PHONOLOGICAL VOICING CONTRASTS IN AUSTRALIAN ABORIGINAL LANGUAGES

Peter Austin

It is widely known that the phonological systems of Australian Aboriginal languages show many similarities right across the continent. One characteristic of these systems that has been often reported is the lack in most languages of a phonological contrast between voiced and voiceless stops. This paper is an investigation of the occurrence of such a contrast in a number of widely scattered languages. It will be shown that, in a number of instances, phonological voicing is a recent historical development in the languages which have it, and the contrast has been subject to linguistic diffusion in one of the areas where it is found. Certain generalisations about the types of phonological voicing contrasts that tend to be found in Australia are also advanced.*

1. INTRODUCTION

General introductions to Australian Aboriginal languages often note the similarities which obtain in the phonological systems of the languages spoken across the continent (see for example, Blake & Dixon 1979:18, Yallop 1982:25, Dixon 1980:125)[1]. As Dixon (1980:125) puts it: "[t]he languages of Australia are remarkably similar in their phonetics and phonology". A significant characteristic of Australian phonological systems is that for stops and nasals there are contrasts at up to six points of articulation, but it is not usually the case that a distinction is drawn between voiced and voiceless oral stops.[2] Many writers have noted that the majority of Australian languages lack a phonological voicing contrast, in contradistinction to languages such as English (Blake & Dixon 1979:19, Dixon 1.980:125,

* I originally began research on this paper in 1976 when I was struggling with understanding the phonological voicing contrast in Diyari for my PhD thesis (Austin 1978, published as Austin 1981b). I am grateful for encouraging comments at that time from Bob Dixon; it is as a result of his suggestions that I undertook the Australia-wide survey that ultimately grew into this paper. In the intervening twelve years I have had the opportunity to work on more Australian languages with a phonemic voicing contrast, and the available descriptions of Australian languages have improved in both quantity and quality. The time seems now to be ripe for the sort of survey that this paper attempts. I wish to express my gratitude to the School of Humanities, La Trobe University for a grant which has materially assisted my research on this topic. Thanks are also due to Gavan Breen, Bob Dixon and Luise Hercus for their comments on an earlier draft of this paper. They are not to be held responsible for remaining errors and shortcomings.

[1] Blake & Dixon (1979:18) note however that the languages spoken in the Cape York peninsula are somewhat exceptional: It has often been remarked in the previous literature that Australian languages exhibit great phonological similarity (e.g. Capell 1956:4, O'Grady et al. 1966:56, Wurm 1972:31). As a first approximation this is true, but considerable divergences from the norm exist in langimges of the Cape York peninsula.

[2] Transcriptional practices vary across the sources employed in this survey. In quoting from sources I have attempted to standardise on the widely used conventions that *th / dh* represent lamino-dental stops, *c/f* represent lamino-palatal stops, *t/d* represent apicoalveolar stops, and *rt/rd* represent apico-domal (retroflex) stops *(p/b* and *kig* are used for bilabials and velars respectively). The corresponding nasals and laterals are *nh, ny, n, rn,* and *lh, ly, 1, ri* respectively. The dorso-velar nasal is transcribed as ng, and is to be distinguished from a cluster of apical nasal plus voiced stop which is transcribed as *n.g.* Word initial stops are written voiceless unless there is a contrast. In consonant clusters the digraphs for retroflection and lamino-dental articulation are written once only: thus, *rn* plus *rt* becomes *mt* (not *rnrt)* and *nh* plus *th* becomes *nth* (not *nhth).* Vowels are transcribed following the sources, except that vowel length is signified by doubling the vowel symbol (thus *aa* is long *a*).

Wurm 1972:45, Yallop 1982:25, 56). These writers usually add that there are a few exceptions to be found to this generalisation. Thus, Wurm (1972:45) notes:

> 'The distinction between 'voiced' and 'voiceless' stops is of relevance only for the few languages which have two contrastive orally released stop series. In most of these languages, the contrast between the two series is based more on a tense-lax distinction than a voiceless-voiced distinction. In one instance, in Waramungu in northern Central Australia, the contrast has been found to be based on a length distinction, and in Kunjen in central Cape York Peninsula, it is based on an aspirated-unaspirated distinction.'

Similarly, Yallop (1982:56) comments:

> 'There are some Australian exceptions to the generalisation about voicing: Mabuyag (Torres Strait), Murinypata (Port Keats), Kunjen (Cape York), and the Murngic languages (Yuulngu, N. E. Arnhem Land) all have a distinction that is ostensibly one of voiced and voiceless consonants. A few of the languages of the south and east may also have had such a contrast, sometimes on a limited basis (for example, Dieri in South Australia seems to have had *d* as well as *t*, but not *b* alongside *p* nor *g* alongside *k).* There is, however, some dispute as to the exact nature of 'voicing'. What strikes us as a distinction between e.g. *t* and *d* may in fact be, more accurately, a distinction between a tense and lengthened *t* and a lax *t.*'

In the following sections we will outline the list of languages usually claimed to have such exceptional status, and then examine in detail the phonological contrasts found in each language, seeking any generalisations that may exist about the distribution of phonological voicing in Australian languages.

2. LANGUAGES REPORTED TO HAVE A VOICING CONTRAST

A check of the standard general references on Australian languages shows that there are a number of languages reported to have a phonological voicing contrast. Wurm (1972:50) provides the earliest list:

> 'The presence of two orally released stop series is characteristic of a number of phonologically aberrant Cape York Peninsula languages (also of Mabuiag of the western islands of Torres Strait), and some languages — all members of the Pama-Nyungan Family — located in a relatively narrow central strip of land stretching from the Spencer gulf in South Australia, in the south, to north-eastern Arnhem Land, in the north.'

Blake & Dixon (19 79:20) state:

> 'Voicing is contrastive in a small and scattered minority of languages, e.g. Thargari (W.A.), Wangkumara (s.w. Q).'

and Dixon (1980:215) says[3]:

> 'Just a handful of Australian languages appear to show a distinction between voiced and voiceless stops. In every case that has been fully investigated it can be shown that this is a recent development, by regular phonological change. In a few cases where there are fricatives these do not show a voicing contrast.'

[3] As we shall show below, Kala Lagaw Ya (or Mabuyag) DOES have a voicing contrast for fricatives. It is the only exception to Dixon's generalization however.

He then goes on to list as languages showing a voicing contrast Wik Muminh, Warluwarra, and Purduna, as well as noting that (1980:215-6): "[a]n opposition between voiced and voiceless stops for at least some places of articulation is an areal feature of north-east South Australia and south-west Queensland". The list proposed by Yallop is seen in the quotation from him in 1 above.

Considering these sources[4] then, the following languages are mentioned by one or more authors[5]:

1. Mabuyag — Torres Strait (Wurm 1972, Yallop 1982)
2. Murinypata -—Port Keats (Yallop 1982)
3. Warluwarra — western Queensland (Dixon 1980)
4. Wik Muminh — Cape York Peninsula (Dixon 1980)
5. Diyari — north-east South Australia (Dixon 1980, Yallop 1982)
6. Wangkumarra and Kungkatutyi — south-west Queensland (Blake & Dixon 1979, Dixon 1980, Wurm 1972).
7. Tharrkari and Purduna — Western Australia (Blake & Dixon 1979, Dixon 1980).

3. DETAILED INVESTIGATION

In the following sections the languages listed -above, together with a number of others will be investigated in some detail. The discussion will be arranged for convenience by geographical areas. Approximate locations of the relevant languages are set out on the map; notice that there are two places where a consonant voicing contrast appears to be an areal feature, that is, a linguistic feature whose distribution does not coincide neatly with genetic boundaries. These two areas are the eastern South Australia-western Queensland border region, and the north-east of the Northern Territory. The remaining languages are geographically scattered.

3.1 North Queensland

Four languages in this area are reported to have a voicing contrast: Kala Lagaw Ya (also known as Mabuyag or Mabuiag after one of its dialects) spoken on the western islands of Torres Strait, and three languages belonging to branches of the Paman group spoken on Cape York Peninsula: Mbiywom (northern Paman), Wik Muminh (Middle Paman), and Umbuygamu (Bay Paman).

3.1.1 Kala Lagaw Ya

There are two sources available on the phonology of this language: Bani & Klokeid 1976 for the Mabuyag dialect, and Kennedy 1981 for the Saibai dialect. Both sources agree (Bani & Klokeid 1976:12, Kennedy 1981 :109) that the language has a voicing contrast for oral stops at all points of articulation in word initial, word final and intervocalic positions. This gives contrasts between *p/b, th/dh, t/d,* and *k/g* In addition, the fricatives *s/z* contrast at these

[4] In his survey of phonological contrasts in Australian languages, Busby 1980 includes some information on languages with two series of stops (see 1980:79-81). Among these are languages he reports as having a voicing contrast, and he lists the following, most of which appear in the other sources: Umbuygamu, Diyari, Murinypata, Margany, Mbiywom, Mabuyag, Djamindjung, Tharrkari, Wik Muminh, Wangkumarra, Waramungu, Warluwarra and Yandrruwandha.

