Abstract
The paper surveys the relevant cardinal direction terminology, both stems and suffixal morphology, and compares the data both within the WD dialect web, and externally, with a view to hypothesising about its origins. Comparison with surrounding languages can be made lexically, semantically, and morphologically. Morphologically, the /-rra/ suffix is notable for occurring in languages to the west, north, and east, but not to the south. Some restricted suffixes occurring only, or mainly, with cardinals, are found in Pitjantjatjarra, Yankunytjatjara and more so Martu Wangka, but even there not with the elaboration of the Ngumbin-Yapa languages to the north-east. A hypothesis is made about links between cardinals and names for social divisions in southern WD dialects. A semantic generalisation is that, unlike Ngumbin languages, the WD terminology appears not to include separate stems for ‘upstream’, ‘downstream’. The conclusion, slim as the evidence is, points to a northern origin for WD.
1. **Introduction**

The aim of this paper is the investigation of recurring patterns and irregularities in the terminology for cardinal directions, to see whether links can thereby be discerned between the Western Desert language (WD) and related Australian languages.

The relevant previous investigation of cardinal terminology has been made by Tindale 1974, Whitehead 1990 and then Breen 1993. Cardinals have been included in basic vocabulary lists, including the pan-dialectal compilations of WD data in O’Grady 1967, RDWDL 1974 and Hansen 1984. Comparative analysis of WD data was made by then ANU students Brown 1976, Evans c1981, and Bell 1989. Other Pama-Nyungan subgroups have been analysed comparatively by O’Grady 1966, 1979, Hale 1976, Black 1980, and Austin 1981, 1990.

Patterns in cardinal terminology are considered in turn
* in roots
* in morphology (suffixing), including wind terms
* in ‘stream’ terminology

Turning to semantics, there is mention of the rotation in terminology on the west, and the ‘shade’/‘sun’ terminology in the south.

1.1. **Orthographic note**

This paper generally cites forms in the practical orthography of the particular language. The WD language varieties have at least four different practical orthographies (basically, as used in WA, NT and SA) and I sometimes use the WA conventions even for NT or SA forms, thereby avoiding diacritics. The only real confusion concerns “r”. The WA convention marks apico-domals by a digraph with r (rather than an underscore: t, n, l, r are used in SA and NT), and uses rr for the apical flap and r for the apico-domal approximant (as in NT as well). Martu Wangka uses “j” where the other varieties use “tj” but this should not cause confusion.

Some languages, for instance in the Ngumbin family, use a b-d-k practical orthography, but I generally cite forms here in a p-t-k orthography, which is used also for reconstructed and unattested forms.

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1 This paper was presented to “Where Did The Western Desert Language Come From?”, a workshop at the Third Australian Linguistic Institute, Australian National University, Canberra, 10 July 1996.

I have benefited from discussion of the topic and comments on the draft from Jane Simpson, Harold Koch, Mary Laughren, Patrick McConvell, Nicholas Evans, and David Wilkins. Background work on this topic was partially supported by grants from the Australian Institute of Aboriginal Studies and the Australian Research Council (no. A58932251).
2. Evidence from roots

2.1. WD overview
Before considering evidence from other areas of grammar, first we look at the form of WD roots for cardinal terms, thereby reviewing the evidence for relatedness used in the first approximations of older lexicostatistical classifications.

The common cardinal stems in WD, proposed by Brown 1976 as proto-forms, are shown in Table 1.

Table 1. common WD cardinal stems

<table>
<thead>
<tr>
<th>gloss</th>
<th>Brown, Whitehead</th>
<th>Hansen 1984</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>(y)alinytjarra</td>
<td>kayili</td>
</tr>
<tr>
<td>S</td>
<td>(y)ulparirra</td>
<td>yulparirra</td>
</tr>
<tr>
<td>E</td>
<td>kakarra(ra)</td>
<td>kakarra</td>
</tr>
<tr>
<td>W</td>
<td>wilurarra</td>
<td>yapurra</td>
</tr>
<tr>
<td>‘up, etc’</td>
<td></td>
<td>katu</td>
</tr>
<tr>
<td>‘down, etc’</td>
<td></td>
<td>kaninytjarra</td>
</tr>
</tbody>
</table>

Brown 1976 and Whitehead 1990:66 independently come to the same conclusion on the four in the horizontal plane. Hansen 1984:90-1 from his own interviews identifies “common Northern WD” terms, as in the last column. These coincide with Brown and Whitehead for 'south' and 'east'. The two different stems for 'north' are both widespread within WD, but, as Brown 1976 suggests, /kayili/ may well be a loan: it is shared with Ngumbin languages to the north-east. It is a possible cognate of proto-Arrerntic /*ayerrere/ (Koch 1997). Note also that /kayili/ is also attested with the /-rra/ ending, viz. as /kayilirra/.

