘the Southern Triangle’ (lit. ‘tongs’)
SES:	Lau	<i>sākai</i>	‘bamboo tongs: name of constellation of six stars’
Pn:	Tikopia	<i>te ūkopi</i>	‘the Tongs (Taurus’s forehead), particularly Aldebaran’ (Feinberg 1988:101). (Firth has <i>ūkofi</i>)
Pn:	Anutan	<i>te aŋa-aŋa</i>	‘the Tongs: a constellation consisting of seven stars from Taurus arranged in a V pattern’

In Fiji the constellation is known as *laḏa*, literally ‘a sail’.

There is a possible PEOc reconstruction for Aldebaran, the single brightest star of the group. The long vowel indicates a possible **u(C)u* sequence.

PEOc **u(C)unu* ‘Aldebaran’

Mic:	Kiribati	<i>un</i>	‘the name of a star’
Mic:	Mortlockese	<i>un(allual)</i>	‘Aldebaran and Orion’
Mic:	Puluwatese	<i>wūn</i>	‘Aldebaran; month about late July’
Mic:	Woleaian	<i>ūru</i>	‘Aldebaran. Also the name for a kind of dorfin’ (dorsal fin also triangular [MO])
Mic:	Lamotrek	<i>ul</i>	‘Aldebaran’
Mic:	Satawalese	<i>ul</i>	‘Aldebaran’
Mic:	Carolinian	<i>wūn</i>	‘the star Aldebaran; synodic month, approx. July–August’
Pn:	K’marangi	<i>ūnu te</i>	‘star name’ (Pukui & Elbert 1973)

Other names located for Aldebaran include:

Mic:	Kiribati	<i>te boto-n-aiai</i>	‘Aldebaran (in Taurus)’ (lit. ‘base of ribs (<i>aiai</i>) of canoe’, because it stands in the V-shaped portion of Taurus) (Grimble 1931:241)
Mic:	Marshallese	<i>l^{uu}ɔc-l^{uu}apl^{uu} ap</i>	‘Aldebaran in Taurus’ (lit. ‘big bonito’)
Pn:	Tahitian	<i>ana muri</i>	‘Aldebaran’ (Lewis 1994:403) (‘rear pillar supporting the sky’; cf. <i>ana mua</i> ‘front pillar, Antares’)
Pn:	Maori	<i>wero-i-te-kokota</i>	‘Aldebaran’ (‘herald of the digging season’)

5.2.8 *Polaris*

Polaris marks the centre of the North Celestial Pole. From the viewpoint of a stationary observer it never moves. It is also a good indicator of how far north of the Equator you happen to be. In Western terminology, if Polaris is 15° above the horizon, then your location will be at 15°N latitude. It disappears below the horizon as you move south across the Equator. It is valued by Micronesian sailors because it is always there unless obscured by cloud, and, being close to the horizon, it provides a good bearing (Gladwin 1970:148). The following compounds have been collected. Again we find semantic parallels even when the forms are not cognate.

PChk **fitū m^wakut* ‘Polaris’ (lit. ‘star not moving’)

Mic:	Puluwatese	<i>fūhæ m^wakət</i>	‘Polaris’
Mic:	Satawalese	<i>fuese magut</i>	‘Polaris’
Mic:	Carolinian	<i>f̥se m^wɔxut</i>	‘Polaris’
Mic:	Woleaian	<i>werewereri iyefani</i>	‘Polaris’ (<i>werewere</i> ‘straight, steady, still’, <i>iyefani</i> ‘north’)
Pn:	Tahitian	<i>ana-niʔa</i>	‘Polaris’ (Lewis 1994:403)
Pn:	Hawaiian	<i>hōkū-paʔa</i>	‘Polaris or North Star’ (<i>paʔa</i> ‘firm, steadfast’)

5.2.9 *Altair*

The only cognate set located is from Micronesia. References may be at times to the constellation of Aquila rather than its most prominent star, Altair. The five Chuukic languages reflect ‘PEOc/PMic **maRi*/**mai* ‘breadfruit’ while the Marshallese term, although formally similar, reflects POC **mata* ‘eye’.

PChk **mai-lapa* ‘Altair’ (lit. ‘big/old breadfruit’)

Mic:	Puluwatese	<i>māy ləp</i>	‘Altair; a month, about March: from <i>māy</i> ‘breadfruit’, <i>ləp</i> ‘big, old’ (Appearance of Altair marks the season of old breadfruit, northeast winds and much sailing. <i>māyləpænefæŋ</i> is the name given to the season) (Elbert 1972)
Mic:	Mortlockese	<i>meilap</i>	‘the constellation Aquila’
Mic:	Woleaian	<i>māirapa</i>	‘Altair, the most prominent star in Carolinian navigation, a winter month’
Mic:	Carolinian	<i>māilap</i>	‘the star Altair’
Mic:	Satawalese	<i>mailap</i>	‘Altair’ (McCoy 1976)
cf. also:			
Mic:	Marshallese	<i>mæcləp</i>	‘constellation Aquila, Altair’ (lit. ‘big eye’)

The Maori name for Altair is *poutu-te-rangi* ‘pillar of heaven’, a reference to a creation myth in which the sky is supported on pillars (Makemson 1941:64).

5.2.10 Antares

Antares, in the western constellation of Scorpio, ranks with the Pleiades as the most important of the calendar stars throughout the whole Pacific area (Makemson 1941:98). I have located cognate sets from both Micronesia and Polynesia, terms from the latter referring at times to Venus.

PMic **(d,z)umuri* ‘Antares’

Mic:	Kiribati	<i>rim^{wi}(mata)</i>	‘Antares’
Mic:	Marshallese	<i>tum^{uu}ur^{uu}</i>	‘Antares’
Mic:	Ponapean	<i>tumur</i>	‘Antares’
Mic:	Chuukese	<i>tum^wur</i>	‘Antares’
Mic:	Mortlockese	<i>tumur</i>	‘Scorpio’ (includes Antares)
Mic:	Puluwatese	<i>tīmīr</i>	‘Antares; a month about January’
Mic:	Carolinian	<i>tum^wur</i>	‘Antares’
Mic:	Satawalese	<i>tum^wur</i>	‘Antares; a month about January’
Mic:	Woleaian	<i>tum^{wi}zi</i>	‘Antares’
Mic:	Lamotrek	<i>tumur</i>	‘Antares’
Mic:	Sonsorolese	<i>tumuri</i>	‘Antares’

PCEPn **refua* ‘a star name, Antares?’ (Biggs & Clark 1993)

Pn:	Tahitian	<i>rehu</i>	‘a month name, between Dec. and January’
Pn:	Tuamotuan	<i>rehua</i>	‘a star, Antares?’
Pn:	Maori	<i>rerehu</i> or <i>rehua</i>	‘Antares’ (Makemson 1941:98)
Pn:	Hawaiian	<i>we-lehu</i>	‘Antares’ (Makemson 1941:98)
Pn:	Marquesan	<i>ehua</i>	‘Antares’ (Makemson 1941:207)

PNPn **mele-mele* ‘Venus or Antares’

Pn:	Pukapukan	<i>mele-mele</i>	‘Antares’ (Lewis 1994:406)
Pn:	K’marangi	<i>mere-mere</i>	‘Antares’
Pn:	Maori	<i>mere-mere</i>	‘Venus as evening star’
Pn:	Hawaiian	<i>mele-mele</i>	‘name of a star (Venus?)’

