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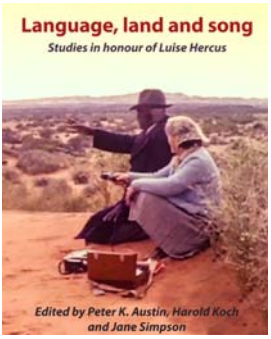

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12
What's up with /u/

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1. Introduction[1]

This paper looks briefly first at how the ways that phonemes are arranged in charts has changed over the years so as to give more information to readers about the nature of the sound systems of languages (in general), and then to make the charts more relevant to the sound systems of Australian languages.

A major change has been combining vowels with consonants in such a way that the high vowels /i/ and /u/ (in a typical chart) are placed immediately below the homorganic glides /y/ and /w/ respectively.

I then look at what can now be called 'the peripheral vowel', or more specifically 'the velar vowel', /u/, and some of the unusual roles it plays in the phonotactics of Australian languages in its interaction with its horizontal partner /i/ and its vertical partners, /w/ and the other velars. Interactions with the labials are not as important as those with the velars for this vowel, perhaps because the labials are somewhat rounded already.[2]

[1] This has developed from a paper of the same name presented at a Workshop on 'Phonetics and phonology of Australian languages', organized by Marija Tabain (thanks Marija) and held at La Trobe University in December 2007. I thank the readers of my manuscript, and the editors of this volume, for their efforts in trying to make something worthwhile of it.

[2] For example, schwa between labials in Western Arrernte is pronounced [ʊ], as in *mpeme* 'burns'. Other dialects have [ə].

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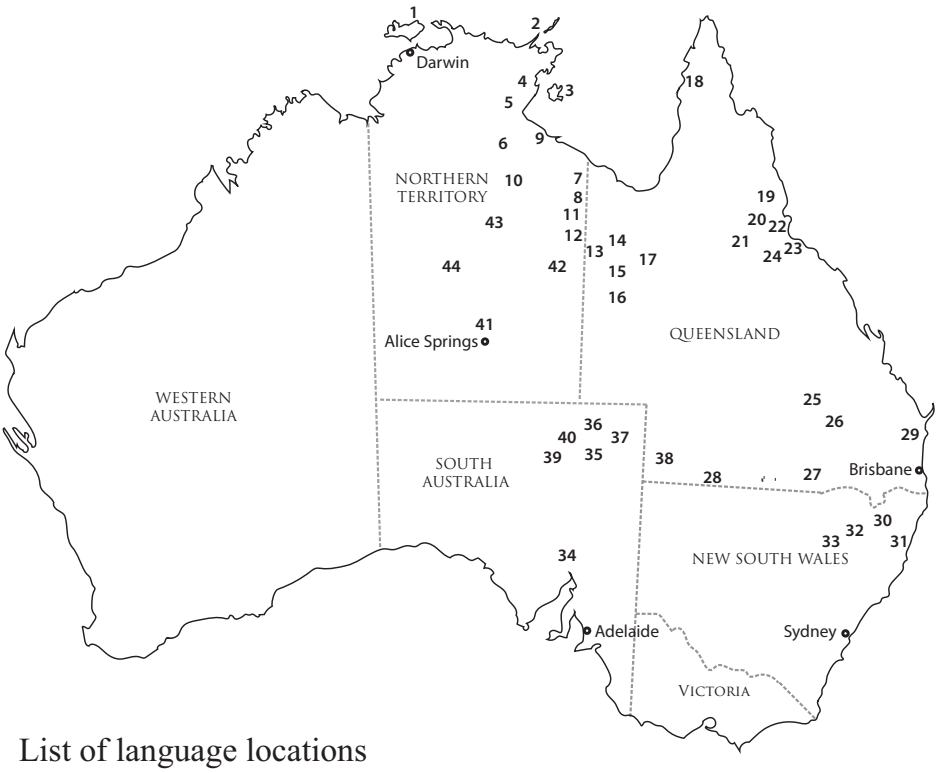

List of language locations

Alawa	5	Gunggari	26	Waka-Waka	29
Anaiwan	32	Guwamu	27	Wakaya	10
Antekerrepenh	42	Guyambal	30	Wambaya	6
Arabana	39	Guyani	34	Wangkangurru	40
Arrernte	41	Guyula	2	Wangkumara	38
Badjidi	28	Kalkutungu	14	Wargamay	24
Bidyara	25	Kaytetye	43	Warlpiri	44
Bularnu	12	Mbabaram	21	Warluwarra	13
Diyari	35	Mbakwithi	18	Wubuy	4
Djabugay	19	Ngamini	36	Yalarnnga	15
Djirbal	22	Ngawun	17	Yandruwandha	37
Enindhilyagwa	3	Nyawaygi	23	Yanyuwa	9
Gamilaraay	33	Pitta-Pitta	16	Yidiny	20
Garrwa	7	Tiwi	1	Yinjilanji	11
Gumbaynggirr	31	Waanyi	8		

Languages referred to in this paper and their locations.
Cartographer: Jenny Green.