2.2. Warnman
The cardinal terminology shows some evidence for the recognition of Warnman as a separate branch of the Wati subgroup. The Warnman terms in Table 2 may be compared with WD terms in Table 1.

Table 2. Warnman cardinal stems

<table>
<thead>
<tr>
<th>gloss</th>
<th>O'Grady c1967</th>
<th>Taylor &amp; Thieberger 1988</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>kayili</td>
<td></td>
</tr>
<tr>
<td>S</td>
<td>ngaparti</td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>kakarra</td>
<td>kankarni</td>
</tr>
<tr>
<td>W</td>
<td>kararra</td>
<td>kankararra</td>
</tr>
<tr>
<td>‘up, etc’</td>
<td>kankararra</td>
<td>kankarni</td>
</tr>
<tr>
<td>‘down, etc’</td>
<td>kaninytjarra</td>
<td>kaninykurti</td>
</tr>
</tbody>
</table>

Warnman uses the usual widespread term for 'east', and 'down', and for 'north' Warnman uses the common northern Wati term (shared also with northern non-WD languages). In the three other cardinals Warnman shows some divergence from WD dialects.

1. /kara.rra/ ‘west’. This term is recorded in WD only at La Grange (Hansen 1984), where it may be a loan as outside the Wati subgroup it is found in La Grange languages Karajarri and Mangala (as /kara/). Of the six
cardinals /kara.rra/ is the most peculiar to Warnman within Wati. The term is further discussed with /karapurt/ below.

2. /ngaparti/ ‘south’. According to Hansen 1984, this term is favoured at Jigalong (Martu Wangka) and La Grange, and recognised across northern WD dialects, but not known at Ernabella, Giles and Warburton. It is not found outside the Wati subgroup.

3. /kankarra/ ‘up, etc’ is most likely an old inheritance, also occurring in Kukatja (Balgo), Ngaanyatjarra, and Pintupi. The /katu/ of other WD dialects is peculiar to WD, whereas /kankarra/ is shared with widespread languages outside the Wati subgroup: Proto-Kanyara-Mantharta, Wajarri, languages to north and east, and Wirangu, and O’Grady 1966:111 assigns /*kanka/ ‘up, above’ to Pama-Nyungan level.

2.3. Other WD cardinal stems
In addition, there are some other stems recorded in particular WD dialects, notably:

1. /yapurra/ ‘west’ (attested in Pintupi, Kukatja alternate, Martu Wangka, Warburton ‘west, country west of Warburton Ranges’; shared with languages to the west). O’Grady 1966:109 assigns /*yapurl/ ‘west’ to Nyungic level, and distinguishes it from /*yapu.rru/ ‘north’ also at Nyungic level. Attestations of both terms display a right-angle shift in correspondences in languages on the west of WD: cf. Wajarri and Martu Wangka /yaburru/ ‘north’: see below.

2. /ngarnawarra/ ‘up’ (Martu Wangka alternate)
/tjaru/ ‘down’ (Pitj/Yank)
/ngururrpa/ ‘down’ (Martu Wangka alternate)

The stem with the widest correspondences beyond WD is /*kaka.rra/ ‘east’, which O’Grady 1966:111 assigns to Pama-Nyungan level.

2.4. Wider correspondences of WD cardinal stems
A few of the correspondences show evidence of directionality, one on the north-west and the other on the west.

1. There is evidence that /(y)alinnytjarra/ ‘north’ form derives from the north-west. Mangala (Vaszolyi 1971 in RDWDL, Tindale 1974:47, McKelson 1989) has for this meaning the stem /ralinja – ralini – ralinya(n)–/, shown with its various inflections in Table 3.

<table>
<thead>
<tr>
<th>Table 3. Mangala 'north' terms</th>
</tr>
</thead>
<tbody>
<tr>
<td>ralinja                  north</td>
</tr>
<tr>
<td>ralinjakuna             northwards</td>
</tr>
<tr>
<td>ralinjawalu             northwards</td>
</tr>
<tr>
<td>ralinjakuti kakarra    northeast</td>
</tr>
<tr>
<td>ralinjakuti kara       northwest</td>
</tr>
<tr>
<td>ralini marra             from the north</td>
</tr>
<tr>
<td>ralinyangu              from the north</td>
</tr>
<tr>
<td>ralinyankarti           on the north side</td>
</tr>
</tbody>
</table>