The Tahitians called Antares *ana mua*. For them it represented the front pillar, the parent pillar of the sky (Makemson 1941:36). The Rennellese term for the constellation Scorpio is *tugā-gupe*, literally ‘flock of pigeons’.

5.2.11 Pegasus

The star names listed from this point onward are reconstructable only for Proto Micronesian or for the lower-order Micronesian interstage of Proto-Chuukic.

PMic **lakV* ‘stars in Pegasus’

Mic:	Marshallese	<i>luak</i>	‘stars in Pegasus’
Mic:	Mortlockese	<i>la</i>	‘Pegasus’
Mic:	Puluwatese	<i>la</i>	‘star in Pegasus; month at beginning of breadfruit season, about May’

Mic: Satawalese	<i>na</i>	‘Alpheratz; about May’
Mic: Woleaian	<i>rax</i>	‘Pegasus’ (Alkire 1970:39)

5.2.12 Dolphin constellation (including Cassiopeia)

PMic **kua* ‘Dolphin constellation incl. Cassiopeia’ (approximately equivalent to Aries)

Mic: Kiribati	<i>kua</i>	‘constellation incl. Andromeda, Perseus and Cassiopeia’ (<i>kua</i> ‘whale, porpoise’)
Mic: Mortlockese	<i>ku</i>	‘Aries’
Mic: Puluwatese	<i>kūw</i>	‘Cassiopeia, plus some other stars; porpoise’
Mic: Woleaian	<i>xu</i>	‘huge constellation including Cassiopeia and Cetus; porpoise’
Mic: Carolinian	<i>xūw</i>	‘constellation Aries’
Mic: Satawalese	<i>xu</i>	‘Dolphin constellation, whose tail is marked by Cassiopeia’

PChk **ukulik* ‘Cassiopeia’ (lit. ‘tail of fish’) (POc **ikuR* ‘tail’, **ikan* ‘fish’)

Mic: Puluwatese	<i>wikinlik</i>	‘Cassiopeia’ (lit. ‘fish tail’)
Mic: Woleaian	<i>ixirix</i>	‘Cassiopeia’
Mic: Carolinian	<i>ikkinix</i>	‘star or stars in constellation of Cassiopeia’
Mic: Satawalese	<i>exulix</i>	‘Cassiopeia’

cf. also:

Mic: Marshallese	<i>l^uɔk^wan l^uakeke</i>	‘Cassiopeia’ (lit. ‘tail of porpoise’. <i>Lakeke</i> is a constellation shaped like a porpoise)
------------------	---	---

5.2.13 Delphinus

PMic **tapia* ‘Bowl constellation, approximately Delphinus’ (POc **tabiRa* ‘wooden bowl’)

Mic: Marshallese	<i>cæpe</i>	‘constellation: stars in Delphinus; bowl’
Mic: Puluwatese	<i>hæpiy</i>	‘bowl, calabash’
Mic: Carolinian	<i>sæpi</i>	‘constellation approximately Delphinus’
Mic: Satawalese	<i>sepie</i>	‘Delphinus: represents a carved wooden bowl’
Mic: Woleaian	<i>tapiy</i>	‘Delphinus star; bowl’

5.2.14 Arcturus

PMic **aremoi* ‘Arcturus’ (brightest star of Bootes constellation)

Mic: Marshallese	<i>ar</i>	‘Arcturus’
Mic: Mortlockese	<i>aramoi</i>	‘Arcturus’
Mic: Puluwatese	<i>yoromōy</i>	‘a star and a month, about November’
Mic: Carolinian	<i>arem^woy</i>	‘Arcturus’
Mic: Satawalese	<i>aremoi</i>	‘Arcturus’
Mic: Woleaian	<i>yazemōi</i>	‘Arcturus’
Mic: Lamotrek	<i>aramoi</i>	‘Arcturus’

In Tuamotuan and Hawaiian, Arcturus and possibly the whole constellation of Bootes, is known by the term for a frigate bird, *kiva* and *?iwa* respectively (Makemson 1941:221).

5.2.15 *Corvus, Leo, Vega, Corona Borealis, Ursa Major, Equeleus*

The following star reconstructions are limited to Proto Chuukic, a subgroup of Micronesian.

PChk **tarop^{wolu}* ‘constellation Corvus’

Mic: Mortlockese	<i>soropuel</i>	‘Corvus’
Mic: Puluwatese	<i>hærepwəl</i>	‘Corvi’
Mic: Carolinian	<i>sarob^{wəl}</i>	‘star Corvus’
Mic: Satawalese	<i>sarapul</i>	‘Corvus’
Mic: Woleaian	<i>sazeφer</i>	‘Corvus; a summer month’
Mic: Lamotrek	<i>sorabol</i>	‘Corvus’ (lit. ‘viewer of the taro patches’)
Mic: Sonsorolese	<i>taleb^{wər^{uu}}</i>	‘name of a star’

PChk **ici* ‘constellation Leo’

Mic: Mortlockese	<i>yis</i>	‘constellation Leo’
Mic: Puluwatese	<i>yiçç</i>	‘name for three unidentified stars’
Mic: Woleaian	<i>iç</i>	‘star in Leo (Hydra or Regulus)’

PChk **mul* ‘Vega, brightest star in constellation Lyra’

Mic: Puluwatese	<i>māl</i>	‘Vega; a month about February’
Mic: Carolinian	<i>māl</i>	‘star Vega’
Mic: Satawalese	<i>mun</i>	‘Vega’
Mic: Woleaian	<i>mer</i>	‘Vega’

PChk **caw* ‘Dip net constellation, approximately Corona Borealis’