2. The development of phoneme charts

The first chart illustrated is for a typical Australian language with the maximum number of points of articulation (adapted from Blake 1969).

Consonants:

	bilabial	dental	alveolar	retroflex	palatal	velar
stops	p	th	t	rt	tj	k
nasals	m	nh	n	rn	ny	ng
laterals			lh	l	rl	ly
trill			rr			
glides	w			r	y	

Vowels:

	front		back
high	i		u
low		a	

Figure 1: A phoneme chart from the 1960s.

Changes introduced in the 1960s and widely adopted in the 1970s led to a chart that is still used and probably still thought of as the normal way to set out and label these charts. The difference is that the place of articulation in the later one is labelled in such a way as to specify the active articulator as well as the passive articulator, and columns with the same active articulator are grouped together. So, for example, what is labelled alveolar in the earlier one, because it is on the alveolar ridge that the tongue makes contact, is labelled apico-alveolar in the later one to specify that it is the tip of the tongue that makes this contact, and that it is on the alveolar ridge. It can be called an apical consonant or a member of an apical series. The retroflex articulation also had the apico- prefix, while dental and palatal both had lamino-, could be called laminal, and were relocated so that they were together. Dixon (2002:551) credits Hale with being the first to characterise consonants according to both active and passive articulators (in manuscript notes), and thinks O'Grady (1966) was the first to do it in print.

A further innovation, introduced and justified by Sharpe (1972:14-15) for a language (Alawa) which has only a single series of laminal consonants, was to group labial and velar columns together under the label 'peripheral' (which can be put on the right hand side, as she has it, or on the left). The advantage of the consonant arrangement is that /w/, which is both labial and velar and sometimes has been put in both positions, can be placed centrally under the peripheral heading. Sometimes other phonemes, such as a lateral, a rhotic or /y/, may be placed centrally under the appropriate heading. Dixon (1980:139) gives a similar chart and justifies it on the grounds that the dorsals and labials form a 'natural class' as regards their distribution in words and other aspects of their phonotactics. On p.146 he refers to the 'two semi-vowels, peripheral /w/ and laminal /y/', and gives justification for this terminology. (See also his §6.6 on phonotactics.)

The final example, Figure 2, is from the grammar of Ngawun in Breen (1981). It reintroduces the placing of vowels in the same chart as the consonants, with /u/ and /i/ under /w/ and /y/ respectively and /a/ in a column of its own.

Dixon (1980:187) says that there are 'strong reasons, in Australian phonologies, for describing vowels and semi-vowels in terms of some of the same feature oppositions as consonants.' Dixon (2002:549) gives a phoneme chart essentially similar to Chart 2, although retaining the categories 'low' and 'high'. He justifies the classification of /i/ and /u/ as laminal and peripheral, respectively, on the basis of the similarity of the articulatory gestures of [i] and [j] and of [u] and [w]. It is relevant that there is a widespread absence of opposition between initial [i] and [ji], initial [u] and [wu] in Australian languages. As will be noticed in the following discussion, the category 'low' (and, at least by implication, the category 'non-low' or 'high') is still useful, at least until (or unless) 'open' catches on.

An arrangement showing consonants and vowels in the one chart had been used in Blake and Breen's 'The Pitta-Pitta Dialects' (1971). The labio-velar and laminal glides in this system were allophones of /u/ and /i/ respectively. The idea was not a failure but was not persevered with. A combined consonants plus vowels chart had been introduced many years before; see Bloomfield (1935:129).

	peripheral		apical		laminal		open
	bilabial	velar	alveolar	post-alveolar	dental	palatal	
stops	p	k	t	rt	th	tj	
nasals	m	ng	n	rn	nh	ny	
laterals			l	rl	lh	ly	
trill			rr				
glides	w			r		y	
vowels	u					i	a

Figure 2: phoneme chart with consonants and vowels together.

3. The behaviour of the peripheral vowel

The late Terry Crowley (1997: 283), speaking about the sound changes – loss of initial consonant or initial syllable, replacement of vowel of former initial syllable by its homorganic glide following the new initial consonant– that had taken place in the language he calls Nganyaywana[3], to give it its un-Australian appearance, says: 'Completely by coincidence, many of these changes are similar to changes that Dixon noted in Mbabaram and that Hale had earlier observed in the Cape York Peninsula languages.' He could have added at least the Arandic languages to this list. But I wonder how much it is coincidence, and how much it might be due to properties inherent in the phonetics of the Australian languages. For example (and this might be a universal property) stress, which is typically on the first syllable of a word in Australia, can move to a later syllable if that syllable has a long or a low

[3] Formerly and again now called Anaiwan; see Wafer & Lissarrague (2008:201).

vowel, and this might lead to loss of the initial consonant or syllable (Dixon 2002 §12.1.4, §§12.4). The close relationship of the high vowels with the corresponding glides can lead to replacement of a peripheral (rounded) vowel with a laminal vowel and a feature of roundness attaching to a consonant or consonant cluster, not necessarily in the same syllable as the vowel (Dixon 2002:631-2).