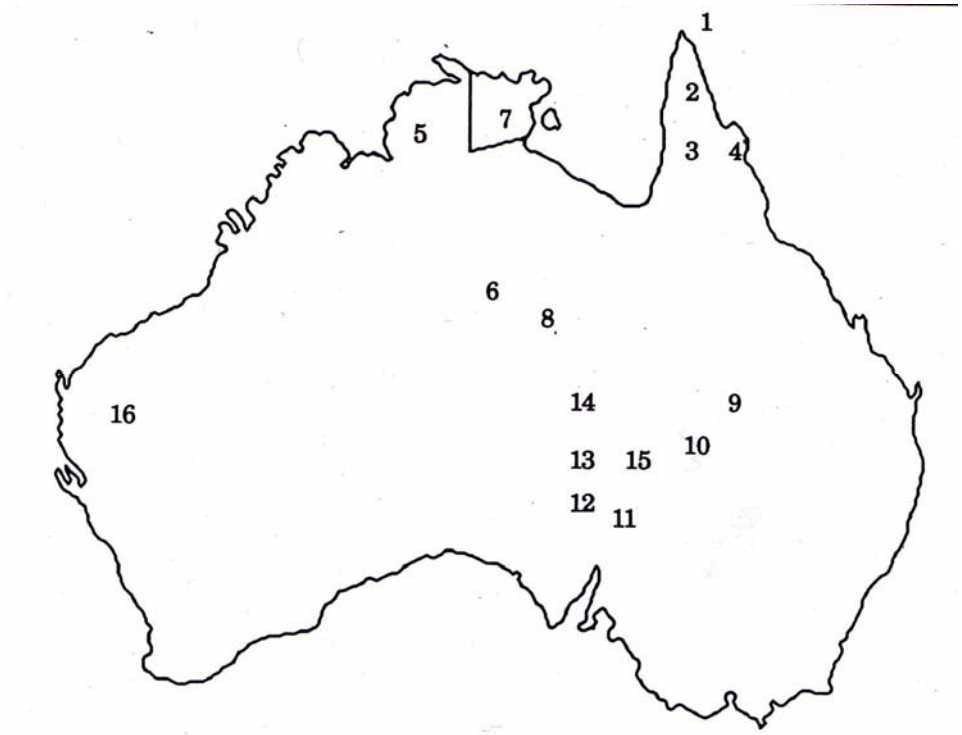
[5] The spelling of Australian language names is notoriously confusing, with different spellings of the same name being used by different authors. Throughout this paper I have tried (except in direct quotations) to spell names consistently in the most phonemically accurate manner following the most recent sources.

structural positions. Kennedy (1981:124) shows that in consonant clusters, that is, following *1* and *r*, there is a contrast for the fricatives and NON-APICAL stops (i.e. *it, id, rt, rd* do not occur).

It is apparent that Kala Lagaw Ya has the best established voicing contrast and the widest range of contrasting environments of any Australian language. It is unclear whether this is due, as has been suggested by other writers, to influence from the neighbouring but genetically unrelated Papuan languages spoken on the nearby Papuan mainland and the eastern Torres Strait islands.

3.1.2 Northern Paman

Hale (1976a:20) reports that one language, Mbiywom, belonging to the northern Paman subgroup: "has voiced stops in contrast both with voiceless stops and voiced fricatives". Hale (1976a:21) adds that: "voiced stops and voiceless stops are in contrast initially and intervocalically", but there is no contrast following nasals in consonant clusters. Very little data is provided in Hale's paper so it is not possible to comment further on the voicing contrast in Mbiywom.



1	Kala Lagaw Ya	9	Margany, Gunya
2	Mbiywom	10	Wangkumarra, Kungkatutyi
3	Umbuygamu	11	Adnyamathanha
4	Middle Paman	12	Diyari
5	Murinypata	13	Ngamini
6	Warumungu	14	Yarluyandi
7	'Top End' languages	15	Yandruwandha
8	Warluwarra, Bularnu	16	Tharrkari, Purduna

3.1.3 Middle Paman Languages

A number of Cape York Peninsula languages classified by Hale 1976b as members of the Middle Paman subgroup are reported to have a contrast between voiced and voiceless stops. These include Wik Muminh (Hale 1976b), Wik Iyanh and Gugu Uwanh (Johnson 1974 and pers. comm.)[6]

In these languages voicing is reported to be contrastive for non-apical[7] stops (i.e. p / *b klg, th/dh, c/j)*[8]. Johnson (1974:6) states that: "voicing is only distinctive after the *firs* vowel in a word". He provides minimal and sub-minimal pairs in Gugu Uwanh such as the following which show voicing to be contrastive in intervocalic position:

p/b	*kapi*	'moon'	*kabam*	'wet season'
kig	*aku*	'skin'	*agu*	'ground, place'
th/dh	*pithapitha*	'bird species'	*pidha*	'Lotus bird'
c/j	*ngaci*	'father'	*ngajinhem*	'bird species'

In addition, he notes (1974:16) that for consonant clusters: "voicing is distinctive only in C_2 position, ... Nasals and */rr/* may occur with both series of stops", and (1974:16): "[h]omorganic nasal-stop clusters allow both voiced and voiceless stops as second member". Consonant clusters involving a lateral plus stop show NO voicing contrast because (1974:16): "*/l/* precedes only voiceless bilabials or velars". This gives the following pattern[9]:

1. Full voicing contrast for non-apical stops
   (a) in intervocalic position
   (b) in homorganic nasal-stop consonant clusters
   (c) following *rr*
2. No voicing contrast
   (a) word initially
   (b) word finally
   (c) in consonant clusters following *l*

---

[6] I am grateful to Steve Johnson for discussing the relevant Paman data with me. He is not to be held responsible for any errors in the following.

[7] There are three major phonological natural classes which are of importance in Australian languages (see Dixon 1980:139ff):
(a) APICALS, grouping together the apico-alveolar and apico-domal consonants;
(b) LAMINALS, grouping together the lamino-dental and lamino-palatal consonants;
(c) PERIPHERALS, grouping together the bilabial and dorso-velar consonants.
We will find these class labels of value in the sections below, and especially when drawing cross-linguistic conclusions.

[8] The historical origin of the contrast in Middle Paman languages is discussed by Hale 1976 (see also Dixon 1980:215). Hale describes the descent of proto-Paman stops in Wik Muminh as follows (1976:50):

> "In Wik Muminh, non-apical stops descend as voiced after long *V1 and as voiceless after short *V1. Subsequently, long vowels became short, thus merging with short vowels, so that voiced and voiceless stops are now in contrast medially."

[9] As we shall show below, it is important to consider ALL the phonological environments where stops occur and to treat each environment separately.

3.1.4 Bay Paman

Sommer 1976 reports that Umbuygamu, a language spoken on Princess Charlotte Bay on the eastern side of Cape York Peninsula and classified by him as a member of the "Bay Paman subgroup", has a voicing contrast for stops. Sommer (1976:15) lists voiced and voiceless stops at five points of articulation, but provides no details to demonstrate the contrasts. He notes (1976:19) that the voiced stops are an innovation in Umbuygamu and have arisen from two proto-Paman sources:

(a) proto-Paman clusters of nasal or lateral plus stop; and
(b) proto-Paman plain stops following a long vowel (proto-Paman plain stops following a short vowel descend as voiceless stops).

The examples in Sommer's brief paper suggest that the voicing contrast is applicable both word initially and in intervocalic position. There are no other details regarding its distribution.

3.2 Northern Territory

There are three groups of languages in the north of this territory which have been variously described as having a stop voicing contrast or a contrast of some other type[10].