Mic: Puluwatese	<i>ṛōw</i>	‘star and a month at the end of the breadfruit season, about December; hand net’
Mic: Carolinian	<i>ṣōw</i>	‘constellation approximately equivalent to Corona Borealis; dipping net’
Mic: Satawalese	<i>roe</i>	‘Corona Borealis, shaped like a dip net’ (<i>roe</i> lit. ‘dip net’)
Mic: Woleaian	<i>ṣōū</i>	‘a Corona Borealis star’

PChk **wuleko* ‘stars in Ursa Major’

Mic: Puluwatese	<i>wələ</i>	‘stars in big Dipper, Ursa Major’
Mic: Satawalese	<i>wulego</i>	‘four stars of Ursa Major (Dubhe, Megrez, Phaeda, Merak) which constitute the cup of the Big Dipper’s ladle’
Mic: Woleaian	<i>werexe</i>	‘star in Ursa Major’

PChk **tā(d,z)a* ‘constellation Equeleus’ (tiny constellation between Pegasus and Aquila)

Mic: Mortlockese	<i>sota</i>	‘Equeleus’
Mic: Puluwatese	<i>hāta</i>	‘Equeleus; month about April’

Mic: Carolinian	<i>sēta</i>	‘month in the traditional siderial calendar, about April’
Mic: Satawalese	<i>ceuta</i>	‘stars in Equeleus; month about April’ (Thomas 1987:239, 270)
Mic: Woleaian	<i>sita</i>	‘Aquarius, a winter month’

5.2.16 Magellanic Clouds

I have located terms only within Polynesia and Fiji for the Magellanic Clouds. The reference to *rua* ‘two’ in Pileni and Manihiki is presumably to the Greater and Lesser Magellanic Clouds, which appear as two distinct nebulae, sometimes distinguished as ‘flying’ or ‘stationary’ respectively.

PPn **maqafu* ‘Magellanic Clouds’

Pn: Tongan	<i>maʔafu</i>	‘Magellanic Clouds, a primary reference point for Tongan orientation. <i>maʔafu lele</i> ‘flying fire’ and <i>maʔafu toka</i> ‘stationary fire’
Pn: Pileni	<i>lua mafu</i>	‘Magellanic Clouds’ (Lewis 1994:406)
Pn: Manihiki	<i>rua mafu</i>	‘Magellanic Clouds’ (Lewis 1994:407)

In Samoa, and also Anuta, they could simply be referred to as ‘flying cloud’ and ‘stationary cloud’ (Makemson 1941:187).

Pn: Samoan	<i>ao lele, ao toʔa</i>
Pn: Anutan	<i>ao rere, ao toka</i>

In Bauan they were *matādravu ni sautū*, literally ‘hearth of peace and plenty’.

5.2.17 Milky Way

Makemson (1941:183) wrote that Polynesians could tell the time of night by the changing position of the Milky Way. She quotes a Hawaiian expression *huli ke ʔau*, literally ‘[the handle of] the Milky Way has turned’ as equivalent to ‘it is now past midnight’. The following cognate set is from Polynesia.

PPn **kaniwa* ‘the Milky Way’

Pn: Tongan	<i>kaniva</i>	
Pn: Samoan	<i>ʔaniva</i>	
Pn: Sikaiana	<i>kaniva</i>	‘rainbow’
Pn: Tikopia	<i>te kau tu keniva</i>	‘the Milky Way’ (lit. ‘handle of <i>keniva</i> ’)
Pn: Tokelauan	<i>kaniva</i>	
Pn: W Futunan	<i>kaniva</i>	

In Gedaged (NNG) the Milky Way is *wat-daden* (*wat* ‘driftwood, flotsam’, *daden* ‘trade, barter’). The association is not explained. In Lau (SES), it is simply *tala* ‘the path’, while in Carolinian the galaxy is *mesal fūū*, literally ‘the face of stars’.

Makemson (1941:183–186) lists a range of picturesque terms used by the Polynesians for the Milky Way which include Mangaian *moko-roa-i-ata*, literally ‘long lizard of morning’ Hawaiian *kuamoʔo* ‘backbone of lizard’, Tuamotuan *vaero-o-te-moko* ‘tail of the

lizard’ and a group of Maori terms, *ika-nui* ‘great fish’, *ika-roa* ‘long fish’ and *maŋo-roa* ‘long shark’. Still another Maori term for the Milky Way is *pae-roa-o-whanui*, literally ‘the long threshold of wide space’.

5.3 Star path

Firth (1957:91) writes:

The major navigational guide [in Tikopia] is the Star-path, the ‘Carrier’ (Kavenga). This is a succession of stars towards which the bow of the canoe is pointed. Each is used as a guide when it is low in the heaven; as it rises up overhead it is discarded and the course is reset by the next one in the series. One after another these stars rise till dawn, and at some times of the year a few still remain to rise when dawn breaks.

Lewis records identical advice given to him by a Tongan navigator in 1965, who refers to ‘*kaveinga*, the star path’ (1978:18). This term has a well-supported PPn antecedent and etymology.

PPn **kaveiŋa* ‘that which is steered for (usually a star)’ (From PPn **kawē* ‘to carry’+ *-i* ‘verbal suffix from POc transitive marker **i*’ + *-ŋa* ‘nominaliser’)

Pn: Tongan	<i>kaveiŋa</i>	‘star or other object for which one steers’
Pn: Pukapukan	<i>kaveiŋa</i>	‘a group of stars on the same declination, thought of as a constellation’
Pn: Tikopia	<i>kaveŋa</i>	‘carrier; esp. navigational aid by sequence of stars, star path’
Pn: Tahitian	<i>aveiʔa</i>	‘star path’
Pn: Tuamotuan	<i>kave(e)iŋa</i>	‘guiding star’
Pn: Rarotongan	<i>kaveiŋa</i>	‘that which is steered for’
Pn: Anutan	<i>kāveŋa</i>	‘the major guiding stars or constellations’

Feinberg (1988:100) adds a qualifier to the last-mentioned Anutan gloss. He writes: ‘The name *kāveŋa* ‘carrier’ refers to the particular star or constellation being followed at a given moment. A star path or sequence of stars that is followed from one island to the next, including those stars not yet risen or already set, is a *kau panōŋa porau*.’ (lit. ‘company or group for voyaging’). Feinberg describes this as the Anutans’ single most important navigational tool.

For Tikopia, Firth offers a purely literal term of *ara fetū* ‘star path’, and compares it with *ara a vaka* ‘canoe path’, the latter presumably referring to the actual sea route. According to Grimble (1972:296), the Maori term for star path is also *ara fetū*.