Linguists have in the past observed irregularities in the phonotactics of the high vowels; Hercus (1994), for example, notes that in Arabana and Wangkangurru the sequence [iCu] (where C is any consonant or consonant cluster) does not occur in a morpheme (p. 54)[4] and [ŋi] does not occur word-initially (p. 44, with reference also to other languages with this feature). However, my interest here is on a narrow portion of this broad topic. I am focussing on /u/, on how it gives its roundness to, or shares it with, neighbouring consonants, or plays other games with them. The ultimate change is to lose its identity, and there are indications that this has happened in three areas, involving members of three different language families, and so possibly having its genesis far back in time.

The clearest indication that such a change has taken place can be seen in the Arandic group of languages. Their vowels have developed from a triangular system to a (vertical) system of two vowels, or two major vowels and one or two marginal vowels, as a result of that transfer of the feature of roundness. Some of the languages have developed new vowels with limited functions, but others can be analysed as having now only two vowels, neither having any feature of roundness.

In the original paper arguing for this analysis (in Antekerrepenh, Breen 1977) I recognised only peripherals as rounded consonants, since rounding of other consonants was so uncommon. Later work with other dialects showed that the roundness of earlier */u/ had become a suprasegmental feature of roundness associated with consonants in general. See Breen (2001) for a brief outline. Note too that roundness may be deleted or moved to another consonant in certain circumstances; for example in the Arrernte play language ‘Rabbit Talk’ (Turner & Breen 1984), and in Kaytetye songs in which roundness is deleted from consonants other than velar stops (Koch & Turpin 2008:173).

The (claimed) Gunwinyguan language Anindilyakwa (Enindilyakwa) is another of the languages that is comparable with the Arandic languages. There have been four analyses of its vowel system, as summarized by van Egmond (2012:16-17):

- Heath (n.d.) suggested that there is only one ‘real’ vowel, /a/, and two parasitic or distributionally restricted vowels /ɛ/ and /æ/; the remaining vowels are due to epenthesis;
- Stokes (1981 has four vowels: /a/, /i/, /u/ and /ɛ/;
- Leeding (1989) has just two vowels, /a/ and /i/;
- Van Egmond (2012) has four vowels, /a/, /i/, /ɛ/ and /ə/.

The current system shares two major features with Arandic and perhaps no other group in Australia: schwa is a phoneme and [u] is not. Van Egmond, in Chapter 2, rejects Leeding’s analysis because, although ‘very generally, the quality of the

4 Nash (1986:73-4) notes similar restrictions in Warlpiri.

high vowels and schwa appears to be conditioned by the surrounding consonants', nevertheless 'these vowels also appear in non-conditioning environments'. However, [u] is not contrastive because its roundness is conditioned by underlying roundness in contiguous consonants (as first suggested by Heath).

Then, having dismissed Leeding's analysis in Chapter 2, van Egmond, in Chapter 9, claiming that 'Leeding's analysis may provide a plausible historical scenario,' uses vowel correspondences between Wubuy (Nunggubuyu) and Anindilyakwa to demonstrate a historical relationship between these two languages, and so proposes acceptance of Anindilyakwa as belonging to the Gunwinyguan family.

Osborne (1974) claims that Tiwi, an Australian linguistic isolate, allows word-initial clusters of peripheral stop or nasal plus /w/ (and no other word-initial clusters), and that other consonants are rounded when followed by the vowel /o/. Breen (1979) argued that this amounted to two different analyses of the same phenomenon and that the same analysis should be applied to the rounding of all consonants. Leeding (1989:17) concurs and suggests that Tiwi may have or have had a two-vowel system like Anindilyakwa (as analysed by her at the time) and some Arandic dialects.

I move now to languages with the more common three-vowel system.

4. Changes involving velar consonants

4.1 The change uGa > uGʷa

Some languages have an optional phonetic change from uGa > uG^{w}a where G is a velar stop, nasal or cluster. For example, *thungka* 'rotten' as [ˈt̪ʊŋgʷa], *ngalkungka* '1du.ex.DAT' as [ˈŋalkʊŋgʷa] in Ngamini (in which this applies only to the velar stop)[5], and compare the phenomenon described by Hercus (1994:47). Yandruwandha (Breen 2004b:21) is similar to Ngamini. I have found examples of it also in Pitta-Pitta and Wangkumara. Further north, it occurs occasionally in Wakaya, but much more sporadically than in Ngamini. (The very common Wakaya word *yukwa* 'water' is not an example; the /w/ here is always heard and must be underlying, as witness contrasting words like *bukarr* 'old woman' and *Wuka*, the name of the language.) In Warluwarra it was heard in occasional pronunciations of words like *wunga* '3sg.DAT', *nuga* 'many', *wukuga* 'water-LOC'.

