

TAPS, STOPS & TRILLS

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1. INTRODUCTION¹

I should begin by explaining, for the benefit of those readers who have not worked in Alice Springs in recent years—perhaps a sizeable minority of Australianist linguists—the local reference in the title of this paper.

Finke is a tiny publess town, situated near the lower reaches of the mighty river of the same name, most notable of the famous dry rivers of Central Australia and reputedly the oldest river in the world. The term ‘mighty’ is not mine and is not used sarcastically; on the rare occasions when it does explode into life it is most impressive, even awesome, and thoroughly deserving of the respect implied by the enormous railway bridge which spans it.

One of the sporting institutions of Alice Springs, ranking alongside Henley-on-Todd—the famous dry riverbed regatta—and the Camel Cup, is the Finke Desert Race. This is a two-day motorcycle race (with, in recent years, sections for cars as well) starting and finishing outside Alice Springs and overnighing at Finke (220 km each way). Competitors start one at a time and risk their necks hurtling down the narrow winding track over the sandhills. The road is, of course, closed to the general public for the weekend; most wouldn’t venture near it anyway, as the alternative route, though 180 km longer, is safer and faster.

A few years ago sponsorship for the race was taken over by a local supplier of bathroom equipment called Taps, Tubs & Tiles Pty Ltd. And the race was renamed the Taps, Tubs & Tiles Desert Race! Protests were feeble and in vain; I suppose we should be grateful they didn’t change the name of the town and the river as well. Anyway, it’s over now. The sponsorship has changed and the name has been restored.

When Michael Walsh invited me to contribute to this volume my reaction was, “Gee, I’d like to, but I can’t think of anything to write”. It was only later, while teaching the world’s first Wambaya literacy course, that my attention was drawn again to the relationship between taps/trills and apico-alveolar stops. And so here I am, thumbing my nose at those parochial plumbers, who will never have the slightest inkling of this, and in the same movement raising my voice, in a small way, in the chorus of praise to one of the legends of Australian linguistics.

¹ I am grateful to Peter Austin, Bob Dixon, Mary Laughren and David Nash for their helpful comments on an early draft of this paper.

2. SERIOUS INTRODUCTION

O'Grady's (1990a:xxi) idea of the sound system of Proto Pama-Nyungan differs from Dixon's (1980:158) idea of the sound system of Proto Australian in two important respects:

- (i) O'Grady now postulates two series of apical consonants while Dixon has only one;
- (ii) O'Grady groups the retroflex glide **/r/* with **/y/* and **/w/* as semivowels and has **/rr/* in a manner group on its own, while Dixon groups **/r/* and **/rr/* together as rhotics and **/y/* and **/w/* together as semivowels.²

Leaving aside the difference—which may be rather academic—that O'Grady is talking about Pama-Nyungan and Dixon about Australian, I will put forward some thoughts about these competing analyses. I consider first some dangers arising from the enthusiastic and seemingly uncritical acceptance of the rhotic grouping. I then survey some languages in which the opposition between apico-alveolar stop and apico-alveolar tap seems to have been lost. The next section deals with cases where these sounds approach more closely than usual to complementary distribution. Then I compare the phonotactics of the rhotic sounds with one another and with the phonotactics of glides.³ Finally, I indulge in some speculation concerning language change.

3. THE RHOTIC BLOCK

The term 'rhotic' was introduced over twenty years ago (Dixon (1980:144); see also McGregor (1988:166)) and was uncritically, it seems, adopted by a number of linguists. It has been questioned more recently; see McGregor (1988), Alpher (1988) and (briefly) Breen (1992:40–41). It is, perhaps, strange that it was not criticised earlier; the arrangement of the rhotics in Dixon's phonemic chart of Pitta-Pitta (1980:160), with the tap seemingly having its own unique place of articulation, cries out for comment.⁴

A danger of an over-enthusiastic adoption of such a concept is a procedural weakness it may lead to; if a sound is thought of as part of a group, the linguist feels a constraint against considering any analysis which would lead to its removal from this group.

For example, Dixon (1980:175) considers the possibility that the alveolar stop and lateral in Proto Australian belonged to a single phoneme. Such speculation is possible because the reconstructed sound system Dixon was considering had only one lateral. In some modern languages, such as Wangkumara (see further below), there is an apico-alveolar stop of very restricted distribution. This could be considered to be in complementary distribution with a number of other phones; the most phonetically similar are the apico-alveolar lateral and tap. From memory, I don't think I even considered the lateral as a possibility, and I was no doubt

² My orthography, used when not quoting or using an established practical orthography of a language, has the following features worth mentioning: I use 'r' for the retroflex glide, 'rr' for the other rhotic sound in the language if there is only one and if it is phonemically distinct from a voiced apico-alveolar stop, and for the trill if a language contrasts tap and trill, 'd' for the tap if it contrasts with a trill or if it is in complementary distribution with a stop, 'dj' and 'tj' for voiced and voiceless lamino-palatal stop.

³ I include the retroflex rhotic whenever I use the term 'rhotics' or the term 'glides'. There is no contradiction in this, as I use 'glide' as the name of a manner class and 'rhotic' as the name of a useful grouping of sounds with members belonging to two or three (or even four) manner classes. I have used the term 'semi-vowel' only for *y* and *w*.