The Micronesians followed successive rising or falling stars in the same way. The name given to star courses learnt by navigators on Woleai was *wōfarīw* (Alkire 1970:45), and on Satawal, *wofanu*, literally ‘gaze at the island’ (Thomas 1988:261).

Beatrice Blackwood documents a voyage in the northwest Solomons from Buka to Nissan made by Hanahan speakers which agrees in every respect with Firth’s description of navigating by using a star path. She gives a sequence of ten stars, but no term for the system (1935:381–382).

5.4 Star rise and star set

Stars provide the most accurate bearings when they are low in the sky. Thus navigators describing star paths refer not to star X but to ‘rising X’ or ‘setting X’. In Micronesia such compound forms have become lexicalised.

5.4.1 Rising

POc **sake* had as its primary sense ‘rise, go up’. But it also had the sense of ‘ride on something, e.g. a canoe, catch a ride’. Both senses go back to PMP **sa(ŋ)kay*. POc reflexes can also carry the directional ‘east’.

PMP **sa(ŋ)kay* ‘catch a ride, ride on something’ (ACD)

POc **sake* ‘rise, go up; upwards’ (see also p.273)

Adm:	Mussau	(<i>sae</i>) <i>sae(na)</i>	‘upwards’
NNG:	Kove	<i>rae</i>	‘rise’ (Chowning)
		<i>sae</i>	‘up, eastwards along the coast’ (Chowning)
PT:	Motu	<i>dae</i>	‘ascend’
MM:	Bali-Vitu	<i>ḍaye</i>	‘(sun) rise’
MM:	Nakanai	<i>sae</i>	‘rise’
MM:	Meramera	<i>saʔe</i>	‘climb’
SES:	Sa’a	<i>taʔe</i>	‘up, inland’
SES:	Arosi	<i>taʔe</i>	‘go up, ascend’
SES:	Lau	<i>tae</i>	‘rise, ascend, get up, climb’
SES:	Longgu	<i>taʔe</i>	‘ascend, go up’
Mic:	Kiribati	<i>rake</i>	‘up, upwards, eastwards’
Mic:	Marshallese	<i>tak</i>	‘eastward, upward’
Mic:	Ponapean	<i>tak</i>	‘rise, of the sun and moon’
Mic:	Mokilese	<i>tak</i>	‘rise (of sun); to shine’
Mic:	Kosraean	<i>tak</i>	‘rise’
Mic:	Woleaian	<i>tax</i>	‘upward, eastward, up’ (<i>xetaxe-f̣is</i> (N), ‘rising stars’ eg <i>taxari-p^{wu}</i> ‘Crux rising’, <i>taxrli-metaẓiwa</i> ‘Scorpio rising’. Also <i>taxari-yaro</i> ‘sunrise’)
Mic:	Puluwatese	<i>tān</i>	‘(star) rise in the east’ e.g. <i>tānup^w</i> ‘rising Southern Cross’, <i>tāni māl</i> ‘rising Vega’. Lewis refers to (uncorrected spelling) <i>daane</i> <i>eliüüel</i> ‘rising Orion’s Belt, 90°’, <i>daane</i> <i>mailöb</i> ‘rising Altair, 83°’, and <i>daan uun</i> ‘rising Aldebaran, 75°’ (Lewis 1994:404)
Mic:	Carolinian	<i>tān</i>	‘rising (esp. heavenly bodies)’
Fij:	Bauan	<i>ḍake</i>	‘east; upwards’
Pn:	Tongan	<i>hake</i>	‘go up, esp. from the sea to the land’
		<i>ha-hake</i>	‘east’

5.4.2 *Setting*

The POc term usually contrasted with **sake* ‘to go up, upwards’ is **sipo* ‘go down, downwards’. Reflexes sometimes refer as well to the directional ‘west’ just as **sake* reflexes refer to ‘east’.

POc **sipo* ‘go down, downwards’ (see also p.271)

Adm:	Lou	<i>si</i>	‘down; descend’
NNG:	Kove	<i>rio</i>	‘descend, lie down, be swallowed’
		<i>sio</i>	‘down, westward along the coast’
PT:	Motu	<i>diho</i>	‘go down, descend’
MM:	Bali-Vitu	<i>(va)ḍiyo(ni)</i>	‘downwards’
MM:	Nakanai	<i>sivo</i>	‘go down’
MM:	Tomoip	<i>tio</i>	‘(sun) set’
SES:	Lau	<i>sifo</i>	‘late afternoon rain’
SES:	’Are’are	<i>siho</i>	‘(sun) set’
Mic	Chuukese	<i>tup^{wu}</i>	‘setting (western) position of a heavenly body’
Mic:	Puluwatese	<i>tup^{wu}</i>	‘(sun) set’
Mic:	Carolinian	<i>tub^{wu}</i>	‘sink, go down, set (of sun, moon, stars)’.
		<i>tub^{wul}</i>	(N) ‘setting, setting position of stars etc.’
Mic:	Woleaian	<i>tuφu</i>	‘set, of heavenly bodies’ (e.g. <i>tuφuri-werexe</i>
			‘Ursa Major setting’, <i>tuφuri-yaro</i> ‘setting sun’)
Fij:	Bauan	<i>ḍivo-ḍivo</i>	‘wind sweeping down from hills’
Pn:	Samoan	<i>ifo</i>	‘downwards’
Pn:	Tongan	<i>hifo</i>	‘downwards’
Pn:	Tikopia	<i>ifo</i>	‘down, come down, descend’
Pn:	Maori	<i>iho</i>	‘downwards’
Pn:	Hawaiian	<i>iho</i>	‘downwards’

In Chapter 3 (p.85) we reconstructed POc **solo* ‘sink down, subside’, with reflexes from the Solomons and Polynesia referring to landslides. In Puluwatese (Mic), a reflex of **solo* rather than **sipo* is used in combination with star names to refer to stars setting. Elbert’s dictionary lists *tolol* (N) ‘setting of stars’ and *tololɔ* (V) ‘disappear, set, as a star’, and offers, as an example of usage, *tolonup^w* ‘Southern Cross in setting position’. Lewis lists (his spelling) *doloni mariger* ‘Pleiades setting’ and *dolon uun* ‘Aldebaran setting’ (Finney 1976:24, Lewis 1978:166).

5.5 *Zenith star*

A zenith star is a star whose path is seen as lying directly overhead a particular island. It is thus a rough indicator of the latitude of that island. (It tells nothing of longitude, so is useful mainly in north–south voyages, such as from Hawaii to Tahiti.) For instance, Arcturus is the zenith star for Hawaii; Sirius marks Tahiti, Fiji and Vava’u in Tonga; while Rigel is the zenith star for Tikopia, Anuta and Vanikoro.