Cf. Paakantyi /kanka/ ‘near, close by’ and /kanka-yartu/ ‘wind coming from downstream on the Darling, storm from the west and south’ (Hercus 1993).
The evidence that Mangala has the older form is that
(a) lenition of initial /*r/\(^3\) is more plausible than the
reverse; and (b) Mangala shows allomorphy in the stem\(^4\) where
in WD there is none.
Other relevant data is Martu Wangka /yali/ ‘hot weather,
summer’, with derivatives /yalipuru/ ‘summertime’, /yalijarra/
‘summertime’. This would seem to counter the Mangala evidence
and point to Martu Wangka as a source, via a putative nasal
form of the Comitative suffix: /yali+nyjarra/ ‘summer+with’ >
/yalinyjarra/ ‘north’.

2. Wajarri has among its cardinal terminology an extra term
built on a root meaning ‘west’. The cardinal terms of Wajarri
are (Marmion 1995):
- \(N\) marlbagardi, milimili, yabugura, yaburru
- \(E\) gagararra, garangula (garangu ‘sun’)
- \(S\) minangu (<Nyungar ‘mirnong’ [W. Douglas])
- \(W\) wirlura, wirlunyu ‘seacoast people’
The ‘west’ term is comparable to WD /*wilurarra/\(^5\), and shares
the apparent root /*wirlu-/ with /wirlunyu/ ‘seacoast people’
(i.e. people to the west of Wajarri). This somewhat greater
complexity suggests the root is older in Wajarri than WD.

3. Wati /kaninytjarra/ ‘down, etc’ is shared with Ngumbin-Yapa
languages to the north-east. There the root /*kani-/ ‘down,
inside’ is discernible,\(^6\) and so may be older there, with the
form having spread into WD.
On the other hand, WD /kaninytjarra/ ‘down, etc’ shares with
/(y)alinnytjarra/ ‘north’ the ending /-nytjarra/. In Ngumbin-
Yapa, at least in Warlpiri, /kaninja+rra ~ kanunju/ ‘down,

\(^3\) O’Grady 1966:89. Laughren & McConvell (1996) point out the initial r:y
correspondence of:
- Nyangumarta
- Warnman
- Mangarla, Wmj
- WD
- Warlpiri
- ruka
- ruka-ruka
- ruka-ruka-ra
- yuka
- yuka
‘afternoon’ ‘sunset’ ‘afternoon smoke’ ‘night’ ‘night’
and propose that */ruka/ is original; cf. O’Grady 1966:110 proto-Ngayarda
/*yuka/.
The correspondences for */ralinyja/ ‘north’ are not quite parallel:
- Nyangumarta
- Warnman
- Mangarla
- WD
- Warlmanpa
- yali+nyji/a (kayili)
- rali+nyja
- yalinyjarra
- yanyja+rra
(Warlmanpa is the more relevant Yapa language here; cf. Warlpiri
/yatijarra/.)

\(^4\) The other three Mangarla cardinals have an invariable stem; a similar
allomorphy occurs in Nyangumarta, with root /yali-/ ‘north’.

\(^5\) A possibility might be a folk etymology /yalinyjarra/ ‘north’ >
/yali+nyjarra/ ‘X-Comitative’ leading to \(X = ‘\)hot weather’. The nasal form
/+nyjarra/ of the suffix is not in modern Martu Wangka. However, note
Pintupi/Luritja /kali pina+tjarra/ ‘boomerang with an ear, hooked
boomerang’, cf. /pina/ ‘ear’ and regular Comitative /pina+tjarra/ ‘deaf, mad’.

\(^6\) Looking further afield, what may be the same root occurs with opposite
meaning. Whitehead 1990:22 proposes Pama-Nyungan /*kani/ ‘up, above’,
following Alpher for proto-Paman (and now Alpher 1991:150 for proto-Pama-
Maric).
etc’ is the only one of the six cardinals with this precise ending.

2.5. /kara.purta/ ‘westerly’

The root /kara-/ ‘west’ is found in north-western WD (Warnman) and adjacent languages Karajarri and Mangarla. It is cognate with the Ngumbin-Yapa root /*karla-/ ‘west’, evincing the intervocalic r:rl correspondence studied by Laughren & McConvell (this workshop).