This phenomenon is a precursor to the phonological change whereby uCV becomes C^{w}V, as in the Arandic system and in the Cape York languages that Dixon (2002:550, 598) refers to (an example he gives is *gwa* 'eat' from **mungga* in Mpakwithi, Crowley 1981). (This does not necessarily lead to a change in the number of vowel phonemes, and if it does it might be a decrease or an increase.)

5 Data whose source is not given are from my unpublished notes.

4.2 The change [#GuS] to [#GwiS]

I have observed over a wide area that initial [GujV], where G is a velar stop or nasal and S is a semi-vowel, can be pronounced [Gwi]. The /u/ gives its roundness to the velar consonant and its vocalicness to the following /y/ which with a following /i/ becomes a long high front stressed vowel or with a following /a/ or /u/ becomes a sequence of two vowels which is broken by the appropriate epenthetic glide. For example, some southern Mari languages in central south Queensland have words like *guyilban* and *guyibiny* (probably onomatopoeic) for 'curlew'. My spelling of this word with 'guy' instead of 'gw', which was based on my understanding of the phonotactics of these languages, was confirmed by the way it was pronounced by a 90-year-old speaker of Gunggari, a dialect which, despite its name, had lost almost all initial velar stops (thus *amu* instead of *gamu* for 'water', *uyu* instead of *guyu* for 'fish', and so on). This lady pronounced the word for 'curlew', very clearly, as [ˈujilban]. An old language speaker's enthusiastic reaction to a careful pronunciation of the word for 'fire' in Wambaya was instrumental in settling a disagreement between linguists on whether we should spell it as *guyiga* or *gwiga*; the former was chosen. Other examples are [ˈkwiːɾi] *kuyirri* 'boy' in Yalarnnga (Breen & Blake 2007:8-9) and Kalkutungu, and [ˈŋwiːnda] *nguyinda* 'east' in Warluwarra.

When the second vowel is /a/ we get [ija] instead of [iː]; thus *kuyamada*[6] 'dogwood' in a number of western Queensland languages is pronounced ['kwijamaɾa], [ˈgwijɛja] is *guyaya* father's father in Warluwarra, and *guyardiyila* 'wife (plus a formative whose function is unknown)' in Bidyara can be pronounced ['gwijaɖiːla]. *guya* 'fish' in Badjidi (and other south-west Queensland languages) was spelt 'kwia' and 'gwīa' by R.H. Mathews (1905) (and note also the placename Queerbidie in Yandruwandha country, anglicised from *kuyapidri* 'fish's bum'). Examples with language names from Capell (1963) D17) are Gujambal (= Guyambal NSW D17), with alternative Kwiambal, and Gujani (= Guyani South Australia L15) with alternative Kwiani. In Waka-Waka dialects (Jefferies 2005: 136, 217) representations of *nguyang* 'mother' include 'weyoung' and 'wee-ung'. An example of a related phenomenon across a word boundary is *wuku yapangu* 'water (rain) fall-complement' as [ˈʊkwəˈjæpaŋʊ] in Warluwarra.

For a rare example where the vowel following the /y/ is /u/, note the northeast Arnhem Land language name Guyula (Oates & Oates 1970:217) with alternative Gwiyula.

4.3 The change [#GVw] to [#Gw]

The sequence /uwa/ after a velar loses its first vowel in Western Desert *kuwarru* 'now', [ˈkwaɾu]. Examples of this in other languages are *Nguwanguwa* as [ˈŋwaŋwa] (a place and personal name) in Warluwarra, *kuwala* [ˈgwala] 'creek' in Kalkutungu,

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6 I phonemicise intervocalic [ɾ] as /d/ in languages where it contrasts with both the alveolar trill and the retroflex glide.

the (Maric) language name Guwamu as [ˈgwamʊ][7] and *nguwajba* as [ˈŋwaidʲba] 'be jealous' in Waanyi. In these cases it is the first, ought-to-be-stressed, vowel that is lost; loss of an unstressed vowel in such an environment is more likely, of course.

I have one example of palatalisation of the retroflexed glide [ɻ] to [j] combined with this effect: Ngamini *kurithidi* 'head' pronounced [ˈgwijiʈiɾi]. (Palatalisation of [ɻ] like this is a feature of Arandic, see Henderson 2013:121.)

4.4 Idiosyncratic features of Wakaya

Some languages have small groups of words, involving /u/ adjacent to a velar consonant, exhibiting idiosyncratic changes. I'll look first at one of these: Wakaya, which is contiguous with the most northerly Arandic dialect.