Lewis writes that ‘the determination by zenith stars of what amounts, in our terms, to latitude, has long been postulated as a Polynesian navigational method, but on largely

circumstantial evidence' (1978:33). He records his subsequent emotion when a Tikopian navigator, Ramfe, referred to 'stars on top' as opposed to guiding stars. Ramfe knew that there were different 'on top' stars for other islands, and that his grandfather had known them but that he himself had forgotten them. Lewis writes that this information was later repeated independently by other Tikopian navigators (p.33). The only other direct reference Lewis makes comes from Tonga, where a member of the hereditary navigator clan, the Tuitas, told Lewis that a *fanakena* star, in secret Tuita usage, is 'a star that points down to an island, its overhead star' (1978:77).

Blust has reconstructed WMP **uRtuh* 'zenith; noon, mid-day' (ACD), i.e. with specific reference to the sun, but, although references to zenith stars are frequent in the literature on Oceanic navigation, I am unable to reconstruct any term for the concept as it applies to stars. There is less need for zenith stars in the northern hemisphere, because Polaris is always a convenient indicator of latitude. The Micronesian navigators whose methods were described by Lewis, Gladwin and others, evidently made no use of zenith stars.¹⁷

Kiribati has a term *taubuki ni karawa* for 'zenith', literally 'the ridgeline of heaven'. Note that *taubuki* is also the name for the zenith star Rigel. Other terms for zenith, Samoan *tumu-tumu* 'top; peak, height, zenith' and Maori *puanga* 'zenith (also refers to Rigel,¹⁸ in Orion's Belt)' are unrelated.

The Hawaiians have a term for zenith, *hoʻokuʻi*, which is literally 'point of juncture'. Pukui and Elbert's dictionary records an expression *mai ka hoʻokuʻi a ka hālāwai* 'from zenith to horizon', *halawai* meaning 'meeting' as well as 'horizon'. Both terms appear to relate to the concept of sky zones, a kind of grid reference of lines drawn across the sky.

5.6 Star compass

The fact that stars always rise and set at the same point on the horizon has in some places led to the use of star names as cardinal compass points. A surviving example of a sidereal compass comes from the Carolines, where Goodenough in 1953 recorded a compass with thirty two named star positions (Lewis 1994:102). The terms cannot be equated precisely with the cardinal points of a European compass; they are not placed at regular intervals but are bunched together at their eastern and western margins. The primary compass point and basis of the Carolinian navigational system is the position where Altair rises in the east, in our terms at 8°30' N. Many of the stars identified in this paper—Altair, Aldebaran, Pleiades, Orion's Belt, Corvus and Antares—are represented on the Carolinian compass by both their rising and setting positions. Polaris represents due north. No fewer than five southerly directions are indicated by the various positions of the

¹⁷ However, Tom Davis, Cook Islander and experienced western-style ocean yachtsman, has provided a plausible solution to a question which has long puzzled Lewis and others concerned to understand the skills of the early Pacific navigators. This relates to a report made in 1866 by a Spanish Captain Sanchez after interviewing an Elato (Carolines) navigator, which refers to the observation of star zenith by filling a cane with water, and similar references to a Polynesian sextant or sacred calabash (Lewis 1978:78). Davis proposes that an instrument of this kind, i.e. a coconut with holes drilled appropriately, can identify when the angle of a particular star above the horizon is of a predetermined size, not the 90° of a zenith star, but rather one of about 45°, this being known in advance as the declination of this star when over a particular destination. In other words, it signifies that one is on the same latitude as one's destination. Davis gives a fuller description of the instrument and its use in his autobiography (1992:70–73).

¹⁸ Rigel is not an overhead or zenith star for New Zealand, so one must assume that its dual meaning has been brought from a place where it was, i.e. about 12°S latitude, far north of New Zealand

Southern Cross, depending upon whether its axis is upright, lying at either diagonal or horizontally on either side (Lewis 1994:103–106). Alkire describes the siderial compass used by navigators on Woleai Atoll in the Carolines in almost identical terms. He gives the name *pāfīs* to the thirty two star points as they constitute the star path compass (1970:41).¹⁹ The Puluwatese term *pāfī* ‘the navigational stars in thirty two star positions’ is cognate.

6 Other navigational clues

6.1 Winds

Navigators, steering primarily by sun and star, also need to take into account variable factors such as winds and currents for which a steersman must compensate if he is to maintain his course. Pacific wind systems and associated terminology are described in detail in Chapter 5, where terms for seasonal winds and wind directions are reconstructed.

6.2 Wind compass

Terms for seasonal winds also come to be applied to that section of the compass from which the winds blow. Frequent reference is made in the literature to ‘wind compasses’. Parsonson writes (1962:41) that ‘like the Arabs, the Polynesians divided the horizon into a greater or lesser number of points, the Tahitians into 16 parts, the Cook Islanders 32, to each of which corresponded a wind’. Lewis has recorded wind compasses in both the Southern Cooks and Pukapuka, the Tokelaus and Tahiti, and refers to rather more nebulous reports from the Carolines. He also reports a six-point wind compass from the Lau group of Fiji (1994:112ff.). Feinberg writes (1988:92) that ‘Anutans have what might be described as a rudimentary wind compass in that they know the prevailing winds at various seasons and use the same term for the wind coming from a particular direction and the name of the geographical bearing itself. However, the number of points is not great.’ Feinberg in fact lists six: *tokerau* (NW) *ruatū* (NE), *tona* (E), *tuauru* (SE), *raki* (SW) and *pakatiu* (W). He reports that Firth gave a similar description for Tikopia wind points, although the latter are rotated roughly 40° clockwise from the Anutan ones. Wayan Fijian distinguishes six wind directions/compass points: *ḏeva* (S), *tokalau* (E), *tokalau ḏeva ḏeva* (SE), *vualiku* (N), *vua i ata* (also E), *vua i rā* (NW), and *vua i roro* (SW) (Andrew Pawley pers. comm.). Lewis mentions a rare Western Oceanic example, from the Vitiaz Strait between New Guinea and New Britain, where a five-point wind compass from Siassi has been recorded (Lewis 1994:118–119, quoting from Chappell).

There is general agreement that winds can equate with cardinal directions only in a very loose sense. Both Lewis and Gladwin reiterate that directions for the navigator need not be precise in the cartographer’s sense; they only must be good enough to enable him to get where he wants to go with some margin for error. Winds indicate approximate directions; star bearings are absolute.