Two Ngumbin-Yapa languages adjacent to WD appear to have the older /*kara-/ root preserved in a couple of words:

<table>
<thead>
<tr>
<th>Language</th>
<th>Word</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Warlpiri</td>
<td>karapurda</td>
<td>‘warm westerly wind which signals end of cold season’</td>
</tr>
<tr>
<td>Walmajarri</td>
<td>karapurta</td>
<td>‘wind from the west (sometimes blows in the afternoon during the hot season and is welcomed)’</td>
</tr>
<tr>
<td>Walmajarri</td>
<td>karawarra</td>
<td>‘evening; afternoon between mid-afternoon and nightfall’</td>
</tr>
</tbody>
</table>

The more widespread /karapurta/ is also attested in the Warburton WD variety, which does not use a reflex of /*kara-/ in the meaning ‘west’:

<table>
<thead>
<tr>
<th>Language</th>
<th>Word</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Warburton</td>
<td>karapurta</td>
<td>‘hot north wind and clouds’</td>
</tr>
<tr>
<td>Ngaanyatjarra</td>
<td>karaputa</td>
<td>‘summer storm cloud (cumulo-nimbus) cf. liri’</td>
</tr>
</tbody>
</table>

The implied suffixation, and the semantic changes, both need discussion.

The modern languages with the appropriate suffix are just Warlpiri and Warlmanpa, where /-purda - -purta/ ‘towards, facing’ occurs on cardinals and a few other directional stems. But these languages cannot be the source of /karapurta/ because they lack the root (in the required form). There is a trace of a /-purta/ suffix in the WD area in these related words:

<table>
<thead>
<tr>
<th>Language</th>
<th>Word</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>E Walmajarri</td>
<td>lirrapurta</td>
<td>‘Ingram’s Brown Snake; said to cause toothache in certain situations’</td>
</tr>
<tr>
<td>Warburton</td>
<td>yirrapurta</td>
<td>‘magic killing stick made of flint’</td>
</tr>
<tr>
<td>Kukatja</td>
<td>yirrapurta</td>
<td>‘diseased tooth; a toothache’, cf. /yirra - lirra/ ‘tooth, teeth’</td>
</tr>
</tbody>
</table>

There is no modern WD /-purta/ suffix, but there are the possibly related roots:

<table>
<thead>
<tr>
<th>Language</th>
<th>Word</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Warburton</td>
<td>purta</td>
<td>‘suggestive particle, precedes a suggestion’</td>
</tr>
</tbody>
</table>

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9 Warlpiri also has the possibly related /-ku-purdangka/ ‘Possessive (where referent is same generation kinsman)’.
10 Douglas 1988; or, as P. McConvell suggests, this may be /yirra-puta/ ‘tooth-bad’, cf. /kata-puta/ ‘Moloch horridus; head-bad’ (PMcC).
A possible scenario\textsuperscript{12} is the following: a common ancestor of WD and Ngumpin-Yapa had a particle or suffix /*purta/ with some kind of approximative meaning; the verb root /purta/- 'to miss' could have existed alongside. The combination with the cardinal /*kara/ 'west' referred to a westerly wind, in much the same way that English -ly can form a wind name from a cardinal. The suffix /*-purta/ was continued in the Yapa languages, with a meaning change, retaining the approximative component, to 'towards (but not reaching)'. WD continued /karapurta/ as the particular wind name but lost the productivity of the suffix version. After the r>$rl$ sound change in Ngumbin-Yapa languages, /karapurta/ was borrowed into Walmajarri and Warlpiri (both adjacent to WD), and was lost from most WD varieties, or continued in Warburton area with focus changed: to a northerly (not westerly) wind or to thunderstorm clouds (associated with warmer weather). Presumably the tropical import of westerlies is absent or quite different further south; in any case in the south the meaning has changed more than in the north. Thus we may have evidence that WD has a longer history in the tropics than south of the tropics. Warburton speakers now use /karapurta/ with the meaning they do because the term has travelled south with speakers adapting the meaning as they moved, so that the original 'west' element was dropped.

3. Evidence from morphology (suffixing)

3.1. Suffixes in basic terms

3.1.1. The /-rra/ suffix 'away'

It is notable that WD cardinals commonly end in /-rra/. In some varieties (see Yankunytjatjara and Martu Wangka discussed below) the /-rra/ has suffix status, as it can be dropped or replaced by other endings. Even so, this /-rra/ does not occur in WD outside the cardinal (and some semantically akin) vocabulary, unlike the situation in Ngumbin-Yapa languages where /-rra/ has a number of general uses apart from occurring on cardinals\textsuperscript{13}: primarily meaning ‘away, forth’ as an enclitic on verbs and preverbs. Wider afield, as Whitehead 1990:13 observes, “The original meaning or function of */-rra/ (reflexes: /-rr(a)/) is obscure, however this form is so common on the directional terms that it seems probable that it is a directional suffix.”

\textsuperscript{11} Douglas 1988; RDWDL has the example /malu puta/ ‘it is possibly a kangaroo’. This particle has some similarities with the Warlpiri particle /puta/ ‘improperly, partly, try to’.