⁴ Says he, having not noticed it himself until recently. (There is, of course, no suggestion that this actually represented Dixon's idea of the point of articulation of the tap.)

strongly influenced by the fact that the apico-alveolar lateral is just one of a set of four well-established laterals in Wangkumara, whereas the tap is on its own and fair game for reassessment. (There are, however, other reasons for preferring the tap.)

In the same way, the belief that the tap/trill and the retroflex glide belong together tends to inhibit consideration of other possibilities: you can't meddle with one without breaking up the group. The rhotic bloc leads to a rhotic block, blinding linguists to the possibility that the tap (or alveolar flap, as it is frequently called) might not be phonologically distinct from the apico-alveolar stop. This is despite the fact that there are dialects of English in which a tap is an allophone of /t/ (see, for example, Jones (1958:71)).⁵

Examples abound; I choose some from Volume 3 of the *Handbook of Australian languages* (Dixon & Blake 1983). Morphy (1983:20) gives for Djapu minimal pairs for some "critical pairs of phonemes": /i/ vs /u/ vs /a/; /a/ vs /a:/, /i/ vs /i:/, /u/ vs /u:/; /t/ vs /ṭ/ (underlining denotes retroflexion), /ṭ/ vs /ḍ/, /n/ vs /ṇ/, /l/ vs /ḷ/, /th/ vs /tj/, /nh/ vs /ny/; /r/ vs /rr/ (i.e. glide vs trill); /d/ vs /r/, ' (i.e. glottal stop—not analysed as a segmental phoneme, however) vs zero, /r/ vs /ḷ/. She does not give any minimal pair for /t/ vs /rr/. In fact, a search through the thousand-odd items of her published vocabulary reveals no such minimal pair. Furthermore, a count reveals that /t/ is quite rare: for example, intervocalically after a stressed vowel there are three instances of /t/, 55 of /rr/, intervocalically later in the word the figures are two and 35, word-finally three and 40.⁶ There is, however, no question that /t/ is phonemically distinct from /rr/; note such sub-minimal pairs as *datam* 'waterlily sp.' / *darramu* 'man' and *mattjurr* 'flying fox sp.' / *marrtji* 'to go'. The grouping of /rr/ with /r/ as exhibiting a rhotic manner of articulation does seem to be justified for Djapu; unlike many languages, Djapu has *rC* clusters and the phonotactics of /rr/ and /r/ are quite similar.

Similarly, Keen (pp.195–196 in the same volume) does not include the pair /t/—/rr/ (/r/ in her spelling) among the consonant pairs for which she feels it necessary to provide evidence of phonemic contrast for Yukulta, despite the fact that she points out that the distinction between these two phonemes tends to be lost in fast speech. In fact, there is at least one minimal pair: *ngarra* 'we dual exclusive' / *ngata* 'I (nominative)' and a number of sub-minimal pairs, as well as oppositions in bound morphemes. Nevertheless, there is not a great deal of opposition between the two: /t/ is never the first member of a cluster nor /rr/ the second; only /t/ can begin a word (and then rarely); intervocalically /rr/ outnumbers /t/ about ten to one. Phonotactically, /r/ is quite different from /rr/: /r/ can begin a word but /rr/ cannot; /r/ cannot occur root-finally but /rr/ can; /r/ cannot occur in consonant clusters while /rr/ does commonly. There does not seem to be much justification for grouping /r/ with /rr/ rather than with /y/ and /w/. (Note, by the way, that Yukulta is currently classified as non-Pama-Nyungan; see Blake (1988).)

It may well be, of course, that both Morphy and Keen did satisfy themselves that these two sounds were phonemically distinct. I emphasise that both of them have come up with what seems to be a correct analysis, if not necessarily the best arrangement of the phonemes. The point is that they did not feel the need to provide the evidence.

⁵ Note also that Aboriginal native speakers of English who are partial speakers or non-speakers of their Aboriginal language and are attempting to acquire literacy in that language have, in my experience, perhaps more difficulty with the /rr/ - /t/ contrast than with any other. This is so even when the phoneme /t/ tends to be voiced in the language. A similar observation is made by Schmidt (1985:195) about Dyirbal non-speakers.

⁶ In this count, and others referred to later, I have disregarded loan words (if I have noticed them).

The danger in neglecting to consider the question of phonemic opposition between tap/trill and stop is well illustrated by another grammar in the same volume. This is the grammar of Nyawaygi by Dixon (1983). In this case, Dixon, although the foremost protagonist of the 'rhotic' concept, did *not* neglect to consider the question, and indeed found no contrast between them. He found (p.438) that there was "a phoneme that combines rhotic and stop allophones; it is normally realised as an apico-alveolar stop [d] after a consonant and as an apico-alveolar trilled rhotic [r] in all other environments (that is, word-initially, word-finally, preconsonantly and intervocalically)". Dixon (pp.449–450) shows that this situation has probably arisen in the fairly recent past by straightforward phonological changes.⁷

This [r]—[d] phoneme could be written as /rr/ on the grounds that [r] is its unmarked realisation, or as /d/, to give a neater phoneme chart and more specifically to preserve the generalisation that there is a one-to-one correspondence between oral stops and nasals in Australian languages. Dixon (pp.439–440) prefers to leave the matter open and to write *d* or *r* (his spelling of this sound) according to the environment (and to the pronunciation).

4. THE BATHROOM PHONEME

This bathroom phoneme, as I will call it because of its bringing together the tap or tile with the apico-alveolar tub, is found as an areal feature of a number of languages, belonging to a variety of genetic groups, in south-west Queensland and north-east South Australia.