¹⁹ *pāfīs* in the orthography used here.

6.3 The seascape

In the area of sea signs, my hunt for terms has been much less successful than with heavenly bodies. There are a number of terms—for the sea itself, and for current, drift, wave and reef—which are not restricted to navigation, and which have been reconstructed in Chapter 4. A small group of terms may be considered as particularly significant to navigation. These are discussed below.

6.3.1 *Swell*

Ocean swells are unbreaking waves which have their origin in regions of strong and persistent winds such as the tradewinds or the monsoons. They travel beyond the wind systems that generate them, and remain after the wind has died away (Lewis 1994:124). Although they vary with the seasons, and to some extent with local weather conditions, their behaviour tends to be long-term, and thus reasonably predictable for any particular journey. Typically, two, three or more swells will move across or through each other simultaneously, requiring a high degree of skill on the part of the navigator first to distinguish and then to compensate for when maintaining course. Any known sea route can be expected to have its own probable swell pattern, with individual swells likely to be given local names. Gladwin (1970:170) describes Puluwat as having three main swells, Big Wave, North Wave and South Wave. Lewis writes that in the Santa Cruz Group, (presumably Pileni), three swells are considered to be present all year round. They are *hoa-hua-loa*, the long swell from the southeast, *hoa-hua-dela-tai*, the sea swell from east northeast and *hoa-hua-dela-hu* from the northwest. Lewis suspects that these originate from the southeast trades, the northeast trades and the northwest monsoon respectively, and considers that this is a fairly general pattern in this segment of the Pacific. ‘Further eastward, but still south of the equator, we might expect the effects of the monsoon to be lost, and, once clear of the big Melanesian islands, for the Southern Ocean swell to sweep unhindered up from the south. This indeed is the pattern in the Gilberts and Tonga, with their “great swells” from the east and south.’ (Lewis 1994:128).

We have two POc reconstructions, **bayau*, which probably refers specifically to swells, and a second, **yalu(n)*, where there is some doubt as to whether the reference is to swells or to ocean waves of all kinds. (For cognate sets see Ch.4, §2.4.)

Heyen (1962:67) lists a further two Kiribati terms, *ao-mean* ‘the sea swell from the north’ and *ao-maiaki* ‘the sea swell from the south’. Feinberg (1988:114) lists terms from Tikopia—*ɲaru fenua*, and Anutan—*ɲaru penua*, which refer to swells which have been reflected back from a land mass, and thus serve as indicators that land is close.

6.3.2 *Deep phosphorescence*

This phenomenon is distinct from surface phosphorescence. It comprises streaks and flashes of light a metre or so below the surface, and is in constant motion.

Its flashes dart out from the directions in which islands lie, or else flicker to and fro in line with these bearings. It is best seen ‘in the middle sea, 80–100 miles out’, but it invariably indicates the direction of land. As you approach land, it becomes scanty and finally disappears by the time the island (if an atoll) is well in sight. (Lewis 1994:253)

It is particularly marked on dark rainy nights, when it becomes the main direction finder. Lewis has recorded names for it in Pileni in the Reef Islands, in Tonga, and also in Micronesia, although the names are unrelated. In Pileni the term is *lapa*, a reflex of **lap^(w)a(r,R)* ‘lightning, phosphorescence’ (Ch.5, §5.4). In Tonga it is *ulo ?a e tahi*, literally ‘flame of the sea’. In Kiribati it is called *te mata*, here in its sense of light or something used to give light. The only other reference to it is a Marshallese term given by Lewis (1978:119) as *drojet*, which I cannot locate in the Marshallese dictionary although the second element *-jet* (*-cet*) is from **tasik* ‘sea water’ (Ch.4, §2.1).

6.3.3 *Reference islands*

Lewis’s books make frequent reference to *etak* islands, used as ‘moving’ reference points by Puluwat navigators. A voyage is conceived of as being divided into stages or segments with reference to a sequence of islands lying away to one side of the course. Each island is in turn conceptualised as moving while the canoe’s position is held to be fixed relative to that of a given star with which each island is aligned. *Etak* refers both to the concept of dividing up the voyage in this way, and to the stages themselves.

An *etak* is a variable distance ... [but] the *etak* island is generally so chosen as to make an *etak* segment somewhere around 20 miles. The first and last two *etaks* of a voyage are exceptions. These are the ‘*etak* of sighting’ and the ‘*etak* of birds’, and both are absolute distances of 10 miles. (Lewis 1978:147)

See also Gladwin (1970:181–186).

The only reference to *etak* as a concept is from the Carolines (*etak* in Puluwatese and Satawalese, *hatag* in Woleaian²⁰). However, Lewis believes that the navigator Tevake, from the Polynesian outlier Pileni, must have used a similar system. He writes:

His [Tevake’s] ability to point out the direction of invisible islands whenever he wished is presumptive evidence that he was thinking in terms of some form of home-centre reference system.

and again,

One cannot say whether or not Tevake’s orientation concepts resemble the Carolinian one of *etak*. One can, however, be certain to this extent about the picture that his mind composed of the changing relationships of islands 50 and 100 miles from his course. This was of a similar order of accuracy and enabled him to point out the direction of invisible islands, in the same manner as the *etak* system. (Lewis 1994:171)

I have not been able to trace the term elsewhere.

6.3.4 *Sea marks*

Lewis (1994:291) writes that:

The term ‘sea mark’ (*betia*) is a Gilbertese one, but the conception is not unique to that archipelago or to Micronesia. Carolinian navigators, for instance, learn sequences of what they call ‘sea-life’. These, much more frequently than their Gilbertese counterparts, are transitory phenomena such as sightings of certain fish, and the like. Some, however, like a whirlpool on Uranie Bank, have real and permanent existence.

²⁰ These forms are in Lewis’s (1978) orthography.

Lewis then includes a quote from Grimble:

There were certain traditional signs by which navigators judged their distance westward of the land. The safety limit to leeward (i.e. westward in the trade season) was called the Fish Wall of Kabaki. It consisted of a line of leaves and rubbish scattered over the sea from Makin to Samoa far to the westward of the land. This is probably quite true, the rubbish being carried by some current.

Betia is a reflex of a Proto Micronesian term **peti* (N,V) ‘float’. I have no record of any term for sea marks outside the Gilberts.