\textsuperscript{12} Thanks to Harold Koch for discussion of this.

\textsuperscript{13} There is also minor occurrences in Nyangumata, such as the alternation /kakarra - kakarn/ 'east' (an alternation not paralleled in other Nyangumata cardinals) -- see below.
It is striking that the /-rra/ suffix is absent from cardinals across the west and south of WD. It is absent from southern Nyungic languages Nyungar, Mirniny, and Kaurna, and from pKanyara-Mantharta (Austin 1981):

N *yapuru
S *wartantu
E *walparra (pK), *kakarra (pM)
W *kawari
‘above’ *kankara
‘down, inside’ *kankara

and from pNgayarda (O’Grady 1966):

N *yapu.rru (Nyungic), *wartarl (Nyungic)
S *kuri.la (Nyungic)
E *jingka; *kaka.rra, *yaju (both Pama-Nyungan)
W *wurlu.ju, *yapurl (Nyungic)
‘up, above’ *kanka (Pama-Nyungan)
‘down, inside’ *thurnu.ngka (Nyungic)

However /-rra/ is found the north and east of WD. Both /-rra/ and /-rni/ cardinal suffixes occur regularly in Ngumbin-Yapa languages to the north-east, and sporadically in Marrngu languages to the north-west, and in Wajarri. It may also be detected as /-rrre/ in some Arrerntic cardinals.

A disyllabic suffix something like /-karra/, recurs in the proto-Karnic cardinals (Austin 1990):

N thinankarra, walpangkarrha
S thirrhiwa
E kunankarr (pWK)
W yantakarra (pWK)


Nyangumarta (O’Grady 1964:49-51, §2.3.2) has a longer form of the Locative, /-jirri/, on cardinals only, e.g. /karajirri/ ‘in the west’, whereas the general Locative is /-ngV ~ -ji/. Given the extensive vowel assimilation in Nyangumarta, this extension could descend from /*-rra/.

3.1.1.1. Martu Wangka

Kayilli ‘north’
yurlpari, ngaparti ‘south’
kakarra ‘east’
yapuru ‘west’
yapurrkura ‘toward the west’
-puri ‘shadow’: kakarra- ‘afternoon’, yapurra- ‘morning, about 8am’
-karti ‘to the X’ (kayili-, kaniny-) general

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-rni directional suffix ‘toward speaker’ (kakarra-, ngaparti-, on /ngalya/ Preverb)
  kakarramarni ‘the one farther on in the east’
-rra directional suffix ‘toward’ (kayili-, yurlpari-)
-rrangu ‘a X wind’ (kayili-)
-karta ‘a wind or smoke from the X’ (cardinals and /ngurrakarta/ ‘camping out’, /purikarta/ ‘day’s outing’, /jampakarta/ ‘soon’)
-malu ‘the mob from the X’ (kakarra-, kayili-)
-warraku (Manyjilyjarra) ‘back east/pointing eastward’ (kakarra-, kaninyjarra- ‘deep in’)
-kaninykurti ‘deep in’

The Martu Wangka cardinal suffix /-rrangu/ ‘a X wind’ (attested on /kayili-/ ‘N’) can be compared with the unique Nyangumarta suffix with the same form which is attested only in the combination /kanka–rangu/ ‘above–from’.

### 3.1.2. The /-rni/ suffix ‘hither’
Nyangumarta /-rni/ occurs only on two cardinal roots, in each case on a unique truncated allomorph of the root:
1. /kurili/ (sporadically /kurila/ (O’Grady 1964:44)) ~ /ku-/ ‘south’ > /kurni/ ‘from the south’
2. /kakarra ~ kaka-/ ‘east’ > /kakarni/ ‘from the east’\(^{15}\)

The roots “occur in the latter shapes in each case only when in sequence with 652 [sc. this suffix]” (O’Grady 1964:44).

The meaning ‘from’ is expressed by /-ngu/ on other cardinals and sequences of nominalised verb, /-ngurlu/ on other nominals, e.g. /karangu/ ‘from the west’.

Wajarri /-rni/ sometimes occur before the suffix /-karti/ ‘around, on the other side of’, including on deictic stems, “probably referring to the speaker as object of the direction (compare /-rni/ the pronominal suffix indicating 1st person object)” (Douglas 1981:224). Martu Wangka also has /-rni/ ‘1st person singular object’ (Marsh 1992:300).