When writing my grammar of Bidjara and Gungabula (Breen 1973), I used 'd' (for apico-alveolar stop) and 'rr' (apico-alveolar tap), but admitted (pp.221–222) that I had been unable to find any convincing pairs to demonstrate an opposition between them. I suggested that they might belong to a single phoneme, with [d] word-initial and in the environments /i-i (e.g. in *yidi* 'smell') (however, note that this rule gives precedence to another in a certain circumstance, as detailed below), /rrV_V (e.g. in *garrudu* 'brolga' and *Budhurradala*, a placename) and /n_ (as in *gundu* 'away'); both occur in free variation in /a_i (*barri* ~ *badi* 'to cry', *gambarri* ~ *gambadi* 'far') and /a_Ci (*badbirda* ~ *barrbirda* 'echidna'); [ʌ] in /i_idi (*Dhirridi*, a personal name), in /V₁CV₂ (where we do not have both V₁ as /a/ and V₂ as /i/, e.g. *warrgu* 'bad'), in other (i.e. most) intervocalic environments and word-finally. The situation was not straightforward; for example, I pointed out that *wan-gadi* 'hard, strenuous' was common but *wan-garri* had not been heard.

Fieldwork that year provided further confirmation of this (Breen 1974), although there was (and remains) still room for doubt. In that document I suggested a consonant chart as in Table 1 in which [d] is an allophone of /rr/.

⁷ Note that **d* has become *rr* in some environments and *r* in others, thus providing some evidence for a grouping of *rr* and *r* even in this language.

TABLE 1: BIDJARA CONSONANTS (VERSION 1)

<i>b</i>	<i>dh</i>		<i>rd</i>	<i>dy</i>	<i>g</i>
<i>m</i>	<i>(nh)</i>	<i>n</i>		<i>ny</i>	<i>ng</i>
		<i>l</i>			
		<i>rr</i>			
<i>w</i>			<i>r</i>	<i>y</i>	

In Breen (1990a) I used 'd' instead of 'rr', thus implying the chart in Table 2 in which [ɹ] is an allophone of /d/.

TABLE 2: BIDJARA CONSONANTS (VERSION 2)

<i>b</i>	<i>dh</i>	<i>d</i>	<i>rd</i>	<i>dy</i>	<i>g</i>
<i>m</i>	<i>(nh)</i>	<i>n</i>		<i>ny</i>	<i>ng</i>
		<i>l</i>			
<i>w</i>			<i>r</i>	<i>y</i>	

However, another alternative is as in Table 3.

TABLE 3: BIDJARA CONSONANTS (VERSION 3)

<i>b</i>	<i>dh</i>	<i>d</i>	<i>dy</i>	<i>g</i>
<i>m</i>	<i>(nh)</i>	<i>n</i>	<i>ny</i>	<i>ng</i>
		<i>l</i>		
		<i>rr</i>		
<i>w</i>		<i>r</i>	<i>y</i>	

The last is the neatest, but phonetically a little unusual in that the apical stop is often retroflexed (perhaps to maintain the contrast with /rr/ in its stop allophone) but the nasal and lateral never are. A phonotactic fact that favours the second arrangement is that the retroflex stop can occur as the first member of a cluster and word-finally, thus paralleling the phoneme /d/ in that chart.

Note that one of the relevant features is a dissimilation which prevents two apico-alveolar stops or two taps occurring intervocalically in successive syllables. A similar process will be noted for Wangkumara (see below) and for Wambaya (a non-Pama-Nyungan language; see §5). In some other languages, such as Arrernte, a similar situation is resolved by a dissimilation in which *tVt* becomes *tVrt* or *rrVrr* becomes *rrVr* (which does point to a grouping of /rr/ with /r/).

Bidjara clearly has lost the already limited opposition between the tap and the stop when earlier intervocalic stops have been lenited to taps. For example, *badi* ~ *barri* 'to cry' is a reflex of a protoform, **pati*, of some depth: it occurs in Mari and Pama groups as well as some other groups of north-east Queensland, being one of the words quoted by Dixon (1983) in his study of Nyawaygi. Another reflex of a widespread term is *nguda(n)* 'dog'; compare Proto Pama **kutaka*, which may be **nguta* in Proto Mari (as it is in Gunya, south of Bidjara). Other words comparable with other Mari languages are *wada* 'to play, dance' (*wata* in Gunya) and *mudun(a)* 'shingleback lizard' (*mutun* in Margany and Gunya). There are also, of course, examples of a tap corresponding to a Proto Mari tap or trill, such as *mudu* 'nulla-nulla' and *gudi* 'blanket' (both with trills in Margany and Gunya).

Kungkari and Pirriya (Breen 1990a, Chapters 2 and 3) were spoken to the west of Bidjara, separated from it by some little-known dialects which were closely related to Bidjara

(Breen 1990a, Chapter 4). They cannot be related to either of the major language groups of the area—Mari (which includes Bidjara) to the east and Kama to the west and south, and they are of unclear relationship to one another (Breen 1990a:159–163). The data on both, especially Pirriya, are very limited. They distinguish three rhotic sounds, trill, tap and glide, but the tap is grouped with a voiced apico-alveolar stop which occurs only in the cluster /nd/. The tap is chosen to be grouped with the stop on the grounds of phonetic similarity.⁸ /d/ is thus always voiced; the other five stops are basically voiceless.