3.2.1 Murinypata

As noted above, this language has been quoted by Yallop 1982 as having a stop voicing contrast. There are two sources for Murinypata, which is spoken in the Port Keats region (see map): Walsh 1976 and Street & Mollinjin 1981. In both sources it is stated that stop consonants show a voicing contrast, with *p/b, t/d, rt/rd, th/dh*, and *k/g* being differentiated[11]. A close inspection of the phonotactic statements in the two sources[12], however, shows that the voicing contrast is not fully applicable at all structural positions in words. It is possible to discern several patterns ranging from full, through partial to no voicing contrast:

1. Full voicing contrast
   (a) in word initial position
   (b) in intervocalic position for single stops
2. Partial voicing contrast

---

[10] Tryon (1974:230) says that there seems to be a voicing contrast in the Daly River language Ngangikurrungurr, but suggests that phonemically the contrast is one of length (see the discussion below). He notes:

"[t]here appears to be no phonemic distinction between voiced and voiceless stops in spite of the existence of such minimal pairs as [depi], head and [debi], thigh. Such minimal pairs have been found with other members of the Daly Family. However, an examination of the morphology and morphophonemic rules for each language have led to the conclusion that the voiceless stop, where it occurs intervocalically, should be interpreted as geminate, giving /tepi/, thigh and /teppi/, head . . .In fact the problem must not be magnified out of proportion, as the distribution of the voiced and voiceless allophones of stops is generally clearly definable. Hoddinott, however, is of the opinion that there may exist a phonemic contrast between voiced and voiceless stops, at least in word-initial position (personal communication)."
I have not had access to any more recent data or analysis of this language.

[11] We follow the practical orthography proposed in Street & Mollinjin 1981 in transcribing Murinypata forms. Note that the major allophones of *th /dh* are lamino-palatal, not lamino-dental. There are spectrographs in Walsh 1976 to show that, for p/b at least, voicing is a relevant acoustic distinction.

[12] There are some minor inconsistencies between the statements in Walsh 1976 and Street & Mollinjin 1981. I have taken the latter as a more recent and possibly more accurate account.

In consonant clusters (except for nasal-stop clusters) there is a voicing contrast for stops as the second member of a pair of consonants, but the strength (functional load) of the contrast varies according to point of articulation. Bilabial stops show the widest distribution of contrast, followed by laminals, then velars and finally apicals. The apical stops *t/d* and *fl/rd* show the most limited range of contrasting environments.

(a) bilabial stops contrast in ALL cluster types:
  (i) stop-stop: *tp/tb, rtp/rth, thp/thb, hp/kb*
  (ii) lateral-stop: *lp/lb, rlp/rlb*
  (iii) tap-stop and glide-stop: *rrp/rrb, yp/yb*
  (iv) triconsonantal: *lkp/lkb*

(b) laminal stops contrast in MOST cluster types:
  (i) stop-stop, following peripheral stops: pth/pdh, kth/kdh
  (ii) lateral-stop: lth/ldh, rlh/rldh
  (iii) tap-stop and glide-stop: *rrth/rrdh, yth/ydh*

(c) velar stops do NOT contrast in stop-stop clusters but do in other environments:
  (i) stop-stop: NONE
  (ii) lateral-stop: lk/lg, rlk/rlg
  (iii) tap-stop and glide-stop: *rrk/rrg, yk/yg*

(d) apical stops show the MOST LIMITED contrast environments:
  (i) stop-stop: alveolar following velar kt/kd
    domal following domal rtrt/rtrd
  (ii) lateral-stop: homorganic only lt/ld, rlrt/rlrd
  (iii) tap-stop and glide-stop: NONE

3. No contrast

(a) in word final position13
(b) in nasal-stop clusters[14].

3.2.2 Warurnungu

In this language there is a contrast which has been variously described as voicing and consonant length (see Wurm 1972 quoted above, and Yallop 1982). In their descriptive grammar, Simpson & Heath (1982:6) note that:

> 'the outstanding feature of Warumungu in the light of the phonological systems of neighbouring languages are the presence of two stop series, (voiced and voiceless), and the regular lengthening of nasals and laterals after primary stress.'

They go on to discuss the stop contrast (1982:6):

---

[13] Walsh (1976:35) gives instances of final voiced stops but all the examples are reduplicated monosyllables that also have voiced stops INITIALLY. This suggests that voicing may be a PHONETIC feature of whole syllables of this type, but not phonologically contrastive in word final position. Street & Mollinjin 1981 write final stops as voiceless only.

[14] Walsh (1976:36) gives examples of contrasts in this environment but notes "nasal-stop clusters tend to have the second member voiced". Street and Mollinjin 1981 show no contrast for stops following nasals

> We have called the distinction between the two stop series 'voicing' ... but this is not quite accurate. 'Voiceless' stops are voiceless and usually aspirated. 'Voiced' stops are unaspirated and often voiced. 'Voiced' stops are never long, while voiceless stops are long depending on their position within the word.'

Simpson & Heath describe in some detail these alternations in length (1982:11-12) and conclude that the most appropriate analysis is one in which the consonant contrast is treated as short versus long stops, e.g. p versus pp. The contrast has a limited distribution:

(a) only intervocalically following a short vowel

(b) only in consonant clusters whose first member is a nasal, lateral or tap.

There is no contrast word initially, syllable finally, or in disyllables following a long vowel (where short voiced stops are found). For the latter point it is interesting to compare the history of Middle Paman languages mentioned in 3.1.3 above, and Warluwarra to be discussed in 3.3 below.

3.2.3 'Top End' Languages

A large number of (apparently unrelated) languages spoken in the north of the Northern Territory have a stop contrast which has variously been described as voiced-voiceless, fortis-lenis and short-long (gemination). The languages include Yuulngu dialects of eastern Arnhem Land, such as Djinang (Waters 1980), Gupapuyngu (Lowe quoted in Dixon 1980 and Morphy 1983), Djapu (Morphy 1983), Dhuwal (Heath 1980b), and Ritharrngu (Heath 1980a), as well as non-Pama-Nyungan languages such as Rembarrnga (McKay 1975), Ngandi (Heath 1978), Ngalakan (Merlan 1983), Mangarayi (Merlan 1982), Kunwinjku (Carrol 1976), and Wagiman (Cook 1987).

The nature of the stop contrast in these languages has been the subject of some controversy. Yallop (1 982:67fn.8) notes:

> 'The precise nature of voiced and voiceless plosives in the Yuulngu languages ... is debatable. In general, the voiceless plosives are strongly articulated and somewhat lengthened (rather like Italian pp, tt, etc.). It would be feasible to write p as pp and b as p, likewise t as tt and d as t, etc.'

In a similar vein Dixon (1980:487) comments:

> 'In Yolngu the two varieties of stop contrast only in medial position ... The phonetic nature of the distinction in Gupapuyngu (and other languages and, dialects of the area) is still under investigation. It seems that there are several interrelated factors — quantity, tenseness and probably also voicing (or delayed onset of voicing); the phonetic distinction may well vary depending on whether the stops occur between vowels, between *1* and a vowel etc.'

Cook (1987:33-52) is a careful study of the contrast in all the relevant languages (see also Walker 1984, McKay 1984:114-116). He notes that the contrast is only relevant in the following environments:

(a) intervocalically
(b) following the lateral *1* and the tap *rr*.

In other environments, voicing (and also quantity and tenseness) is not contrastive and phonetically predictable. Cook (1987:35) argues that in Wagiman "it is voicing which is the consistent auditory cue for the stop contrast", but he accepts that alternative analyses may be appropriate for the other languages.

Notice that regardless of the precise phonetic nature of the phonological contrast, in some Yolngu dialects it is not found for all points of articulation. Thus, in Djinang the contrast is relevant for all points of articulation EXCEPT bilabial, and in the eastern dialects Djapu and Galpu, ONLY APICO-DOMALS have the contrast (since historically intervocalic peripherals have lenited to *w*, and laminals have lenited to y). Similar patterns will emerge in the discussion of north-east South Australia below.

3.3 Western Queensland

Two languages near Warumungu are reported to have a stop voicing contrast, namely Warluwarra and Bularnu. Breen (1976d:257) says:

> 'Note that Bularnu has a voiced-voiceless stop opposition in intervocalic position and possibly in consonant clusters, while Warluwara has this opposition only in homorganic nasal-stop clusters.'

Breen (1971a:22) and Dixon (1980:215) note that in Warluwarra the voiced stops follow syllables with phonetically long vowels, and the voiceless stops occur after syllables with short vowels. As Dixon (1980:215) points out:

> 'We could take vowel length as contrastive and then predict that a stop will be voiced after a homorganic nasal preceded by a long vowel. Or we could recognise a distinction between voiced and voiceless stops after homorganic nasals and then predict that a vowel occurring before a nasal followed by a homorganic stop will be long ... there appears to be no compelling reason for preferring one solution over the other.'

Breen 1971a opts for the voicing distinction as phonemic, noting that vowel length solution (1971a:22): "led to some minor problems, but the only real exception was [kaantha]". It may be that voicing is an emerging contrast in this language. It is important to note also that the contrast is NOT SIGNIFICANT for velar stops (Breen 1971a:23).