### 3.1.3. Other suffixes
The other cardinal suffixes in Pitjantjatjara/Yankunytjatjara are:

/-lkutu/ Allative ‘-wards’
/-lkutu/ (used mainly on the words for directions) ‘in the area in this direction’ ‘in a Xerly direction’ (alintjarra- entry, wilurarra-, ulparirra-, munkarra ‘beyond’) (cf. WD /-pirti/ ‘like’)

\(^{15}\) It seems that the final /rra/ of /*kakarra-*/ has been reanalysed as being the directional suffix /-rra/, implying thereby a root /kaka-/ in this language. In other languages however, the /-rra/ directional is added to /*kakarra-*/ giving /kakarrara/ by rhotic dissimilation.

\(^{16}\) These suffixes /-lkutu/ and /-lkutu/ occur only with the four cardinals (Goddard 1985:254), cf. /tjarukutu/ ‘downwards’.
3.2. Wind terms
Several WD varieties have cardinal wind terms, based on the cardinal stems.

3.2.1. Pitjantjatjara/Yankunytjatjara
Pitjantjatjara/Yankunytjatjara wind terms show a suffix which replaces the /-rra/ ending of the stem:

- **N** alintjarra  alinytjinil(pa) 'a northerly wind' (northern dialects only)
- **S** ulparirra  ulparinil(pa) 'a southerly, cool wind from the south'
- **E** kakarrara  kakarratal(pa) 'an easterly wind'
- **W** wilurarra  Wilininil(pa) 'a westerly wind'

(Goddard 1992; for clarity of comparison I have written "rr" where the practical orthography has "r")

Three of the cardinal roots in the wind terms show /-ni/ in place of /-rra/. The exception, ‘east’, shows an ending in /-ta/ which is more common in Pintupi/Luritja.

These terms could derive from compounding with /walpa/ ‘wind, breeze’ reduced to /-alpa/; ~ /-ilpa - -ilpa/ after stem /i/.

The only other evidence of the ending is in the two words:

- **tjuntal(pa)** ‘type of fast-moving non-rain-bearing cloud, associated with very cold conditions, usually from the south; cold wind from south, or south-east’; also in Ngaanyatjarra; cf. Warlpiri /jurnta/ ‘away’.
- **maral(pa)** ‘empty-handed, carrying nothing’; also in Ngaanyatjarra ‘without any’; a speculative source is compounding mara ‘hand’ and walpa.

3.2.2. Pintupi/Luritja
A suffix /-ta/ ‘Xerly wind, wind from the X’ is recorded on three cardinal terms:

- **N** kayili  kayilita ‘northerly wind’
- **N** alintjarra  (not attested)
- **S** (y)ulparirra (y)ulparita ‘southerly wind’
- **E** kakarrara  kakarrata ‘easterly wind’
- **W** yapurra  yapurra-kata ‘westerly wind’

(Hansen & Hansen 1991)

Note that /-ta/ replaces a /-rra/. The ‘west’ term instead is recorded with the longer suffix /-karta/ which is the regular wind suffix further west in Martu Wangka.

3.2.3. Martu Wangka
A suffix /-karta/ ‘a wind or smoke from the X’ occurs on all four Martu Wangka cardinals and some other stems.

3.3. ‘up/down’ as a cardinal dimension
Stems meaning ‘up’ and ‘down’ generally participate to some extent in the morphology of cardinals in the horizontal plane, but with limitations, and sometimes with skewing of meaning in combination with some suffixes. There also may arise a link between cardinals and ‘up’/’down’ terms in a region with a

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17 Goddard has no wind term based on the alternate ‘north’ root /kayili/, but one is attested in Pintupi: kayilita ‘northerly wind; wind from the north’ (Hansen & Hansen 1992).
generally uniform overall slope, so that ‘upslope’ for instance may have a usual association with, say, ‘north’.

3.4. ‘upstream’/‘downstream’ terminology
Unsurprisingly, WD cardinal terminology does not include separate stems for ‘upriver, upstream’, ‘downriver, downstream’, and would use for these meanings the general stems for ‘up’ and ‘down’. This of course goes along with the general absence of rivers in the WD, as compared to the country of the Ngumbin languages which have the elaborated terminology.

Now /kanimparra/ occurs in a number of Ngumbin languages with the meaning ‘downstream’, and in those languages, best exemplified in Gurindji, or Malngin, where the form has an analysis /kaniny-pa-rra/ with the usual epenthetic /-pa-/ > /kanimparra/ by assimilation.\(^{18}\) As the occurrence of a corresponding term in languages where the form has no analysis is evidence of its having been borrowed there, this term would appear to have been borrowed to the west from Ngumbin (at least, some ancestor of Malngin/Gurindji).