Margany and Gunya, south and south-west of Bidjara and closely related to it, were described by Breen (1981a). These have a voicing distinction in stops, of limited distribution. The tap is grouped with the voiced apico-alveolar stop as /d/ and is regarded as a lenited form. Some of the other voiced stops: /b/, /g/ and /dh/ but not /dy/ or /rd/⁹ have lenited intervocalic allophones in the form of voiced fricatives. The classification of /d/ as a stop is supported also by the parallelism with /rd/ in that both can occur word-finally¹⁰ (but only /d/ can be first member of a consonant cluster). The voiceless stops, characterised intervocalically by length, are not common, but some words containing them seem to be direct descendants of Proto Mari forms. These include *nguta* ‘dog’ (in Gunya; *nguda* in Margany), *bati* ‘to cry’ (in Gunya; Margany has *badi*), *ngatju* ‘my’, *gatja* ‘rotten’, *yatju* ‘flame’ and *nuka* ‘to taste’ (the last two only in Margany), all of which are ancestral to both Mari and Pama groups. Note, however, that phonetically voiced stops are the norm in Mari languages. It seems quite likely that the voicing distinction has been borrowed from languages to the west, even though the actual forms illustrating it were not (as Austin (pers. comm.) first pointed out to me). Note also the differences between Margany and Gunya words in some cases, indicating some difference in the lenition rule. (See also Breen (1981a:298) and Austin (1988b).) Both the tap /d/ and the trill /rr/ can be related to the Proto Mari /rr/ in some words; for example, *magida* ‘copi (gypsum), clay’ is phonetically the same as *magirra* in Gudu-Badhun while *dharra* [d́ára] ‘thigh’ corresponds to *dharra* [d́ára] in Gugu-Badhun.

Wangkumara (Breen 1981c, 1981d; see also McDonald & Wurm 1979) was spoken to the west of Margany, but is not closely related, belonging to the Kama group (Breen 1990a:156–157). Like its neighbours to both east and west, it has a voiced/voiceless distinction in stops and three rhotics, of which one, the tap, is grouped with the voiced apico-alveolar stop as a phoneme /d/. The stop allophone of /d/ does not occur intervocalically except as a result of dissimilation; thus an expected **burrarra* ‘will tell’ (with purposive inflection *-rra*) becomes *budarra* and the /d/ is realised as a stop. The rule regarding this dissimilation is not clear; note the word *puliwarrida* ‘will fall down’, in which it is the second of the underlying trills that has become a stop (and compare the similar situation described above for Bidjara).

⁸ The reference to *d* occurring as the first member of a cluster (Breen 1990b:24) is incorrect and should be deleted.

⁹ But there is a cross-dialectal correspondence between /rd/ in Gunya and /r/ in Margany in a number of words.

¹⁰ There is a typographical error on page 291 of Breen (1981a): “Phonemes which can occur word-finally are the vowels, apical nasals and laterals (but there are no confirmed examples of final retroflex lateral voiced stops in Gunya), and /nʏ/”. This should read: “Phonemes which can occur word-finally are the vowels, apical voiced stops, nasals and laterals (but there are no confirmed examples of final retroflex lateral in Gunya), and /nʏ/”.

Wangkumara also has a trill-released stop (see also Austin (1988a)),¹¹ originally analysed as an allophone of the trill occurring word-initially and as second member of a cluster after /l/ or /n/. However, it is now thought to be a separate phoneme because it occurs intervocalically in at least two roots—*madri* ‘to hold’ and *kadra* ‘to pierce, to spear’. Another doubtful example is *padri* ~ *parri* ‘beetle’. It also occurs intervocalically across a morpheme boundary as in *dribidribi* ‘rough’. Word-initial examples include *draya* ‘tooth’, *dratja* ‘to bite’, *dridja* ‘to run away’ and examples in clusters include *-andru* ‘ergative suffix (allomorph)’, *nundri* ‘yam’, *puldru* ‘eye’ and *ildri* ‘tears’.

Yandruwandha (Breen 1975) was spoken to the west of Wangkumara and belongs to a different subgroup of the Kama group. In proliferation of consonants it has gone further than any other language of the area: it has six voiceless stops, six voiced stops, six nasals, two trill-released stops (/dr/ apico-alveolar and /rdr/ retroflex),¹² four laterals, one or two pre-stopped laterals, a trill and three glides. An apico-alveolar tap is combined with the corresponding voiced stop as the phoneme /d/, grouped with the voiced stop series.¹³ Of the apicals only /rd/ and /rdr/ can occur word-initially; /t/ is very rare intervocalically and quite uncommon in general. The pre-stopped lateral(s) can occur only intervocalically. Some relevant minimal and sub-minimal pairs are given in Table 4.