Wakaya has a system of two noun classes, which are called masculine and non-masculine. More exactly, the two classes are masculine plus all non-singular, and singular non-masculine. Females count as masculine if they are in a group. There are several sets of words which mark the classes in different ways, but the largest group has masculine words with final /u/ and non-masculine with final /i/. A variety that I formerly called Eastern Wakaya, but which I now regard as a simplified form of the language used as a lingua franca, does not have noun classification, and all the nouns of this form end in /u/. However, in what I have in the past called Western Wakaya, but prefer now to call Wakaya proper, or just Wakaya, if the final consonant of the root is velar, the ending is sometimes /wi/ instead of /i/. Six Wakaya words in my corpus end in *kwi* (for example, *ngerakwi* 'flood'[8]) and four in *ngwi* (for example, *nhanngwi* 'ashes') while 27 end in *ki* (for example, *mingki* 'ground') and 27 in *ngi* (for example, *minngi* 'eye'). Fluctuation has been noted in one word, and there may be a difference with different speakers in another case.

Wakaya's noun classification system is quite different from that of the related Yanyuwa, and I have always, until very recently, thought of it as a fairly recent innovation. However, Mark Harvey (p.c.), using insights gained from a study of noun classification in the neighbouring Mirndi language group, has found reason to believe that the Wakaya system is indeed descended from the same proto-system as the Yanyuwa system. It would seem, then, that originally the system was masculine /u/, non-masculine /i/ except when the preceding consonant was velar, in which case it was masculine /u/, non-masculine /wi/, and that the Cwi endings had been gradually simplifying to Ci. Note that some of the Cwi words (in my corpus) are quite widespread, e.g. *kangkwi* 'man's son's daughter' is related to *kangku* and *kangkuya* in other languages, and *barrkwi* 'nulla-nulla' to *barrku*.

In my (unpublished) grammar I have called this phenomenon, the retention of the roundness feature of an /u/ that should have been lost, 'persistence of

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7 This language has in recent years been called Kooma. Members of this group now call the language Gwamu (Jennifer Munro, pers. comm. 2010).

8 In Wakaya *e* represents schwa.

roundness'. It is not restricted to non-masculine endings. An example from the eastern dialect (lacking noun classification) is *ngambwarn marniy* 'I hit [him] on the jaw'; **ngambarn* (with deletion of the stem-final /u/ of *ngambu* 'jaw'; *-arn* is 'I') would be expected. A vowel sequence is heard at times, for example [ˈbʊɳŋuid̪əɭə] for expected *burnngitherl* 'on another hill'.

Another relevant feature of Wakaya is a loss of the contrast between the two high vowels in the environment /#y-w.[9] For example, the word for 'sun' (including the compound based on it with the meaning 'another day') has been written most commonly as *yuweji* or *yuweju* and a little less often as *yuwiji* or *yuwiju*. AW[10] also said *yeweji* on a few occasions and MK *yewiju* once. AW was heard as saying *iweji* twice, while *iweju* and *iwiju* were the only pronunciations heard from DJ. Pronunciations noted by Hale (1960; he worked with AW) were *yeweji* and *yuuji*. (Note too the indecision here as to whether the vowel between /w/ and /j/ is /i/, /e/ or even /u/.)

There are also no instances of consistent contrast between the high vowels in unstressed position before /y/ and /w/. I will illustrate just with Hale's spellings (adapted to my orthography) of the verb 'to spear', which I phonemicise, and usually transcribe, as *jirrew-*: these were *jirruwe* twice, *jirruu*, *jirru-* twice, and *jirriwu-*.

There are many instances of fluctuation between two or all three of the short vowels in other environments. One such pair of environments is that of the vowels in /P-C(C)- where P is a peripheral consonant and C any consonant. Consider the demonstrative 'that', usually heard in isolation as [ˈbʊlʊ]. It is frequently cliticised to another word and in such cases the last or second-last vowel of the other word is stressed and the demonstrative is heard as [bəlʊ] with no stress. Examples are [ˈɭa:n̪ibəlʊ] 'Don't hit (*lanhi*) him!', [ˈbənkəɳibəlʊ] 'he went (*benkerniy*)', [ˈbət̪əɖiˌjubəˌkʊbəlʊ] 'He's scratching (*betherdiy*) himself (*yubuk(a)*)'. The demonstrative forms the last half of a sequence of four unstressed syllables in [mʊnˈgʊgədʲəbəlʊ] (*munku* 'good', *kij* 'still') given as a translation of 'That's right'. Similarly, if the stress is shifted to a later syllable the first vowel is heard as schwa, as in [bəˈlo:lɪdʲ] (*buluwulij*, with plural suffix *-wul* and ergative *-ij*). The ergative form of the (singular) demonstrative is [ˈbʊləɭ], with regular reduction of the final /u/ before the /rl/ suffix, but as a clitic it has stress shifted to the second syllable or forward to the preceding syllable, as in [ˈwʊt̪iˌjɪnbəlʊɭ] 'it might bite (*wuthiy*) you (*-in*)'.