For instance, /kanimparra/ ‘down’ is attested in the Ngayarda group: Nyamarl ‘down’ (O’Grady 1967), and Ngarla ‘north’ (O’Grady 1966:114, Geytenbeek), and /kanimirri/ ‘northeast’ in the Marrngu group (Nyangumarta, O’Grady 1966:114; Wallal Nyangumarta, O’Grady p.c. 12/5/96), in all cases apparently without morphological analysis.\(^{19}\)

The suffixes of /kanimparra/ have a derivation only in Ngumbin-Yapa (in modern languages) and there has the primary meaning ‘downstream’. Hence the best hypothesis is that /kanimparra/ in the west is a borrowing, with a meaning shifted to a cardinal direction (in ways still to be researched).

\(^{18}\) Capell’s Malngin and Ngarinyman vocabularies record the form as meaning ‘north’, possibly a local equating of the meanings based on the dominance of the Victoria River. Whitehead 1990:22,67 has /karnimparra/ as an Mudburra alternate term for ‘east’. He presumably relied on the IAD Sourcebook, which actually has it as an alternate for ‘west’, not ‘east’. McConvell’s Western Mudburra notes record only /kanimparra/ ‘downstream’, whereas Nash and Belfrage have each recorded the meaning ‘west’ in Eastern Mudburra, and Breen substituted in Elliott Mudburra /karlarra/ for the Western Mudburra /kanimparra/.

\(^{19}\) O’Grady (1966:114) writes “kanim.parra” thereby proposing this etymological break. In Ngumbin-Yapa cardinal directions the morpheme /-mpa/ can be analysed in modern languages (as described in particular languages by Laughren 1978, McConvell 1991). Of possible relevance may be Wati genitive suffix /mpa/ (mentioned by Laughren & McConvell, this workshop); not pursued here. As for the intermediate sense ‘NE’, compare Wallal Nyangumarta /yarlunu/ ‘SE’, /yarl ‘middle, a short cut’ as well as Ngarla /yarl/ ‘a course set to intercept someone or something that is moving’ (Brown & Geytenbeek 1992). (p.c G O’Grady 12/5/96)
4. Terminology rotation in the west and south

Right-angle shift in cognacy of cardinal terms has been discussed by Tindale 1974:45-48, Whitehead 1990, and in most detail by Breen 1993. There is a right-angle shift in correspondences in languages on the west of WD: one involving Wajarri /yaburru/ ‘north’ (discussed by McConvell 1996:141), and a trace of one on the south of WD (not considered by Breen 1993) discernible in Table 4.

Table 4. Ngadjumaya cardinal terms (von Brandenstein 1980)

<table>
<thead>
<tr>
<th>Direction</th>
<th>Term</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>mernu</td>
</tr>
<tr>
<td>E</td>
<td>kagarra</td>
</tr>
<tr>
<td>S</td>
<td>currga, yulbairra</td>
</tr>
<tr>
<td>W</td>
<td>ngardii, yalinjarra</td>
</tr>
<tr>
<td>‘down, below’</td>
<td>yaburru</td>
</tr>
<tr>
<td>‘up, above’</td>
<td>maadu</td>
</tr>
</tbody>
</table>

Of Ngadjumaya /yalinjarra/ in Table 4, von Brandenstein 1980:88 notes “not ‘north’ as in Pidandjatjarra”, whereas the Ngadjumaya ‘east’ and ‘south’ terms correspond to the usual WD terms.

5. ‘sun’/‘shade’ moieties

Tindale 1974:49 sketches an environmentally based hypothesis about the prehistory of some cardinals in a Kimberley language and suggests on that basis that the people speaking the language have migrated north from the desert. Whitehead 1990 advances a similar kind of argument.

Within WD I have noticed one possible environmentally based clue to prehistory. This is the connection between cardinal directions and ‘shade’ vs. ‘sun’ terminology in some southern WD varieties (extracted from RDWDL 1974, where “r” is apical flap/trill):

ngumpa  a shade, wurley. cf. ngu [\l 5 \s 28\textsuperscript{20}]
ngumpalurpa shade, dark, poor light [\l 4 \s 49\textsuperscript{21}]
ngumpaluru a moiety, the "shade side". associated with the south. *cf. wiyltjalaru.
ngumpalutu name of the generation level made up of the purungu and milangka sections. associated with the south and west compass directions. "shade side". cf. ngumpaluru [\l 61 \s 35\textsuperscript{22}]
ngumpulurutja moiety which comprises the karimara (including milangka) and purungu sections
tjintulu name of the generation level made up of the tjarutu and panaka sections; sun side.