Breen 1974 includes details of the voicing contrast in Brularnu, which appears to be better established than in Warluwarra. From the examples presented (1974:1-13), it is possible to draw the following generalisations:

(a) the voicing contrast DOES NOT apply in word initial position;
(b) all words end in a vowel, so the voicing contrast is not applicable word finally;
(c) voiced and voiceless stops contrast intervocalically and in consonant clusters:

> (i) in intervocalic position there are clear minimal (or sub-minimal) pairs for all points of articulation EXCEPT APICO-ALVEOLAR. Breen gives three putative examples of the contrast for t and *d*, but one of these was not accepted as genuine by all his consultants and the other two show a vowel length contrast (i.e. we find short vowel plus voiced stop *Vd* contrasting with long vowel plus voiceless stop *VVt)*. Breen (1974:5) notes that phonetically "the stressed (i.e. first) vowel in a disyllabic word is long if the following consonant is a voiced stop ... and is short if the following consonant is voiceless". The words with *VVt* (plus one with *VVp)* are exceptions to this phonetic generalisation so it appears that vowel length is contrastive in Bularnu, in which case there is no phonemic voicing contrast for the apico-alveolar stop position;
>
> (ii) for consonant clusters there is a clear contrast at all points of articulation following homorganic nasals. Breen (1974:11) also gives one example of *k* contrasting with g following non-homorganic apico-alveolar nasal *n*, but notes

later (ibid:13) that the relevant word with *n.g* may be a borrowing from Warluwarra. There is no clear evidence of a contrast in other cluster types.

Bularnu thus seems to show the same pattern as Warluwarra, but additionally has a voicing contrast in intervocalic position for points of articulation other than the apico-alveolar.

3.4 South-Western Queensland

There are two groups of languages in this area which have phonological voicing: members of what Breen 1971b called the Ngura sub-group which includes Wangkumarra and Kungkatutyi, and Margany and Gunya, which are members of the Maric group of closely related languages that extends over a vast area of central and southern Queensland[15].

3.4.1 Margany and Gunya

Breen 1981 reports that these languages have a voicing contrast intervocalically and in consonant clusters. Breen (1981:283) notes:

> 'The only unusual feature of this inventory is the existence of two series of stops, labelled voiced and voiceless, but perhaps more correctly lax and tense. In the environment in which they most frequently contrast, i.e. intervocalically, the former are frequently lenited to fricatives (in the case of /b/, /g/ and *Id!)* or a tap *(Id!)* while the latter are characterised by length (especially in Margany) as well as the absence of voice. These phonetic facts suggest that, at least intervocalically, the voiceless stops could be regarded as geminate clusters (as has been done in, for example, Burarra (Glasgow 1967, p.9) and Rembarnga (McKay 1975, pp. 17-21). However, this is not favoured since heterorganic stop clusters, such as /2db! and /2dg/, which occur inter-morphemically, remain voiced. Voiced and voiceless stops contrast also in clusters with lateral and nasal as first member. With laterals the voiced stops may be lenited while with nasals they are realised as voiced stops. In both cases the voiceless stops are voiceless but not long.'

Breen (1981:284) gives a set of minimal and near minimal pairs to illustrate the contrast, noting that the voiceless stops are low in frequency. Notice that there are NO examples in Breen 1981 of voiced and voiceless APICO-ALVEOLAR stops contrasting in intervocalic position[16].

Margany
Intervocalic

p/b	*kapuny*	'small'	*kabuny*	'egg'
k/g	*maka*	'bone	*paga*	'tree'
rt/rd	*thurti*	'elbow'	*purdi*	'fire'
th/dh	*thatha*	'sick'	*thadha*	'excrete'
c/j	*kuca*	'spear'	*kuja*	'honey'

[15] No other languages in the group have the contrast — Margany and Gunya border immediately on members of the Ngura group which show the contrast, suggesting that it has probably been borrowed from them, despite what Breen (1 981 :283-4) says:

> "[t]he possible origin of the voiced-voiceless stops distinction will not be discussed in detail here.... It seems likely, therefore, that the distinction arose as a result of internal phonological change rather than borrowing."

[16] In presenting the following examples I have modified Breen's transcription by substituting *c* for his *ty* and *j* for his *dy*, and by writing initial stops with the voiceless symbols rather than the voiced. Notice that in Breen's orthography intervocalic *d* is a tap, not a stop.

Breen also gives some examples which apparently show a voicing contrast in nasal-stop consonant clusters. The instances presented show *k* contrasting with g after nonhomorganic nasal, and t contrasting with *d* after homorganic nasal. It is impossible to determine from the examples given just how general these contrasts really are.

Consonant clusters

Nk/Ng	*kunkurru*	'coughing'	*kurn.ga*	'raw'
nt/nd	*pintada*	'cormorant'	*pindata*	'sit-CONJ'

3.4.2 Wangkuinarra

Immediately to the south-west of Margany and Gunya are located a group of closely related languages classified by Breen 1971b as the Ngura subgroup. These languages are Wangkumarra, Punthamarra and Kungkatutyi. Their wider genetic affiliations are said to be with languages in north-eastern South Australia (see 3.5).

> Breen (1976c:339) mentions the existence of a voicing contrast for stops in Wangkumarra:
>
> 'Note that Wangkumara has a contrast between voiced and voiceless stops. The full extent of this contrast has not yet been determined; it may be confined to intervocalic position and consonant clusters.'

From the vocabulary presented in Robertson 1985 it is apparent that there is a voicing contrast intervocalically for stops at points of articulation OTHER THAN the APICO-ALVEOLAR.

The dialect of Wangkumarra[17] described by McDonald and Wurm 1979 has a voicing contrast for all six oral stops intervocalically and in some consonant clusters. McDonald & Wurm (1979:7) describe the stop voicing contrast as follows:

> 'Unlike most Australian languages, Wangkumarra (Garlali) has a voicing distinction in the oral stops. The contrastive value of voicing is limited to certain environments. There is no distinction initially or before */r/*, and it may be demonstrated intervocalically only for laminals and peripherals. It can be shown for all the consonant series in homorganic clusters following nasals, but to only a limited extent following laterals and rhotics. Absence of a full set of distinctions after laterals and rhotics is probably a function of the limited material. It should be noted that voiced stops occur in only 20% of the vocabulary items.'

Their description of the phonetic nature of the contrast has parallels in the descriptions of other languages cited above. Thus, they note a correlation between phonetic length of the stop and voicelessness, and a further correlation between phonetic length of the preceding vowel and voicing of the stop (cf. Warumungu described in 3.2.2, and Bularnu in 3.3). As McDonald & Wurm (1979:7-8) state:

> 'Voiceless stops, which have a fairly tense articulation in all positions, are particularly tense — and geminate — following a stressed vowel. Voiced stops are weakly articulated, with bilabials and velars in particular being realised as lenis fricatives. A stressed vowel preceding a voiced stop is often lengthened, whether the consonant is single or in a cluster. Thus a long vowel is usually

[17] McDonald & Wurm 1979 erroneously call the language "Garlali"; as Breen (pers. comm.) points out, Galali is a different language and probably does not belong to the same subgroup as Wangkumarra.

> associated with the voiced stops while a preceding short vowel characterises the voiceless series. The relevant contrast could then be identified either as vowel length or as consonant voicing. The weight of evidence favours a distinction residing in the consonants, however. Vowel length is not maintained as consistently as consonant voicing.'

They provide the following examples of the contrast (McDonald & Wurm 1979:10-11). Notice that there is NO contrast for APICO-ALVEOLARS stops in any environment.[18]

Intervocalic

p/b	*thapa*	'lick'	*draba*	'sting'
th/dh	*katha*	'cockatoo'	*kadhi*	'lie'
c/j	*maca*	'long ago'	*nhaja*	'see'
k/g	*paka*	'hide, send'	*waga*	'lie down, sleep'

In homorganic nasal-stop clusters there is a contrast for all non-apicals:

p/b	*pampuli*	'wild orange'	*yamba*	'fight'
th/dh	*yantha*	'go'	*yandha*	'talk'
c/j	*manca*	'crawl, move'	*nganja*	'want, need, like'
k/g	*yangkuri*	'move'	*kangga*	'hunt, carry'

After laterals there are examples of contrast for peripheral stops:

p/b	*walpa*	'rise'	*walbira*	'shadow'
k/g	*kalka*	'hit, fight'	*kalga*	'evening'

Following the tap *rr* it appears that only velar stops contrast for voicing:

k /g	*purrkanga*	'bandicoot'	*murrgaja*	'younger brother'

There is one other language in this group that has been reported to have a voicing contrast for stops, namely Kungkatutyi. Wurm (1 972:132) comments:

> 'The occurrence of two phonemic stop series (tense-lax contrast) and of nasally and laterally released stop series has been observed in Kungadutji.'

Schebeck 1987b describes the distribution of a voicing contrast in that language. The details are essentially identical to those for Wangkumarra.