6.3.5 *Expansion of target*

Pacific navigators reduced their risk of missing a target island through various strategies designed to expand the target. As a general rule, low islands with trees are visible for a distance of about 10 miles. Bird sightings can at least double this range. Terns, noddies and boobies are all species that spend their days flying over off-shore fishing grounds. As night approaches they will drop low over the water and make a beeline for their land roosts. The reverse occurs at dawn. Terns and noddies will range up to 20–25 miles offshore, while the range of boobies is 30–35 miles (Lewis 1978:30). Other indicators of nearby land include the presence of off-shore reefs, a change in the patterning of swells as one nears land caused by their refraction at a different angle, change in water colour, and particular effects in the clustering and colour of clouds that gather over land. Although these indicators are put to practical use in various parts of the Pacific, we have insufficient linguistic data to draw any conclusions about origins of these concepts.

7 Navigation in Western Oceania and the Admiralties

7.1 Navigation in Western Oceania

There is little information on navigation among the people of the Western Oceanic region. One might expect such skills to have been most developed on small islands distant from a large landmass, where trade was essential to the community’s livelihood. Such islands would have included the western outliers of the Admiralties, and Nissan Island between New Ireland and Buka. However, navigational skills were not necessarily limited to such islands. Malinowski wrote in 1922 about the navigational skills of the Trobriand Islanders and the people of the Amphlett group, who were involved in the ‘Kula ring’, the ceremonial trading cycle which flourished until a few decades ago among the islands of the region off the tip of Papua:

Taking the bearing by sight, and helped by the uniformity of winds, the natives have no need of even the most elementary knowledge of navigation. Barring accidents they never have to direct their course by the stars. Of these, they know certain outstanding constellations, sufficient to indicate for them the direction, should they need it. They have names for the Pleiades, for Orion, for the Southern Cross, and they also recognize a few constellations of their own construction. (Malinowski 1922:225–226)

Malinowski also mentions a particular Trobriand village, Wawela, as the traditional centre of astronomical knowledge, but its function seems to be restricted to regulation of a calendar and the fixing of significant dates (p.68).

Lauer (1976:86) has provided some information on the Amphlett Islanders, whose home is a small group of high islands situated south of the Trobriands.

The Amphlett Islanders do not appear to have developed sophisticated techniques for orientation and navigation. For example, although Amphlett men commonly know many stars by name they do not attempt to use their knowledge of the stars to guide them when sailing at night. The relative lack of sophistication in the navigation techniques of the Amphlett Islands, as well as those of their neighbours in the northern Massim, can probably be explained by the character of the voyages made in the area. The voyages are all short [no more than 75 km]. Land, except during bad weather, is always visible. ... And the island targets are all large.

Lewis (1994:126, 134) interviewed two men in 1966 who had participated in the *hiri* trading voyages of the Motu people across the Gulf of Papua and reported using the deep ocean swells and star paths to guide their vessel. No terms were recorded.

Blackwood (1935:380–382) has given a description of voyaging undertaken by Buka people in the northwest Solomons.

The people of the North Bougainville coast are not great sailors, and seldom venture on trips more than a few miles from the shore. Those of Buka ... are more venturesome, and go, on occasion, as far as the island of Nissan, a trip involving little short of a hundred miles, mostly of open and sometimes stormy sea, to buy the pigs for which Nissan is famous.

These voyages are made in paddling, not sailing canoes. Voyages are made at night, and a star path is followed. Although Blackwood does not give this method of navigation by star path a particular name, it is obviously the same technique as that developed on such a broad scale in Polynesia and Micronesia.

7.2 Navigation in the Admiralties and St Matthias

I have not been able to locate any record of navigation techniques in this area apart from the brief description given by David Lewis on Ninigo, which lies 120 miles west of Manus and the same distance north of New Guinea. Although he sailed with the Islanders in their 50 foot canoes and referred to them as ‘true deep-sea navigators’, his description of their technique is brief, and he does not give local terms. He summarises:

It soon became apparent that it [Ninigo navigation] followed the general oceanic pattern. Steering was by stars rising or setting a little above the horizon; currents were known to vary with the monsoon and trade wind seasons and particular wave forms were regarded as being characteristic of different currents. There was also an unfamiliar high star technique, reminiscent of one sketchily reported from Samoa and the Tokelau Islands, which I was never able to fathom out. (Lewis 1978:93)

8 Conclusions

Reconstructions of navigation terms for Proto Oceanic, Proto Micronesian and Proto Polynesian are listed in Table 4.

From the table, it can be seen that **manuk* ‘bird’ and **tolu* ‘three’ for Orion’s Belt, are the only star reconstructions with reflexes in both Polynesian and Micronesian languages. Success in reconstructing non-western constellation names has been almost entirely limited

to Micronesia, with its descriptive names like PMic **kua* ‘Dolphin constellation’, PMic **tapia* ‘Bowl constellation’ and PChk **caw* ‘Dip net constellation’. This may simply reflect the adequacy of our sources, with more star terms being included in Micronesian dictionaries than Polynesian, perhaps because the terms have been retained more recently in Micronesian memory. Makemson, my most consistently useful source for Polynesian star names, lists a number of Polynesian constellation names by their English translation and with western equivalents where they exist. They are The Seven (Big Dipper), the Darts (Orion’s Belt), the Wild Duck (Crux), the White Sea-swallow (Cygnus), the Pigeon-roost, the Birdsnare (Orion) and the Canoe of Tamarereti (Tail of the Scorpion) (1941:197–198). However, I have been unable to reconstruct any of these as PPn constellation names on linguistic evidence, and there is no evidence that the same images are used in Micronesian terms.

Lewis (1994:353–354), more concerned with the practices of navigation and less so with its labels, has written:

Particular ideas or techniques were favored in different archipelagos in accordance with local geographical and social factors. However, so far as can be determined by haphazardly recorded items of information, and by what is still remembered, the methods used were surprisingly homogeneous. So much so that it would overstep the evidence if one were to speak of separate or typical Polynesian and Micronesian systems. Navigation seems to have been equally efficient in both areas, and the techniques were very often identical.