\textsuperscript{20} RDWDL source: EV 28 Pitjantjatjarra- English Vocabulary from Ernabella.
\textsuperscript{21} RDWDL source: GH 49 Glass, Amee, and Hackett, Dorothy, Unpublished Dictionary Material Warburton, Western Australia.
\textsuperscript{22} RDWDL source: SAK 35 Sackett 1973 (Wiluna); djindulu and ngumbaluru are quoted by Sackett 1978:119.
associated with the north and east compass directions. the tjarutu and panaka sections; sun side. [\l 61 \s 35]

tjintuluru sun-side. cf. tjintu wakantja

tjintu wakalpa "sunny side". "sun-speared". name given to the ilkakumunta moiety of society which is made up of the panarka and tjaruru sections. cf. tjintuluru. the opposite side (moiety) is referred to as umpaluru (wiltjaluru), vide.

tjintu wakantja sun-speared (ie. western side). cf. tjintuluru; sun-side

wiltjaluru "shady-side" or east side. (the side which has shadows cast on it in the evening.) moiety *name also referred to as ilkakumunta. cf. ngumpulurutja

wiltja shade, shadow, wurli wurli, hut, shadowy bush, bush with shade as opposed to shadeless *plain. cf. pulynu. [\l 4 5 36158 731243514 53 302829 \d y]

ilkakumunta the gn. moiety name. comprises panarka (inc. yiparka) and tjaruru sections, which see. animal totem: tiipu (tyilpu), fox. cf. umpaluru. cf. ngumpaluru (shade side). cf. wiltja luru (shade side)

yilkaku outside [\l 4 \s 49]
yilkari the day sky, clear; sky [\l 4 3 \s 82714]

It is to be expected that this association occurs south of the Tropic of Capricorn. The fact that the sun-shade terminology is generally compositional and transparent could point to its recency. For instance, /wiltjaluru/ is clearly based on /wiltja/ ‘shade’. The moiety name /ilkakumunta/ is the only term not completely transparent -- whereas it apparently involves the stem /yilkaku/ 'outside', that is recorded in a different WD variety, and the ending /-munta/ is of unclear origin.

This is a kind of association outside the scope of Brown 1983’s survey as it does not specifically involve cardinal terminology. However the association does link cardinals and social classification (and kinship), a kind of association not exemplified in his survey.

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23 There can be a social mapping within shade, and with no cardinal implications. Mathews 1905:209-10 recorded in Nemba (central NSW) two matrilineal divisions ("castes") with names translated as 'sluggish blood' and 'active blood'. Coupled with these matrilineal divisions were 'shades', related to the shades cast by the lower or higher portion of a large tree (which regulated camping and resting places). The 'active blood' people were identified with the top shade, and the 'sluggish blood' with the low shade.

24 The most likely stem in RDWDL is Pintupi/Luritja /muntuŋu/ ‘snatched, grabbed, held a person to prevent them taking some action’ (Hansen & Hansen 1991).
Brown 1983 identifies cross-language uniformities in the semantics of etymological sources for cardinal terms; he surveyed 127 languages including Gidabal, Ngandi, Kardutjara, Tiwi. He concluded (1983:127) that the main source domains are terms for:

(1) celestial bodies and events
(2) atmospheric events
(3) other more general directions, and
(4) environment-specific features.

The first of these is exemplified in Pama-Nyungan by cognacy of widespread similar terms meaning ‘east’ and inland Queensland terms meaning ‘moon’, wider than summarised by Tindale 1974:44.25

When ‘up’ and ‘down’ are added to the range, semantic change may follow links into wider spatial and even temporal terminology (synchronic links explored for instance by Montredon 1990).

6. Conclusion
The shreds of evidence in the domain of cardinal direction, from root correspondences, morphology, and semantics, point to WD having a closer relationship to its north-western and north-eastern neighbours than the neighbours on other sides.

References
For source material, see also the references at URL http://www.anu.edu.au/linguistics/dgn612/linguistics/WD/

Bell, N.R. 1989. The synchronic and diachronic status of the morphological categories expressed by the verb forms of some dialects of the Western Desert language. M.A. subthesis, Dept. of Linguistics, Arts, ANU.

25 Cf. proto-Paman and Mayi-Yapa /*kakara/ ‘moon’ (Alpher 1991:158) and Kaurna /kakirra/ ‘moon’ cited above. The distribution of cognates of /kakarra/ in the meaning ‘east’ is also wider than Tindale’s 1974:44 map, and probably not as disjoint from the ‘moon’ terms: witness Warumungu /kakurru/, Wakaya /kekerril/, and possibly even proto-Arrernte /*akngirra/ (Whitehead 1990:74) or pre-Arrernte /*kangarra/ (H. Koch, p.c.).

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