3.5 North-East South Australia

There are two groups of languages in this area which have a voicing contrast. The two groups are geographically adjacent but do not appear to be closely genetically related. They are Adnyamathanha, spoken in the northern Flinders Ranges, and Diyari-Ngamini-Yarluyandi-Yandrruwandha, spoken east of Lake Eyre (and immediately west of the Ngura subgroup — see 3.4.2). Voicing is thus an areal feature of north-east South Australia and south-west Queensland (see map and Dixon 1980:215-6 quoted in 2 above).

All these languages have a voicing contrast, but it has a limited distribution in them all. None of the languages has the contrast intervocalically for apico-alveolar stops. It is interesting to note in this connection that there is a further areal feature that all the languages of this region share with their eastern and north-eastern geographical neighbours (the several dialects of

[18] McDonald & Wurm 1979 claim that apico-domals contrast following homorganic laterals, but according to Breen (pers. comm.) the relevant examples have been mistranscribed by them.

Pitta-Pitta spoken to the north-east of Yarluyandi and extending into western Queensland, which do not have a stop voicing contrast, and the Ngura subgroup of south-west Queensland, which do). This feature is the presence of a contrast in intervocalic position between three 'r'-sounds: an apico-alveolar tap, an apico-alveolar trill and a post-alveolar continuant[19]. It may be that the presence in intervocalic position of two apico-alveolars provides structural pressure which militates against a further contrast between voiced and voiceless stops.

3.5.1 Adnyamathanha

Schebeck (1976:535) mentions **a** restricted stop contrast, which he describes as 'lenes/fortes':

> 'The opposition between 'lenes' and 'fortes' is found relevant only intervocalically or between laterals or /r/ and vowels ... stops after nasals are always voiced.'

Tunbridge (1988:281fn2) says that: "Adnyamathanha manifests a phonemic voicing distinction", but gives no details or examples.

A thorough search for relevant examples in the vocabulary in Schebeck 1974 and the fuller dictionary (Schebeck 1987a) reveals a number of interesting points about the putative voicing (or 'fortis/lenis') contrast:

1. in intervocalic position the contrast can be established with different degrees of confidence for stops at different points of articulation.

(a) apico-domal stops show a clear contrast with a number of minimal pairs to be found, for example:

arti	'blood'	*ardi*	'initiation song'
irta	'bird'	*irda*	'flea'
virta	'outside'	*virda*	'dog lice'
warta	'big'	*warda*	'kangaroo rat'

(b) for bilabials there is a contrast between p and *v*, with a number of minimal and near minimal pairs to be found:

api	'to close'	*avi*	'to vomit'
ipi	'alive'	*ivi*	'sheep'
ngaparla	'cousin'	*ngavalya*	'weather'
wapatha	'guts'	*wavarri*	'long'

(c) for velars there is just one word that contains g medially, this word contrasts minimally with a word containing *k:*

ika	'to sit'	*iga*	'wild orange'

[19] Most Australian languages have just two 'r'-sounds, a post-alveolar continuant and an alveolar consonant which usually has both trill and tap allophones. We transcribe the continuant as *r*, the tap as *rr*, and the trill as *rrh.*

(d) for the lamino-dental stops there is one word that contains *dh;* it contrasts with another word containing *th*[20]*:*

ithi 'dry spike' *idhi* 'finch'

There are no words showing a voicing contrast for lamino-palatal stops in intervocalic position.

2. in consonant clusters the voicing contrast is on1y weakly attested. I find the following pattern:

(a) after laterals there is one word containing *u* sub-minimally contrasting with p:

walpa 'to peg out' *ngalvai* 'to be stuck in'

(b) after laterals there are two words containing *th* and a large number of words containing *dh:*

maitharra	'emu feathers'	*vaidha*	'clothes, fur'
multharri	'sacred objects'	*vuldha*	'flesh'
		yuldhalpa	'to press down'
		uldha	'branch, leaf

One word is given in Schebeck 1987a with both voiced and voiceless alternatives: *yulthada* or *yuldharra* 'business (i.e. corroboree) ground'.

(c) after *rr* there is one word with *v* contrasting with p:

arrpa 'to paint' *ngarrvai* 'to be mixed together'

(d) after *rr* there is one word with g contrasting with *k:*

vurrka 'to sprinkle' *vurrgu* 'south-west'

In general then, except for intervocalic apico-domal stops, the voicing contrast is only weakly attested in Adnyamathanha (and not attested at all for apico-alveolar and lamino-palatal stops). It is only marginally applicable in consonant clusters, and then not for apicals. It seems likely that Adnyamathanha is in the process of acquiring the voicing contrast, possibly by diffusion from its northern neighbours Diyari and Yandrruwandha (see below).

3.5.2 Diyari

This language, spoken to the east of Lake Eyre, has a very limited voicing contrast. Austin (1981b:16) reports a contrast between *rd* and *rt* intervocalically and in homorganic nasal-stop clusters[21], and between *d* and t in homorganic nasal-stop and lateral-stop clusters[22].

The phonetic realisations of the various stops are interesting. Intervocalic *rt* is voiceless and long (Trefry 1984:227 measures mean duration for the stop in six words as 15.9 centiseconds), while *rd* in the same position is voiced and short, almost approaching a tap (Trefry 1984:227 gives mean duration for 23 words as 8.0 centiseconds, with some durations

---

[20] I recorded the Adnyamathanha word *idhiidhi* meaning 'rainstorm' from Mrs May Wilton in May 1974. This contrasts with *ithithi* 'back', but does not appear in Schebeck's dictionary. If it is a genuine Adnyamathanha form then there are two words known to contain *dh.*

[21] See Trefry 1984 for acoustic evidence that the contrast involves a difference in voicing. There are also length correlates and these are discussed below.

[22] In Austin 1981b it is claimed that t contrasts with *d* intervocalically, but this analysis rests on taking medial trill *rrh* as an allophone of d *1,* which now appears to be incorrect

as short as 4 centiseconds). Also, intervocalic t, which has no voiced counterpart, is voiceless and long (Trefry 1984:227 gives mean duration in seven words as 16.3 centiseconds). Thus, voicing and length are closely correlated (cf. discussion of Warumungu, Bularnu, Margany and Wangkumarra above).

The stop *d* appears after *l* and *n* only and is realised as a voiced apico-alveolar stop with trill release, i.e. *ndrr* and *ldrr*[23]. This gives the following pairs:

kantu	'wallaby'	*kandrru*	'snore'
nhantu	'horse'	*nhandrru*	'she (erg)'
pantu	'lake'	*pandrra*	'cooked'
kalta	'lizard type'	*kaldrra*	'necklet of reeds'

We will compare these distributions with Diyari's immediate neighbours in the following sections.

---

[23] Trefry (1 984:229, 31 8fnl 0) suggests that the sequence we have described phonetically as nasal or lateral followed by a voiced stop with trill release should be analysed as *nrr* and *lrr* (ie. lacking the stop component). There are several reasons why such an analysis is inappropriate:

1. in the closely related language Thirrari there is apparently free variation between *nd/id* and *ndrr/idrr* (Austin 1981:5);

2. in Thirrari the participial suffix has the form *-rda* following verb stems containing a nasal-stop cluster, *and-rnda* elsewhere. Stems that contain *ndrr* select the former allomorph, showing that the nasal-stop sequence is present;

3. there are numerous cognates with neighbouring languages that show Diyari *ndrr/idrr* correspond to *nd/id* in languages without the trill release of stops:

Diyari			
kandrri	'club'	Pitta-Pitta	*kantikanti*
kundrru	'head cold'	Adnyamathanha	*untuuntu*
ngandrri	'mother'	Yarluyandi	*ngandi*
pindrri	'grasshopper'	Pitta-Pitta	*pintiiya*
wandrra	'to show'	Adnyamathanha	*wanta* tell story
yundrru	'you(erg)'	Yarluyandi	*yindi*
pildrra	'possum'	Adnyamathanha	*vilta*
waldrra	'heat	*walta*	

Trill release of stops also occurs in Yandruwandha (Breen 1975). Here ALL medial apico-alveolar stops are voiced and have trill release, as do the majority of intervocalic apico-domal VOICED stops. Compare the following cognates between Yandrruwandha and Diyari:

Yandrruwandha		Diyari
kadrra l	ouse	*kata*
kudrri s	wan	*kuti*
pidrri	anus	piti
mardrra	stone	*marda*
pardrra	to hold	*parda*
kardrri	brother-in-law	*kardi*
kurdrru	hole	*kurdu*

It appears that trill release of *rd* is an innovation in Yandrruwandha. Interestingly, there are words which consistently do NOT show the innovation — they include *ngardu* nardoo' (Marsilia drummondii, an important plant food), and *mardu* 'moiety', both of which are important concepts from a socio-cultural point of view and so would well be expected to be among any residue of a change in progress.