Another common word involving these environments, /P-C(C)-, is the verb 'to run'. With the past and present tense suffixes *-rniy* and *-rdiy* the root is nearly always heard as [ˈbʊdʲəkʊ]; for example in [ˈbʊdʲəkʊɳi] 'ran'. However, if the suffix begins with /a/, which replaces the final vowel of the root and which tends to attract stress to itself (although in fact the primary stress always remains on the

9 I do not have space to discuss a similar feature, but involving /w-y instead of /u-w, in a neighbouring language: Furby and Furby (1977) give *-wuya* as dual suffix on nouns in Garrwa (their Garawa), but its close kin Waanyi has *-wiya* (Breen 2003:436) and unrelated neighbours Wakaya *-(a)wiy*, Yinjilanji *-wiyi*, Warluwarra and Bularnu *-wiya*.

10 Speakers were AW, who was the last good speaker of Wakaya proper, and DJ and MK who were first-language speakers of Bularnu and also spoke the eastern form of Wakaya.

first vowel of this root), the first vowel is quite often centralised to schwa while the second vowel is nearly always [ʊ] (for example [ˈbədʲʊga] 'running').

There are three Wakaya verbs whose stems end in /uk/, *thuk* 'to throw', *bujuk* 'to run' and *merdebuk* 'to jump'. These do not belong to the conjugation that the final /k/ of their stems implies. They are almost the only verbs whose conjugation membership is not covered by a set of rules (admittedly tentative in one or two aspects) relating phonological form to conjugation membership. A rule covering the conjugation membership of these verbs would refer not only to the final consonant of the stem but also to the vowel preceding it (which, admittedly, another rule does too).

4.5 Avoidance of *u*-final verb stems

Ngamini, in the far northeast of South Australia, has only a handful of verb stems that end in /u/. The present tense of Ngamini verbs is regularly marked by suffix *-yi*. The verb *paku-* 'to dig' follows this pattern, with present tense *pakuyi*, but this is probably a loan from Diyari or Yandruwandha and appears only once in the corpus. A different verb was given for Ngamini on other occasions. Other verbs with stem ending in /ku/ are exceptions to this rule and the present tense form is the stem: *durnku* 'come out', *ngurrku* 'know'. The less knowledgeable of the two informants sometimes gave these verbs with *-ayi* endings — the stem-final /u/ was dropped or possibly retained as /w/ as in the pronunciations *durnkwayi* 'come out', *yurrkwayi* 'swallow' and *thurrkwayi* 'paint', but this /w/ could just as well have come from the /u/ of the preceding syllable. This speaker was sometimes corrected by his more knowledgeable wife, but nevertheless the forms are interesting and perhaps come from another local language. (Compare the 'final *uk'* verbs in Wakaya.)

There are a few *u*-final verb stems in Ngamini that do not have /k/ as the final consonant: *dumu* 'gather up', *yurdu* 'walk about', *kurru* 'away' (as an auxiliary; as a verb in its own right it means 'to give birth').[11]

The avoidance of *u*-final verb stems is widespread in inland Australia, and could have its roots in descent of the vowel systems in these languages from an earlier two-vowel system, which may be responsible also for the higher frequency of odd behaviours of /u/. The following lists give language names, sources, numbers of verbs with each final vowel and a set of figures, given as percentages, which is intended to demonstrate that there is no particular bias against /u/ in general in that language. These numbers are given as percentages, but the actual figure they illustrate depends on what can be reasonably easily extracted from the source, whether overall percentages or percentages in certain syllables, percentages in lexicon or percentages in texts, for examples.

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11 An anonymous reader points out that there are a number of widespread monosyllabic verb roots that end in /u/, and that these, being monosyllabic, could be expected to have retained their vowel quality when longer roots were losing it. Most of the languages that I have looked at do not have monosyllabic roots.

Language	source	verbs with stem final			% frequency of vowels		
		/a/	/i/	/u/	/a/	/i/	/u/
Diyari	Austin (1994)	68	19	1	49	28	23
	The one /u/-final verb has final consonant /k/						
Yandruwandha	Breen (2004b)	154	47	4	51	27	22
	The four /u/-final verbs have final consonant /k/ or /g/						
Pitta-Pitta	Blake (1979b)	101	51	1	47	32	22
Kalkutungu	Blake (1979a)	113	152	14	42	29	29
Warluwarra	Breen ms	217	117	0	54	22	24
Bularnu	Breen ms	153	82	0	48	27	25
Yanyuwa[12]	Kirton and Nagai (1984)	100s	c150	2	55	17	28

The two *u*-final stems in the Yanyuwa dictionary files, *banthu-* 'to light grass-fire' and *ngabu-* 'to bathe', are in different conjugations. Also there are two verb roots with a final consonant, /rr/. About twelve other verb roots are /u/-final, although the /u/ does not appear in the verb stem as that appears in the dictionary.

I have looked briefly at verb stems in some languages in other parts of the north-east of Australia, with the following results.