Table 4: Reconstructions of heavenly body and other navigation terms

Term	POc	PMic	PPn
sun	<i>*qaco</i> ‘sun, daytime’	<i>*alo</i> ‘sun’	<i>*qaso</i> ‘day as time span’ PNPn <i>*qaho</i> ‘daytime’
	<i>*raqani</i> ‘daytime’	<i>*rāni</i> ‘day’	...
	<i>*[dr,r]aqaa</i> ‘sun’s heat, light’		<i>*laqā</i> ‘sun’
	<i>*rarar</i> ‘be warm’	<i>*rar</i>	<i>*rara</i> ‘heat over fire’
	<i>*sinaR</i> ‘to shine, sun’	<i>*sina</i> ‘light, shine’	<i>*mā-sina</i> ‘moon’
moon	<i>*pulan</i>	...	<i>*pula</i> ‘to glow’
	<i>(d)rama(R)</i> ‘light’	<i>*marama</i>	<i>*marama</i> ‘moon’
			<i>*mā-rama</i> ‘light, bright’
star (generic)	<i>*pituqun</i>	<i>*fitū</i>	<i>*fetuqu</i>
Venus	<i>*ma-dala</i>	<i>*matal</i>	...
	...	<i>*fituu rāni</i>	<i>*fetuqu qaho</i> ‘day star’
Bird constellation	<i>*manuk</i>	<i>*ma(a)nu</i>	<i>*manu</i>
Sirius?	...	...	<i>*takulua</i>
star in Orion	...	...	<i>*tākelo</i>
Orion’s Belt	<i>*tolu-</i>	<i>*telu-</i>	<i>*tolu-</i>
Pleiades	<i>*bulu(q)</i>	...	...
	...	...	<i>*mataliki</i>
Southern Cross	? <i>*paRi</i>	...	...
	...	<i>*p^wup^wu</i>	...
Pointers	...	...	PNPn <i>*rua tajata</i>
Aldebaran	...	<i>*u(C)unu</i>	...
Polaris	...	PChk <i>*fitū m^wakut</i>	...
Altair	...	PChk <i>*mai-lapa</i>	...

continued over ...

Term	POc	PMic	PPn
Antares	...	*(d,z)umuri	...
	...	...	PNPn *mele-mele PCEPn *refua
Pegasus	...	*lakV	...
Dolphin constellation	...	*kua	...
Cassiopeia	...	PChk *ukulik	...
Bowl constellation (Delphinus)	...	*tapia	...
Arcturus	...	*aremoi	...
Corvus constellation	...	PChk *tarop ^w olu	...
Leo constellation	...	PChk *ici	...
Vega	...	PChk *mul	...
Dip net constellation (Corona Borealis)	...	PChk *caw	...
stars in Ursa Major	...	PChk *wuleko	...
Equeleus constellation	...	PChk *tā(d,z)a	...
Magellanic Clouds	...	...	*maqafu
Milky Way	...	...	*kaniwa
sky	*lanjit	*lanji	*lanji
	...	*kadawa ‘heavens’	...
horizon	...	PChk *pai-lanji	*tafa-qaki-lanji
star path (that which is steered for)	...	...	*kaweija
star rise	*sake ‘to rise, upwards’	*sake	*hake ‘upwards’
star set	*sipo ‘to go down, downwards’	*tip ^w o	*hifo ‘downwards’
	...	*zolo ‘to descend, disappear (below horizon)’	...
ocean swell	*ηalu(n) ‘wave, swell’	*ηalu ‘wave, swell’	*ηalu ‘wave’
wave, swell	*bayau ‘ocean swell, whether breaking or not’	*peau	...
lightning	*lap ^(w) a(r,R)	...	*lapa ‘flash of light’
open sea	*masawa(n,η)	*masawa	*moana
sea, salt water	*tasik	*tasi	*tahi ‘shallow sea’
deep blue sea	*laman	...	...
current	*qaRus	*aus	*qau
reef	*sakaRu	*sakau ‘reef, shoal, reef island’	*hakau ‘coral reef’

In spite of our inability to reconstruct many terms at a level higher than PMic or PPn, there remains a fair degree of conformity among the Austronesian speakers of the Pacific in the way they describe their physical world of sea and sky. Among the stars and star groups, for instance, Venus is typically labelled as the ‘day star’ or in association with events of dawn or dusk; Alpha and Beta Centauri are ‘the two men’; Taurus is ‘tongs’; Polaris is ‘the star that does not move’. The horizon, predictably, is ‘base of sky’ or ‘edge of sea’. What is particularly striking about the data collected is the degree of apparent reinvention of terms for similar concepts. Many are transparent compounds, as if the concept is being described for the first time.

My guess as to why this should be so, is to relate it to the fact that these are island communities scattered over a vast area. Each has its own regularly trafficked sea routes, marked by star paths or star clusters possibly relevant only to that community. Each is its own physical world, with its own particular collection of weather patterns and physical features. The stars, for instance, are not only navigational aids. Together with the sun and moon they are a community's clock and calendar. But places separated by 30° latitude will have different seasonal cycles marked by the appearance of different stars. Significant events for a local community will be such things as the time for harvesting breadfruit, the time for particular fish to be plentiful, the time for fair-weather sailing and the time of storms. Local events motivate local names.

The terms which show fewest cognates are the most specialized navigational terms. The body of navigational knowledge held by a community was a precious commodity. In extreme cases, as in Tonga, such knowledge was closely guarded. There it was held by senior members of particular clans, and passed only to their descendants. Although all members of a community would be aware in a general way that star paths, swells and so on were aids to navigation, the actual terms used would in some places belong to secret usage. But even in less stratified communities, there would have been few skilled navigators at any one time. Arthur Grimble wrote that of the thirty thousand inhabitants of the Gilbert Islands in his time there (around the 1920s), fewer than twenty could speak with authority about the stars; and 'those who have the knowledge are often most unwilling to impart it, for of all the secrets treasured by the native, those connected with navigation are still perhaps the most jealously prized and guarded' (Grimble 1931:197). And, as has been well exemplified by Stephen Thomas (1987) in his book *The Last Navigator*, this knowledge could be lost within a generation or two.

So although we can recognize the same navigational techniques such as the use of star paths and swells in places as far apart as the Papuan Gulf, the Admiralties, the Solomons, Micronesia and Polynesia, and techniques involving a wind compass and deep luminescence in Micronesia and Polynesia, comparative linguistics provides no proof that these shared techniques evolved from a common knowledge base at the POc stage.

However, it seems that gains have been made in another, unexpected, direction. At least in the subgroups for which we have most data, that is, in the Southeast Solomonic, Polynesian and Micronesian, the data are unusual in that the terms for what we might describe as cosmic features—heavenly bodies, the horizon, the solstices and the like—are not arbitrary names. They are overwhelmingly descriptive terms, transparent compounds that (a) reflect some specific function or aspect of the feature, whether they be calendar or navigation stars, or (b) that underpin their role in creation mythology. The Oceanic Lexicon Project is organized on semantic principles partly in the belief that this will provide a basis for cultural reconstruction. In this sense, I believe that star names have offered us some rare clues as to the values and world view of Proto Oceanic speakers.