In word initial position, Diyari, Ngamini and Yarluyandi allow no apico-alveolar stops but do have the apico-domal voiced stop *rd*. In corresponding Yandrruwandha words a trill-released stop *rdrr* appears word initially, as in:

Yandrruwandha		Diyari
rdrraka	'to strike'	*rdaka*
rdrriji	'sun'	*rdiji*

3.5.3 Ngamini

This language is adjacent to Diyari and closely related to it. There is a voicing contrast for apico-domals intervocalically and in homorganic nasal-stop clusters and for apicoalveolars following homorganic nasals and laterals (the same distribution as in Diyari). Note however that trill release is not a feature of ALL voiced *d* in Ngamini, but appears to be an innovation in the process of spreading through the lexicon (possibly along the lines suggested by the lexical diffusion hypothesis proposed by Wang 1969; see also Chen and Wang 1975). Thus, we find:[24]

1. *nd* occurs in irregular participle forms *(manda* for the verb root *mani-* 'to get' and *_janda* for the reflexive derivational suffix *-jarrhi-),* in the noun ablative case inflection *-ngundu* (cf. Diyari *-ndrru),* in the admonitive verb inflection *-nda,* and the second person pronoun *yindi,* the third person deminine demonstrative *nhandu* plus a few lexical items. The sequence *ld* occurs in irregular participle form of the verb *pali-* 'to die', namely *palda*

kandi	'father's father'
manda	'get-pickle'
ngathanda	'offspring of same moiety'
nyindiya	'cave'
thandipila	'snake type'
thindithindi	'willy wagtail'
wandaka	'to show'
windi	'only'
yinda	'cave'
yindi	'you (erg)'
palda	'die-ptcple'

2. *ndrr* and *ldrr* occur in a large number of common words, such as:

dandrra	'to hit'
kamandrra	'offspring of the opposite moiety'
kundrrukundrru	'cough'
ngandrri	'mother'
pandrra	'cooked'
pindrri	'grasshopper'
thundrru	'stomach'
yindrra	'cry'
kaldrri	'salty'
paldrru	'saltbush'
pildrra	'possum'
waldrra	'heat'

It appears then that trill release of *d* is a phonetic feature entering the language and is being lexically diffused

[24] Ngamini data are from my own fleldnotes plus unpublished data kindly made available by Gavan Breen (see also Breen 1976b).

3.5.4 Yarluyandi

This language borders Ngamini and is closely related to it. Available data are sketchy,[25] but there appears to be a well attested voicing contrast in intervocalic position for apico-domal stops. The following are examples:

parta	'mud'	*pardaka*	'to carry'
marta	'stone, hill'	*ngardarda*	'mother's father'
yurtari	'to go'	*kirdarri* '	to call out'

The voicing contrast is also found in homorganic nasal-stop clusters for apical stops (as in Ngamini and Diyari), as well as for peripheral stops, i.e. bilabial *p / b* and velar *k 1g.* The following sub-minimal pairs illustrate the latter two contrasts:

yampa	'good'	*wamba*	'many'
wangka	'to speak'	*pangga*	'to hear'
kungku	'head'	*nganggi*	'to give'
mangka	'yamstick'	*yanhilangga*	'will talk'
kingka	'to laugh'	*karniggarrha*	'goanna'

There does not appear to be a voicing contrast for laminal stops in nasal-stop clusters. The situation for latera1-stops clusters is unclear[26].

3.5.5 **Yandrruwandha**

This language is spoken to the east of Diyari, Ngamini and Yarluyandi and is distantly related to them[27]. Breen (1976a:597) mentions a voicing contrast for stops:

> 'The Yandruwandha phoneme inventory appears to include a full set (6) of both voiced and voiceless stops (although the opposition may be significant only in certain environments).'

Breen (1975:7) provides some details regarding the distribution of the voiced stops. He says of the voicing contrast:

> 'The distinction is found only after stressed vowels (and almost always after a primary stressed vowel) or in nasal-stop clusters.'

However, on page 9 of the manuscript, there are examples of *k* /g and p *lb* contrasts following laterals! In the phonotactic statements (1975:49) it is said that PERIPHERALS contrast after apico-alveolar nasal r and lateral *1*. There seems to be no contrast between apical stops after laterals.

---

[25] Data on Yar1uyandi are from my own fleldnotes, and come from only brief contact with the language. Luise Hercus has a large amount of data on tape but I have not had access to it.

[26] There may also be a contrast for velar stops following the apico-alveolar nasal *n.* My fieldnotes contain the following pair

mankarrha 'girl' *kan.gu* 'boy'

No other examples are known.

[27] Yawarrawarrka, which is located between Ngarnini and Yandrruwandha, appears from the limited data given in Breen 1971b to be identical to Yandrruwandha in its phonology.

In summary, the Yandrruwandha system seems to be:

(a) an intervocalic contrast for stops after the first (stressed) vowel of a word, except for apico-alveolar

(b) a contrast for all stops following homorganic nasals

(c) a contrast for peripheral stops following *n* and *1*

There is no contrast in other environments.

If we compare the distributions of stops for the four languages discussed above we can see the following patterns:

1. in homorganic nasal-stop clusters we get:

	apical	peripheral	laminal
Diyari	+		
Ngamini	+		
Yarluyandi	+	+	
Yandruwandha	+	+	+

From this we can derive an areally distributed implicational hierarchy of the form:

apical < peripheral < laminal

That is, if a language has a voicing contrast for laminal stops (in homorganic nasal- stop clusters) it also has a contrast for peripheral and apical stops, but not vice versa. Similarly, if a language has a voicing contrast for peripheral stops (in homorganic nasal-stop clusters) it also has a contrast for apical stops, but not vice versa.

2. a partial contrast applies following laterals — in Diyari and Ngamini only **t** / *d* contrast there, in Yandrruwandha only *p/b* and *k* /g contrast after *l*.. In Wangkumarra to the east (see 3.4.2) p/*b* and *k*/g also contrast after laterals.

3. only Adnyamathanha and Wangkumarra contrast stops after *rr,* and then only peripherals p/b and *klg.*

This picture suggests that voicing is an areal feature of north-east South Australia and south-west Queensland (as Dixon noted) and that the contrast has been diffusing between languages, probably centered in Yandrruwandha or the Ngura subgroup, the two language groups which have the widest range of contrast.

3.6 Western Australia

Two closely related language groups in Western Australia have one member each which has developed a voicing contrast for oral stops in intervocalic position as a result of reconstructible historical changes.

3.6.1 Tharrkari

This language is reported by Klokeid 1969 to have a voicing contrast for all points of articulation in intervocalic position. Klokeid 1969 also gives one sub-minimal pair which apparently shows *k* and g in contrast after *rr*, but the *rrk* cluster is inter- morphemic since *k* begins the allative case suffix *-kurda.*

In Austin 1981a I show that the voicing contrast in Tharrkari has arisen as a result of regular reconstructible historical changes. Two basic changes have occurred:

(a) nasals in homorganic nasal-stop clusters have been lost, giving rise to VOICELESS stops. Thus ancestral **kumpa* 'to sit' descends as *kupa* 'to sit' in Tharrkari, **kungka* 'soakage' becomes *kuka,* and so on;

(b) single intervocalic stops descend as VOICED stops in Tharrkari, giving rise to a phonemic contrast. Thus, ancestral **puka* 'to dig' descends as *puga* in Tharrkari (contrasting with *puka* 'to visit' from **pungka).* No plain apico-alveolar stops can be reconstructed for the ancestral language, and so Tharrkari has no voiced *d.*

In addition to these changes, there has been a merger of intervocalic **t** with *rr* in Tharrkari[28]. In consonant clusters there is NO voicing contrast.

In one dialect of Tharrkari (called the d-dialect in Klokeid 1969), laterals have all changed to stops, resulting in ancestral laterals merging with VOICED Stops intervocalically. Thus, ancestral *karla* 'fire' becomes *karda* in one Tharrkari dialect. In this dialect, there is a phonetic contrast in intervocalic position between *d* (from ancestral **1)* and t, but since t and *rr* are in free variation, it is doubtful that a phonemic *d/t* contrast exists (since a phonemic analysis as *d/rr* is an alternative). Further examples may be found in Austin 1981a.