Language	source	verbs with stem final			% frequency of vowels		
		/a/	/i/	/u/	/a/	/i/	/u/
Djabugay	Patz (1991)	133	72	4	53	22	25
	One of the four was an alternative for a more common form						
Dyirbal[13]	Dixon (1972)	1-conjugation verbs end in /al/, /ul/or /il/;					
		y-conj verbs end in /ay/ or /iy/, never in /uy/					
Yidiny	Dixon (1991)	227	108	9	48	25	27
Nyawaygi	Dixon (1983)	76	40	4	47	22	31
		The u-final roots are all monosyllabic					
Wargamay	Dixon (1981)	many	many	0	47	21	32
Bidyara	Breen (1973)	170	45	12	50	21	29
Gumbaynggirr	Eades (1979)	many	many	0	56	29	[14]15
Gamilaraay	Ash et al (2003)	358	70	15	56	23	20

12 Not an inland language, but related to Warluwarra and Bularnu.

13 Another perhaps relevant feature of this language is that /wi/ can be only a stressed syllable (p.273).

14 There are a few irregular verbs which end in a consonant. Three of them are listed as CuX where X is a parenthesized consonant: *bu:(m)* 'hit, *dju:m* 'tell' and *du:(ng)* 'cry'.

In none of these languages is there a preference for velars or even peripherals as the final consonant when the final vowel is /u/ (in contrast to the situation for some Central Australian languages).

5. Conclusion

A thorough search would certainly uncover many more items of data and other types of data in which the high back rounded vowel manipulates the features it shares with the high front unrounded vowel and the labial-velar glide, suggesting, albeit speculatively, the possibility of the former two vowels merging and a three-vowel inventory becoming two-vowel (only to return, perhaps, to the three-vowel situation sometime in the distant future).

In Breen (1994:89-91) I speculate on the possibility of this type of change occurring in a cyclic way, as a solution to the problem of the age of the Pama-Nyungan family. This speculation remains speculative.

References

Ash, Anna, John Giacon & Amanda Lissarrague (compilers and editors). 2003. *Gamilaraay Yuwaalaraay Yuwaalayaay dictionary*. Alice Springs: IAD Press.

Austin, Peter. 1994. Diyari. In Nick Thieberger & William McGregor (eds.) *Macquarie Aboriginal words*, 125-143. North Ryde (NSW): Macquarie Library.

Blake, Barry J. 1969. *The Kalkatungu language: A brief description*. Canberra: AIAS.

Blake, Barry J. 1979a. *A Kalkatungu grammar*. Canberra: Pacific Linguistics B-57.

Blake, Barry J. 1979b. Pitta-Pitta. In R.M.W. Dixon & Barry J. Blake (eds.) *Handbook of Australian languages, Vol. 1*, 182-242. Canberra: ANU Press.

Blake, Barry J. & Gavan Breen. 1971. *The Pitta-Pitta dialects*, Melbourne: Monash University (Linguistic Communications 4).

Bloomfield, Leonard. 1935. *Language*. London: George Allen and Unwin Ltd.

Breen, Gavan. 1973. *Bidyara and Gungabula: Grammar and vocabulary*. Melbourne: Monash University (Linguistic Communications 5).

Breen, Gavan. 1977. Andegerebenha vowel phonology, *Phonetica* 34, 371-391.

Breen, Gavan. 1979. A reanalysis of Tiwi /o/. *Talanya* 6, 76-78.

Breen, Gavan. 1981. *The Mayi languages of the Queensland Gulf Country*, Canberra: AIAS.

Breen, Gavan. 1994. Taps, stops and trills. In Tryon, Darrell and Michael Walsh, (eds) *Boundary rider: Essays in honour of Geoffrey O'Grady*. Canberra: Pacific Linguistics C-136. 71-93.

Breen, Gavan. 2001. The wonders of Arandic phonology. In Simpson, Jane, David Nash, Mary Laughren, Peter Austin & Barry Alpher (eds) *Forty years on: Ken Hale and Australian languages.*45-89. Canberra: Pacific Linguistics (PL512).

Breen, Gavan. 2003. Wanyi and Garrwa comparative data. In Evans, Nicholas (ed.), *The non-Pama-Nyungan languages of northern Australia*. 425-462, Canberra: Pacific Linguistics.

Breen, Gavan. 2004a. Evolution of the verb conjugations in the Ngarna languages. In Bowern, Claire & Harold Koch (eds), *Australian languages: Classification and the comparative method.* 233-240. Amsterdam/ Philadelphia: John Benjamins.

Breen, Gavan. 2004b. *Innamincka talk: A grammar of the Innamincka dialect of Yandruwandha with notes on other dialects*. Canberra: Pacific Linguistics (PL558).

Breen, Gavan & Barry J. Blake. 2007. *The grammar of Yalarnnga: A language of western Queensland*. Canberra: Pacific Linguistics (PL584).

Capell, Arthur. 1963. *Linguistic survey of Australia*. Sydney: (prepared for) AIAS.