TABLE 4: DATA ON YANDRUWANDHA APICALS

<i>t</i>	<i>rt</i>	<i>d</i>	<i>rd</i>	<i>dr</i>	<i>rdr</i>	<i>rr</i>	<i>r</i>
		<i>kadawa</i> 'edge'	<i>kardakarda</i> 'saltbush'	<i>kadra</i> 'louse'	<i>kardra</i> 'yam'	<i>karra</i> 'to tie'	<i>kara</i> 'maybe'
	<i>martimarti</i> 'peewee (bird)'				<i>mardri</i> 'heavy'		
<i>kanta</i> 'over there'	<i>warnta</i> 'short'	<i>kanda</i> 'shallow'		<i>kandra</i> 'top'			
		<i>kadi</i> 'to chase'	<i>pardi</i> 'dangerous creature'	<i>kadri</i> 'brother-in-law'			
			<i>rdarla</i> 'skin'		<i>rdrama</i> 'to cut'		
			<i>martardaku</i> 'ankle'	<i>marnadraku</i> 'tooth'		<i>mararrala</i> 'crab'	
	<i>martardaku</i> 'ankle'		<i>mardanpa</i> 'lizard sp.'				<i>mararrala</i> 'crab'
	<i>warta</i> 'butt of tree'	<i>wada</i> 'to wait'				<i>warra</i> 'arrive'	<i>wara</i> 'who?'
<i>ita</i> 'away'						<i>irra</i> 'to wash'	

There may be some alternation between trill-released stops in simple stems and simple stops in compounds (e.g. *thadri* ‘bank (of river)’ / *thadipalapala* ‘both banks’). Austin (1988a) discusses the history of the trill-released stops in Yandruwandha.

¹¹ Austin (1988a) surveys the trill-released stops in this and several other languages dealt with in the remainder of this section and speculates on their history.

¹² Breen (1975) called these ‘pre-stopped trills’. Austin’s (1988a) designation ‘trill-released stops’ is more appropriate, however, especially for the Yandruwandha situation where the two are distinguished by a difference in the tongue position for the stop phase. Phonotactically, they are quite different from the pre-stopped nasals and pre-stopped laterals that occur in languages of this area (O’Grady, Voegelin and Voegelin 1966) and which occur neither word-initially nor in clusters. (I exclude here the Arandic area, where pre-stopped nasals do occur in these positions.)

¹³ Breen (1975) was still unsure on this point.

Dieri (Diyari, Diari) is one of the more southerly dialects in a chain¹⁴ in which the central and southern members seem to have a limited voicing distinction in apical stops, while the more northerly members extend it to at least some other points of articulation. It has the following apico-alveolar consonants (Austin 1981): voiceless stop, voiced trill-released stop, nasal, lateral, trill and tap. Retroflex consonants are voiceless stop, voiced stop, nasal, lateral and glide. The trill-released stop occurs only as second member of a cluster, following apical nasal or lateral. Since the trill occurs only intervocally and as a free variant of the tap in pre-consonant position, it and the trill-released stop are in a complementary distribution. Trefry (1970, 1984) would add a voiced apico-alveolar stop to the above list; he has it word-initially, as his version of what Austin identifies as a voiced retroflex stop, in a homorganic nasal-stop cluster, corresponding to a voiceless apico-alveolar stop in Austin's hearing, and in free variation with the tap intervocally.¹⁵ Trefry regarded the trill-released stop as an allophone of the trill; the stop phase can be plausibly explained as the first occlusion of the trill, which a hearer, especially perhaps an English-speaker, would hear as a stop. Certainly in duration it corresponds with an occlusion of a trill rather than a stop (1984: 318–319, note 10). Austin (1981:16–17) also grouped the two, but classified the phoneme as a voiced stop. Austin (1988a) gives reasons for regarding Trefry's analysis as inappropriate, but these are all based on comparison with neighbouring languages and so are valid only from a diachronic perspective. More recently Austin has ceased to group the trill-released stop with the trill; this is a logical step to take if diachronic criteria are to be used. Austin (1988a:225) demonstrates that the trill-released stop is a reflex of an earlier stop.

There is also a voiced retroflex stop in Dieri. Austin (1981) and Trefry (1984) point out that this sound is phonetically very short (at least intervocally) and often pronounced as a tap (or flap). It seems that the main reason (and a good one) for classifying it as a stop rather than a rhotic is the fact that (at least in Austin's hearing) it occurs word-initially and as the second member of a consonant cluster (following a homorganic nasal). The fact that it does not occur in a cluster following a homorganic lateral differentiates it from the trill-released stop, as does its intervocalic occurrence. In its word-initial occurrence it could be regarded as an allophone of /rt/.

The phonotactic complexity of the apicals in Dieri is illustrated in Table 5 (but with some simplification: I have not included the pre-stopped allophones of nasals and laterals). One way to reduce the inventory is to combine /dr/ (which is unique among the consonants in not occurring intervocally), with some other sound, and the obvious candidate is /rr/. Synchronically, it is not at all clear then whether this phoneme (/dr/) should be grouped with /rd/ and, if so, whether they should be classed as a type of stop or a type of rhotic. If Trefry (1984: 209–210) is correct, and a voiced apico-alveolar stop occurs in a homorganic nasal-stop cluster and in free variation with the tap intervocally, this could be grouped with the tap (and I have written both as 'd' in Table 5). In this case, it would be clear that this phoneme patterns with /rd/, and these would perhaps be more appropriately labelled as tap/flap rather than voiced stop. In fact, Trefry (1984:246–247) regards [d] as an allophone

¹⁴ According to my analysis (Breen 1971b:21–24), which, however, does not cover the southern end of the chain, comprising Thirrari and probably Pirlatapa (Austin 1990a). Austin (1990b) does not include the northernmost members of the chain, Mithaka and Karuwali, due, it seems to me, to a misunderstanding of a perhaps somewhat ambiguous passage in Breen (1971b).