3.6.2 Purduna

This language is reported by Austin 1981a to have a voicing contrast intervocalically. Austin shows that this contrast has developed historically in a manner similar to the development in Tharrkari. Briefly, voiceless stops are derived from homorganic nasal- stop clusters, and voiced stops are derived from plain stops. However, in Purduna, in most environments plain stops have lenited to glides: **th* and *j* become y, and **k* and *p become *w.* The results of these changes are:

(a) the voicing contrast is BEST attested for APICO-DOMAL stops *rt/rd*

(b) the voicing contrast is WEAKLY attested for PERIPHERAL stops *k/g* and *p/b.* The voiced stops are found only in words which begin with *w* (initial *, prevented lenition to *w)* and hence we get a contrast in words like:

waka 'to speak' *wagurra* 'crow

(c) there is NO voicing contrast for laminal stops, that is, there is no *dh* in contrast with *th* and no *j* in contrast with *c.* This is because all intervocalic single laminal stops have lenited to y and so only voiceless stops descending from nasal-stop clusters are to be found intervocalically.

This pattern recalls others described above (see conclusion in the next section).

4. CONCLUSIONS

From the wealth of detail presented above it is possible to draw a number of general conclusions, some of them areally based and some not, about the distribution of phonological voicing contrasts in Australian Aboriginal languages.

Before presenting these however, it is useful to make a few comments on the PHONETIC nature of the contrasts we have been examining. These comments are necessarily brief, given that only limited information is available about the phonetics of the relevant languages, and the required phonetic experimentation (especially studies of acoustic characteristics) of them has yet to be undertaken.

---

[28] See the note above on the presence of three 'r'-sounds in north-east South Australia and the corresponding lack of a medial apico-alveolar stop voicing contrast.

1. in the instances in which there is reliable acoustic data (e.g. Diyari, Murinypata), it appears that voicing (or delayed onset of voicing) is at least one parameter which is relevant to the phonological contrast.

2. in addition, CONSONANT LENGTH is often a concomitant (or major) feature of consonant voicing: voiceless stops are typically LONG, voiced stops are typically SHORT.

3. there is also to be observed an inverse correlation with the phonetic length of the VOWEL which precedes the stop: VOICELESS stops follow SHORT vowels and VOICED stops follow LONG vowels. In no Australian language are voiced stops found after short vowels.

Hopefully, further phonetic research will improve upon these brief remarks.

The PHONOLOGICAL generalisations we can induce from the data discussed above are:

1. if any language has a voicing contrast, that contrast will be restricted to STOPS, except for Kala Lagaw Ya, which contrasts fricatives *s/z.*

2. NO Australian language has a voicing contrast at ALL STRUCTURAL POSITIONS in words

- 2.1 NO language contrasts voiced/voiceless stops in SYLLABLE FINAL position which is not also word final position, that is, in words of the form C1VC2$C3V (where indicates a syllable boundary), no voicing contrast ever applies at 02 position;
- 2.2 NO language (except Kala Lagaw Ya) contrasts voiced/voiceless stops in WORD FINAL position;
- 2.3 NO language (except Kala Lagaw Ya and Murinypata (and possibly also Mbiywom and Umbuygamu)) contrasts voiced/voiceless stops in WORD INITIAL position;

3. ALL Australian languages with a phonological voicing contrast (except Tharrkari and Purduna (and possibly also Mbiywom and Umbuygamu)) contrast voiced/voiceless stops as the second member of consonant clusters.

- 3.1 languages of South Australia (except Adnyamathanha) and Queensland have a contrast for at least some points of articulation in homorganic NASAL-STOP clusters. All languages (except Middle Paman) contrast apical stops in this position, some also contrast peripheral stops here, and a few also contrast laminal stops after homorganic nasals;
- 3.2 if a language has NO contrast in nasal-stop clusters (as in Adnyamathanha and Northern Territory languages) then it will show at least some contrast in clusters following a lateral or tap.

4. ALL languages surveyed contrast AT LEAST SOME stops intervocalically (between vowels, usually after the first (stressed) vowel of a word)

- 4.1 if a language has stops at apico-domal point of articulation, then an intervocalic voicing contrast will minimally apply for apico-domal stops;
- 4.2 NO language (except Kala Lagaw Ya and Murinypata) contrasts apico-alveolar stops in intervocalic position;
- 4.3 if a language contrasts VELAR stops intervocalically, it will also contrast LAMINAL stops intervocalically (except for Purduna);

It is interesting to compare these generalisations we have extracted from the Australian data with the cross-linguistic findings reported in Maddieson 1984. Maddieson notes that in his database, 66.9% of languages have plain voiced stops, and 51.1% have two

stop series. He also finds that a number of implicational statements hold true of the languages in the database, including (see Maddieson 1 984:34ff):

(a) if a language has any voiced stops it will have bilabial *b* (only three languages in the corpus have g or *d* but not *b)*

(b) if a language has a voiced alveolar stop *d*, it will also have *b*

(c) if a language has a voiced velar stop g, it will also have *d* and *b* (twenty one languages have no g but most of them belong to just three language groups: Austro-Asiatic, Austro-Thai and Amerindian).

As we have seen, the first generalisation does not apply for Australian languages; it is APICO-DOMAL position which is most favoured for the voicing contrast in these languages (and APICO-ALVEOLAR is highly disfavoured). Interestingly, Maddieson (1984:37) notes that retroflexes (and palatals) show a high likelihood of being voiced cross-linguistically. He calculates the ratio of voiced to voiceless stop occurrences for each point of articulation in his sample and arrives at a figure of .63 for *d/t.* However, as Maddieson (1984:37) notes: "[t]he voicing ratio is .76 for palatal plosives and .82 for retroflex plosives, both of which indicate greater than usual tendency to voicing." The Australian data is thus consistent with this general tendency. As for the other implicational findings, we have seen that in Australia *b* tends to pattern with g (both are peripheral) and that for these languages the appropriate implicational statement for intervocalic position is:

g	IMPLIES	*j*	IMPLIES	*rd*
velar		palatal		apico-domal

I hope to have demonstrated in this paper that rather than being marginal and exceptional phenomena, phonological voicing contrasts are well established in many Australian languages and that their distributions both within languages and across the continent are subject to certain phonetic and phonological regularities. Some of these accord with cross-linguistic phonetic findings based on data from languages from elsewhere in the world, but some appear to be unique to the phonological systems of the languages spoken in Australia.

BIBLIOGRAPHY

Austin, P. 1978. *A grammar of Diyari, north-east South Australia.* PhD Thesis, Australian National University, Canberra.

Austin, P. 1981a. Proto-Kanyara and proto-Mantharta historical phonology. *Lingua* 54.41-77.

Austin, P. 1981b. *A grammar of Diyari, South Australia.* Cambridge: Cambridge University Press.

Bani, B. and Klokeid, T.J. 1976. Kala Lagaw Langgus: The Western Torres Strait Language. ms.

Blake, B. J. & Dixon, R.M.W. 1979. Introduction. In Dixon, R.M.W. & Blake B.J. (eds), 1-25.

Blake, B. J. 1979. Pitta-Pitta. In Dixon, R.M.W. &Blake, B. J. (eds), 183-242.

Breen, J.G. 1971a. A Description of the Warluwara Language. MA Thesis, Monash University.

Breen, J.G. 1971b. Aboriginal Languages of Western Queensland. Monash University. *Linguistic Communications.* 1 -88.

Breen, J.G. 1974. Bularnu Phonology and Grammar. Monash University, ms.

Breen, J.G. 1975. Innamincka Talk. Australian Institute of Aboriginal Studies, ms.

Breen, J.G. 1976a. Yandruwandha. In Dixon, R.M.W. (ed.), *Grammatical categories in Australian Languages.* Canberra: Australian Institute of Aboriginal Studies. 594- 597, 750-756.

Breen, J.G. 1976b. Ngamini and a note on Midhaga. In Dixon, R.M.W. (ed.), *Grammatical categories in Australian Language.* Canberra: Australian Institute of Aboriginal Studies. 745-750.

Breen, J.G. 1976c. Wangkumara. In Dixon, R.M.W.(ed.), *Grammatical categories in Australian Languages.* Canberra: Australian Institute of Aboriginal Studies. 336- 339.

Breen, J.G. 1976d. Warluwara and Bularnu. In Dixon, R.M.W. (ed.), *Grammatical categories in Australian Languages,* Canberra: Australian Institute of Aboriginal Studies. 331 -335.

Breen, J.G. 1981. Margany and Gunya. In Dixon, R.M.W. &Blake, B.J. (eds), 275-393.

Busby, P.A. 1980. The distribution of phonemes in Australian Aboriginal languages. In Papers in Australian Linguistics No. 14. Canberra: *Pacific Linguistics.* 73-139.

Capell, A. 1956. *A new approach to Australian linguistics.* Sydney: Oceania Linguistic Monographs.

Carrol, P.J. 1976. *Kunwinjku: a language of Western Arnhem Land.* MA Thesis, Australian National University, Canberra.

Chen, M.Y. & Wang, *W.S.-Y.* 1975. Sound change: actuation and implementation. *Language* 51.255-281.