Crowley, Terry. 1981. The Mpakwithi dialect of Anguthimri. In Dixon, Robert M.W. & Barry J. Blake (eds) *Handbook of Australian Languages, Vol 2,* 146-194. Canberra: ANU Press.

Crowley, Terry. 1997. Chipping away at the past: A northern New South Wales perspective. In McConvell, Patrick & Nicholas Evans (eds) *Archaeology and Linguistics: Aboriginal Australia in global perspective,* 275-295. Melbourne: Oxford University Press.

Dixon, Robert M.W. 1972. *The Dyirbal Language of North Queensland*. Cambridge: Cambridge University Press.

Dixon, Robert M.W. 1980. *The languages of Australia*. Cambridge: Cambridge University Press

Dixon, Robert M.W. 1981. Wargamay. In Dixon, Robert M.W. & Barry J. Blake (eds) *Handbook of Australian Languages Vol. 2*, 1-155. Canberra: ANU Press

Dixon, Robert M.W. 1983. Nyawaygi. In Dixon, Robert M.W. & Barry J. Blake (eds) *Handbook of Australian Languages*, Vol. 3, Canberra: ANU Press: 439-525.

Dixon, Robert M.W. 1991. *Words of our country: Stories, place names and vocabulary in Yidiny, the Aboriginal language of the Cairns-Yarrabah region*. St Lucia: University of Queensland Press.

Dixon, Robert M.W. 2002. *Australian languages*. Cambridge University Press.

Eades, Diana 1979. Gumbaynggir. In Dixon, Robert M.W. & Barry J. Blake (eds) *Handbook of Australian Languages, Vol. 1*, 244-361, Canberra: ANU Press.

Egmond, Marie-Elaine van. 2012. *Enindhilyakwa phonology, morphosyntax and genetic position*. PhD dissertation. Department of Linguistics, University of Sydney

Furby, Edward S. & Christine E. Furby. 1977. *A preliminary analysis of Garawa phrases and clauses.* Canberra: Pacific Linguistics (PL D-42).

Hale, Kenneth L. 1960. [elicited material in Wakaya] ms via email.

Heath, Jeffrey G. n.d. *Draft grammatical sketch of Anindhilyagwa.* ms, 67 pp.

Henderson, John K. 2013. *Topics in Eastern and Central Arrernte Grammar*. Munich: Lincom Europa.

Hercus, Luise A. 1994. *A grammar of the Arabana-Wangkangurru Language, Lake Eyre Basin, South Australia*. Canberra: Pacific Linguistics (PL C-128).

Jefferies, Tony. 2005. *The northern dialects of Wakka: A lexical comparison.* MS, Gurang Land Council.

Koch, Grace & Myfany Turpin. 2008. The language of Central Australian Aboriginal songs. In Claire Bowern, Bethwyn Evans & Luisa Miceli (eds), *Morphology and Language History: In honour of Harold Koch*, 167-183. Amsterdam: John Benjamins Publishing.

Kirton, Jean & Yasuko Nagai. 1984. *[Yanyuwa-English dictionary files]*, accessed 13-9-1991, later incorporated into Bradley, John (ed.) 1992. Yanyuwa Wuka: language from Yanyuwa Country - a Yanyuwa dictionary and cultural resource. https://espace.library.uq.edu.au/view/UQ:11306

Leeding, Velma. 1989. *Anindilyagwa phonology and morphology*. PhD thesis, University of Sydney.

Mathews, Robert H. 1905. Ethnological notes on the Aboriginal tribes of Queensland. *Journal of the Royal Geographical Society of Queensland* 20:49-75.

Oates, William J. & Lynette F. Oates. 1970. *A revised linguistic survey of Australia.* Canberra: AIAS.

O'Grady, Geoffrey N. 1966. Proto-Ngayarda phonology. *Oceanic Linguistics* 5(2), 71-130.

Osborne, C.A. 1974. *The Tiwi Language*. Canberra: AIAS.

Patz, Elisabeth. 1991. Dyabugay. In Dixon, Robert M.W. & Barry J. Blake (eds). *Handbook of Australian Languages, Vol. 4*, 244-347. Oxford University Press.

Sharpe, Margaret C. 1972. *Alawa phonology and grammar*. Canberra: AIAS.

Stokes, Judith. 1981. Anindilyagwa phonology from phoneme to syllable. In Waters, Bruce (ed.) *Australian phonologies: collected papers* (Work Papers of SIL-AAB A5) Canberra: AIAS 139-181.

Turner, Margaret Mary & Gavan Breen. 1984. Akarre Rabbit Talk. *Language in Central Australia* 1:10-13.

Wafer, Jim & Amanda Lissarrague. 2008. *A handbook of Aboriginal languages of New South Wales and the Australian Capital Territory*. Nambucca Heads, NSW: Muurrbay Aboriginal Language and Cultural Co-operative.