¹⁵ I am not in a position to decide between the different versions of the phonetic facts as presented by Trefry and Austin. Certainly there are some serious phonetic errors in Trefry (1970), but this need not be justification for assuming that he was still making such errors in 1984.

of /t/ when it occurs word-initially or in a cluster following /n/, and of the tap when it occurs intervocally (in free variation with [ʎ]). Diachronically it is clear that the trill-released stops descend from plain stops, as Austin (1988a:225) shows.

TABLE 5: DIERI APICALS AND THEIR ENVIRONMENTS

stop	<i>t</i>		<i>VtV</i>	<i>nt</i>	<i>lt</i>				
stop	<i>rt</i>		<i>VrtV</i>	<i>rnrt</i>	<i>rlrt</i>				
(stop	<i>d</i>		<i>VdV</i>	<i>nd</i>)					
	<i>dr</i>			<i>ndr</i>	<i>ldr</i>				
	<i>rd</i>	<i>#rd</i>	<i>VrdV</i>	<i>rnrd</i>					
nasal	<i>n</i>		<i>VnV</i>	<i>nt</i>	<i>n(d)rr</i>	<i>np</i>	<i>nk</i>	<i>nm</i>	<i>nng</i>
nasal	<i>m</i>	<i>#m</i>	<i>VmV</i>	<i>mrt</i>	<i>mrd</i>	<i>mp</i>	<i>mk</i>		
lateral	<i>l</i>		<i>VlV</i>	<i>lt</i>	<i>l(d)rr</i>	<i>lp</i>	<i>lk</i>		
lateral	<i>rl</i>		<i>VrlV</i>	<i>rlrt</i>		<i>rlp</i>	<i>rlk</i>		
trill	<i>rr</i>		<i>VrrV</i>						
tap	<i>d</i>		<i>VdV</i>			<i>dp</i>	<i>dk</i>	<i>dtj</i>	<i>dth</i>
glide	<i>r</i>		<i>VrV</i>						

Thirrari was spoken to the south of Dieri and is very closely related. Austin (1988a:224–225) shows that the trill-released stop was a very recent innovation in this dialect. In the speech of the last speaker there is free variation between [nd] and [ndr] and between [ld] and [ldr]. Only [nd] and [ld] were recorded by Reuther, who worked on the language in the 1880s.

Ngamini was spoken to the north of Dieri, separated from it by the little-known dialect Karangura and a member of the same dialect chain. Austin (1991) has examined the available data on Karangura and finds that it was closely related, but not identical, to Ngamini. Ngamini had a voicing contrast in only the apical stops, and also a three-way distinction in rhotics—trill, tap and glide. The apico-alveolar voiced stop does not occur intervocally and is in complementary distribution with the tap. If the tap is regarded as an allophone of this stop this gives us a phoneme with almost the same distribution as the voiced retroflex stop: both occur intervocally and in clusters following the homorganic nasal.¹⁶ The fact that the voiced retroflex stop occurs word-initially while the apico-alveolar does not is not a problem; the apical distinction is lost initially in most of the Australian languages that have it.

The trill-released stop is in complementary distribution with the trill, and, disregarding the diachronic facts, I would analyse it as an allophone of the trill. Austin (1988a:225–228) does not disregard the diachronic facts and concludes that a change from stop to trill-released stop has been in operation but is incomplete.

The next member of the dialect chain north of Ngamini was Yaluyandi. Austin claims (1988a:221) that trill-released stops do not occur in this dialect, nor in any other languages of the region (i.e. excluding those discussed above). I believe he is correct about Yaluyandi, but the last two members of the chain, Mithaka and Karuwali, which were spoken to the east of Yaluyandi, do have them.

Mithaka, in which I have a few hours of fairly poor quality recording from two informants, seems to be rather similar in phonology to Yandruwandha: it has a voicing

¹⁶ There is also at least one example of /ld/. Austin (1988a:226, 228) is contradictory on this point. The tap does not occur initially in clusters except as what can be analysed as a variant of the trill.

distinction in perhaps all stop positions, apico-alveolar and retroflex trill-released stops which can occur intervocalically as well as in clusters and (probably only the retroflex one) word-initially, and the usual trill, tap and glide. It is likely that the tap and the voiced apico-alveolar stop can be combined into one phoneme. The voiced retroflex stop is the only plain stop that occurs word-initially.

Transcriptions at this stage are preliminary and tentative, but material from the fieldnotes seems to be very convincing on at least some points and it is supported by an early word list (Campbell 1899). Relevant examples (some from both informants) include:

pampu 'egg' / *kambu* 'calf (of leg)'

tjimpa 'black' / *kimba* 'blood'

ngapa 'water' / *wabala* 'nothing' (Campbell *napa* 'water' / *waba* 'no')

yungkindari 'crying' / *rnunggindari* 'giving' (In some cases, such as this pair, Campbell's spellings are ambiguous but can be interpreted as supporting mine.)

panytja 'knee' / *panydja* 'woman'

rdambu 'testicles', *rdirki*- 'to break', etc.

rdranga- 'to sing'

mardra 'stone' (Campbell *mudra*)

pandri- 'to hit' (Campbell gives *partindra* for both 'fight' and 'kill'; this includes the participial ending which is always *-nda*, not *-ndra*, so he may be mistaken in his placement of the *r*.)

windra 'spear' (also in Campbell)

thindrithindri 'willy wagtail' (and others with *ndr*)

yundu 'you (ergative)' / *yundra* 'far'

The only sources of Karruwali data are an anonymous word list in Curr (1886, II: 371–373) and a semi-anonymous list by 'W.H.W.' (1912). Examples (identified as C or W) include:

nappa (C), *ngappa* (W) 'water' / *woba* (C) 'no', *wabba* (W) 'none'

patchi (C), *patchy* (W) 'good' / *kudye* (C) 'sweet', *coogege* (W) 'good'

murdra 'tomahawk' and *murtra* 'stone' (both C)

purdra (W) 'to hold'

tunda (C), *tundra* (W) 'hair of head'

windra (C) 'war spear'.