Cook, A.R. 1987. *Wagiman Matyin: a description of the Wagiman language of the Northern Territory.* PhD thesis, La Trobe University

Dixon, R.M.W. 1980. *The Languages of Australia.* Cambridge: Cambridge University Press.

Dixon, R.M.W. & Blake, B.J. (eds). 1979. *The Handbook of Australian Languages,* Volume 1. Canberra: Australian National University Press.

Dixon, R.M.W. & Blake, B.J. (eds). 1983. *The Handbook of Australian Languages,* Volume 3. Canberra: Australian National University Press.

Glasgow, D. & K 1967. The phonemes of Burera, *Papers in Australian linguistics,* No. Canberra: Pacific Linguistics. 1-14.

Glasgow, K. 1981. Burarra phonemes. In Waters, B. (ed.), *Australian Phonologies: Collected Papers.* Wrk Papers of SIL-AAB, A5. Darwin: Summer Institute of Linguistics. 63-89.

Hale, K. 1976a. Phonological developments in particular Northern Paman languages. In Sutton, P. (ed.), *Languages of Cape York.* Canberra: Australian Institute of Aboriginal Studies. 7-40.

Hale, K. 1976b. Wik reflections of Middle Paman phonology. In Sutton, P. (ed.), *Languages of Cape York.* Canberra: Australian Institute of Aboriginal Studies. 50-60.

Heath, J. 1978. *Ngandi Grammar, Texts and Dictionary.* Canberra: Australian Institute of Aboriginal Studies.

Heath, J. 1980a. *Basic materials in Ritharngu: grammar, texts and dictionary.* Pacific LinguisticsSeries B, No. 62. Canberra: Pacific Linguistics.

Heath, J. 1980b. *Dhuwal (Arnhem Land) texts on kinship and other subjects with grammatical sketch and dictionary.* Oceania Ungjñsfic Mcncgra1is No. 23. Sydney: University of Sydney.

Johnson, S. 1974. *A Phonetic and Phonological Survey of Kugu Uwanh and Wik Iyanh.* Honours sub-thesis in general linguistics, University of Queensland.

Kennedy, R.J. 1981. Phonology of Kala Lagaw Ya in Saibai Dialect. In Waters, B. (ed.), *Australian Phonologies: Collected Papers.* Work Papers of SIL-AAB, A5. Darwin Summer Institute of Linguistics. 103-137.

Klokeid, T.J. 1969. *Thargari phonology and morphology.* Canberra Pacific Linguistics

Maddieson, I. 1984. *Patterns of sounds.* Cambridge: Cambridge University Press.

McDonald, M. & Wurm, S.A. 1979. *Basic Materials in Wankumara (Galali): Grammar, Sentences and Vocabulary.* Pacific Linguistics, Series B, No. 65. Canberra: Pacific Linguistics.

McKay G.R. 1975. *Rembarnga: a language of Central Arnhem Land.* PhD thesis, Australian National University, Canberra.

McKay G.R. 1984. Stop alternations in Ndjebbana (Kunibidji). In *Papers in Australian Linguistics* No. 16, 171-327. Canberra: Pacific Linguistics.

Merlan, F. 1982. *Mangarayi.* Lingua Descriptive Series, Vol. 4. Amsterdam: North Holland

Merlan, F. 1983. *Ngalakan grammar, texts and vocabulary.* Pacific Linguistics, Series B, No. 89. Canberra: Pacific Linguistics.

Morphy, F. 1983. Djapu, a Yolngu dialect. In Dixon, R.M.W. & Blake, B.J. (eds), 1-188. O'Grady, G.N., Voegelin, C.F. & Voegelin, F.M. 1966. *Languages of the world: IndoPacific Fascicle 6.* Anthropological Linguistics 8 (2)

Robertson, C. 1985. *Ngalkagarla Ngandrangu Yawarranha Nhanha Wangkumadanha: Let's Learn Wangkumara!* Sydney: Aboriginal Education Unit.

Schebeck, B. 1974. *Texts on the Social System of the Adnyamathanha People with Grammatical Notes.* Canberra: Pacific Linguistics, Series D, No. 21.

Schebeck, B. 1976. Thangu and Adnyamathanha. In Dixon, R.M.W. (ed.) *Grammatical Categories in Australian Languages.* Canberra: Australian Institute of Aboriginal Studies. 516-550.

Schebeck, B. 1987a. Adnyamathanha-English Dictionary and English- Adnyamathanha Finder list. La Trobe University, ms.

Schebeck, B. 1987b. A Note on Kungkatutyi. La Trobe University, ms.

Simpson, J. and Heath, J. 1982. Waramungu sketch grammar. Massachusetts Institute of Technology, ms.

Sommer, B.A. 1976. Umbuygamu: the classification of a Cape York Peninsula language. In *Papers in Australian Linguistics* No. 10. Canberra: Pacific Linguistics. 13-31.

Street, C.S. & Mollinjin, G.P. 1981. The Phonology of Murinbata. In Waters, B. (ed.) *Australian Phonologies: Collected Papers.* Work Papers of SIL-AAB, A5. Darwin: Summer Institute of Linguistics. 183-244.

Trefry, D. 1984. Diari segmental phonology. In *Papers in Australian Linguistics* No. 16. Canberra: Pacific Linguistics. 171-327.

Tryon, D. 1974. *Daly Family Languages, Australia.* Pacific Linguistics Series C, No. 32. Canberra: Pacific Linguistics.

Tunbridge, D. 1988. Affixes of motion and direction in Adnyamathanha. In Austin, P. (ed.), *Complex Sentence Constructions in Australian Languages.*. Amsterdam: John Benjamins. 267-283.

Walker, A 1984. The Yolngu stop controversy: Wood's Prosodic Hypothesis Revisited. Paper presented at Australian Linguistic Society annual conference, Alice Springs.

Walsh, M.J. 1976. *The Murinypata Language of North-West Australia.* PhD thesis, Australian National University, Canberra.

Wang, W.S.-Y. 1969. Competing changes as cause of residue. *Language* 45, 9-25.

Waters, Bruce E. 1980. Djinang phonology. *Papers in Australian Linguistics* No. 14. Canberra: Pacific Linguistics. 1-71.

Wurm, S.A. 1972. *Languages of Australia and Tasmania.* The Hague: Mouton.

Yallop, C. 1982. *Australian Aboriginal Languages.* London: Andre Deutsch.

AUSTRALIAN ABORIGINAL LANGUAGES: CONSONANT-SALIENT PHONOLOGIES AND THE â€˜PLACE-OF-ARTICULATION IMPERATIVEâ€™ Andrew Butcher Department of Speech Pathology & Audiology, School of Medicine Flinders University, Adelaide and Research Centre for Linguistic Typology La Trobe University, Melbourne To appear in: In JM HARRINGTON & M TABAIN (eds): Speech Production: Models, Phonetic Processes and Techniques New York: Psychology Press.Â On the other hand Australian sound systems are rich in contrasts which depend on rapid spectral changes in the middle of the frequency range. 1988. Phonological voicing contrasts in Australian Aboriginal languages. La Trobe Working Papers in Linguistics 1, 17â€“42. Blevins, Juliette & Marmion, Doug.Â 1999. What speakers of Australian Aboriginal languages do with their velums and why: The phonetics of the nasal/oral contrast. In Ohala, John, Hasegawa, Yoko, Ohala, Manjari, Granville, Daniel & Bailey, Ashlee C. (eds.), 14th International Congress of Phonetic Sciences (ICPhS XIV), Berkeley, University of California, 479â€“482. Butcher, Andrew. 2004. â€˜Fortis/Lenisâ€™ revisited one more time: The aerodynamics of some oral stop contrasts in three continents. Clinical Linguistics and Phonetics 18, 547â€“557. Butcher, Andrew. Australians use many words from Aboriginal languages. Aboriginal words are still added to the Australian vocabulary, and meanings are not what you expect.Â When Australian artist Ben Quilty was young, he took a road trip during which he hoped to "learn Aboriginal" along the way, picking up a book on the Pitjantjatjara language. It wasn't until he met a young Aboriginal man that he learned an important lesson. "We showed him the book," recalls Quilty, "and he said, 'Why you learning that mob's language?' Australian languages have been noted for a degree of similarity between phonological inventories of contrastive segments that is exceptional and unexpected in light of the phylogenetic and geographical breadth of the family, the level of diversity observed in vocabulary and aspects of grammar, and the level of phonological diversity found in comparably-sized families of languages elsewhere in the world.Â Table 4 provided some evidence that apical nasals are more frequent in Australian languages than apical stops, and that retroflex laterals are the least frequent of the sonorant apicals. An articulatory study of the alveolar versus retroflex contrast in pre- and post-stress position in Arrernte. Article. Jan 2020.