It seems that these two dialects may have borrowed at least as extensively from Yandruwandha and Yawarrawarrka as any of the languages of the area (see Austin (1988a), especially pp.241–242).

Finally, returning to the other end of this same dialect chain, we find Pirlatapa.¹⁷ The very scanty data are covered by Austin (1990a). This dialect seems to have borrowed from Yandruwandha (to its north) as it has a trill-released stop intervocalically (*kadri* 'wife's brother') as well as in a cluster (*ngandri* 'mother', *pandri* 'to kill'—as well as *mandra* 'to kill', perhaps from Dieri, *mandru* 'two', *yundru* 'you (ergative)'). It does not seem to have a voicing contrast in stops, except perhaps for the apicals; compare *warda* 'where?' with the loanword *thirti* 'tea'. However, there is no indication in the corpus of any cluster *nd* that might contrast with *ndr*. In this it seems to resemble Dieri (as analysed by Austin).

5. PARTIAL CONTRAST BETWEEN TAP AND STOP

The tap/trill and apico-alveolar stop, in a typical Australian (or at least typical Pama-Nyungan) language, are in opposition in only a very restricted set of environments: commonly, neither occurs initially; the tap or trill occurs frequently as the first element in a consonant cluster and never as the second (i.e. normally final); the stop is rarely permitted as the first element, but occurs second in one very common cluster /nd/ or /nt/, and sometimes also in a lateral-stop cluster. Many languages allow the tap/trill but not the stop word-finally. The two are in opposition intervocalically. However, even this may be restricted, either in certain positions in the word or in normal (non-careful) speech.

Dixon (1983:440) refers, during his discussion of Nyawaygi phonology to a partial overlap between /d/ and /rr/ (his /r/) in the neighbouring languages Warrgamay and Yidiny. In both languages either of these phonemes can occasionally be heard as a tap [ɾ]. For Djabugay, Patz (1991:251) speaks of the difficulty of distinguishing between the two rhotics word-finally and between the trill and the apical stop in intervocalic position, especially following a stressed vowel. Another point, which she does not mention but which can be extracted from her alphabetical vocabulary (pp.332–345) is that the apical stop almost never occurs between unstressed vowels. I counted two instances of /d/ in this environment, and 82 of /rr/.

Counts of frequencies in some other languages also tend to suggest a loss of contrast between /t/ and /rr/ away from the stressed vowel. This is partly obscured by the fact that figures are lower for most intervocalic consonants in such positions (because many stems have only two syllables); nevertheless, the infrequency or absence of *t* in the third consonant position is notable in Tables 6 and 7.

An examination of the Pitta-Pitta vocabulary in Blake (1979b) gave the figures in Table 6.

TABLE 6: APICAL STOP AND RHOTIC COUNTS IN PITTA-PITTA

	/V ₁ _V ₂ (i.e. after primary stressed V)	/V ₂ _V ₃
<i>t</i>	7	1
<i>rt</i>	21	8
<i>d</i>	38	27
<i>rr</i>	65	32
<i>r</i>	24	24

¹⁷ I suspect that this name is really Pilardapa. I have heard it pronounced that way, and it seems to conform better to the phonotactics of this language group with *rd* as the initial consonant of the second element of what is most likely a compound.

In Alyawarr, as representative of Arandic languages, a count of a substantial vocabulary (about 1,500 words) gave the following figures for apical stops and rhotics.¹⁸

TABLE 7: APICAL STOP AND RHOTIC COUNTS IN ALYAWARR

	before primary-stressed V	after primary-stressed vowel	away from primary-stressed vowel
<i>t</i>	37	16	0
<i>rt</i>	47	76	19
<i>yt</i>	7	9	8
<i>rr</i>	51	94	65
<i>r</i>	39	74	45

According to Douglas (1981:204) /t/ and /rr/ are easily confused intervocalically in Watjarri and “may even be said to fluctuate in this position”. There is fluctuation also between /r/ and /y/. Austin (pers. comm.) found no contrast intervocalically between /rr/ and /t/ in Gascoyne—Ashburton languages, while in Kanyara languages he found that word-final /rr/ is realised as unreleased [t].

In Wambaya, /d/ and /rr/ seem to be almost in complementary distribution except intervocalically after the primary stressed (first) vowel. In this position I counted twelve occurrences of /d/ and 66 of /rr/.¹⁹ Word-initially and as second member of a consonant cluster only /d/ occurs. Unusually, /d/ as well as /rr/ can be first member of a consonant cluster; however, so can most of the other stops: /g/, /j/ and /rd/ (excluding only /b/). Intervocalically after a non-primary stressed vowel I counted 120 occurrences of /rr/ and six of /d/ (disregarding words like *dawudawurra*, a reduplication, and *gunggudabudabu*, obviously involving compounding and reduplication). Four of the occurrences of /d/ could be attributed to dissimilation: *lirrada* ‘black cockatoo’, *birrida* ‘grebe’, *magurridi* ‘bush coconut’ and *gardurradi* ‘sitting with legs straight’. The other two are *bayida* ‘elder sister’ and *nayida* ‘young woman’; there is a morpheme boundary before the *d* in *bayida* (at least) and the *da* seems to correspond to *rda* in other kinship terms. There is no instance of the sequence *ayirr*. However, there are two words with successive intervocalic *rrs*, *birrirri* ‘shake’ and *ngurrurra* ‘shadow’.

In a search through Zorc’s (1986) large (8,407 entries) dictionary of YolNu-Matha, which combines words from many dialects, some with a phonemic voicing distinction in stops and some without, I found only six examples of intervocalic *d* (two of them personal names with no other meaning) and 69 examples of intervocalic *t* (27 personal names). (I disregarded loanwords.) By contrast, considering **only** *b*-initial words (48 pages out of 286) I found (again counting only intervocalic positions) 181 *rrs*, 73 *ds* (i.e. *rds*), 16 *ts* (*rts*) and 84 *rs*. There was a handful of words with *t*-initial clusters, somewhat more with *tC* and hundreds of *rrCs* and *rCs*; *rrC* outnumbered *rC* about two to one.

This sample of languages, which I believe to be typical of many others (but certainly not all) suggests that a fair proportion of Australian languages are not far from a situation in

¹⁸ The first column of figures includes word-initial consonants (which are preceded by an underlying vowel; see Breen 1990b) as well as consonants preceded by an initial surface vowel; *yt* is a prepalatalised apical stop.

¹⁹ I used my literacy course word list, extracted from unpublished word lists by K.L. Hale and someone from the Institute for Aboriginal Development, and a draft of a dictionary being prepared by Rachel Nordlinger.

which an apico-alveolar stop is in complementary distribution with a tap or trill. Detailed comparative study should show in at least some cases whether the languages are moving towards that situation or away from it. For example, Dench (1991:131–132) notes that intervocalic /t/ is uncommon in other Ngayarda languages but not in Panyjima. Cognates suggest fortition of /rr/ (but this has not been investigated in detail). It is not uncommon for /t/ to be realised as a tap; /rr/ also may be a tap intervocalically, but is more commonly an alveolar rhotic continuant. A count of the type illustrated in Table 6 does not show any tendency for the *t/rr* contrast to be lost in unstressed positions, however.

6. RHOTIC PHONOTACTICS

Dixon (1980:159–167) compares the phonotactics of a sample of Australian languages (two from the north-east and two from the far inland) and finds that three have *r*-initial clusters. While he does not generalise and say that *r* is one of the common initial consonants in heterorganic clusters in Australia, his sample languages may give the false impression that this is so.

Since the phonotactics of *rr* and *r* are relevant to their grouping in a ‘rhotic’ manner of articulation, and it is well known that *rr* is one of the most common initial segments in heterorganic clusters (see Dixon 1980:166), it is worth surveying the occurrence of *rC* clusters. Furthermore, it is relevant to compare their occurrence with that of *yC* and *wC* clusters, and, in some cases, to compare their occurrence word-initially and word-finally. I have not compared the phonotactics of *l* with those of *rr* in detail, but it is noted that they are usually very similar. A similar survey has already been done by McGregor (1988) for a large area of the north-west and centre of Australia.²⁰

In many inland languages rhotics are not permitted initially, final consonants are not permitted, and /*rr*/ but not /*r*/ can occur as first member of a cluster. Both alveolar and retroflex nasals and laterals can occur as the first member of heterorganic clusters, so the prohibition of *rC* cannot be attributed to any neutralisation of apical contrast in this position. Pitta-Pitta (Blake 1979b) is a good example.²¹ Having dismissed these languages I will move to the north-east to begin my survey with a couple of specimens of languages that have undergone substantial sound changes in their reconstructable history.

Kunjen dialects (Sommer 1969) have numerous *rrC* and *rrCC* clusters, some of them quite common, as well as several *rC*, one *rCC* and one *rCCC*, several *yC* and two *yCCC* (but no *yCC*), and one *wC*. Mbabaram (Dixon 1991) has numerous *rrC* clusters and also *yb* and *yg*, but only two examples of *rg* and no others with /*r*/ . The two rhotics are the only consonants that cannot occur word-initially, while all rhotics and glides (among others) can occur finally.

²⁰ One language covered by McGregor is Warlpiri. Mary Laughren (pers. comm.) gives some additional interesting facts on Warlpiri, and suggests that the homorganic cluster **rrt* is not permitted because *rr* was originally an allophone of /*l*/ and geminates are not permitted in the language. This theory could be extended to many other languages. Other points she mentions include (briefly): (a) the *rt/rd* allophony in the Willowra dialect; and (b) the use of the cluster *tj* in Eastern Warlpiri, corresponding to *rtj* in other dialects; at least one correspondence of intervocalic *t* in one dialect with *rr* in another. Other points cannot be summarised in a short note.

²¹ The chart on page 189 which suggests that there are no *rnC* clusters is to be corrected; there are at least three words with *rnk* and one with *rnmm* in the vocabulary.

North-east Queensland languages typically lack a contrast between apico-alveolar and retroflex series, so any contrast between /rr/ and /r/ cannot be regarded as part of an overall apical contrast. Apart from the phonologically aberrant languages, and the partial exceptions mentioned in the next paragraph, they all permit initial apicals, but only stops and nasals, not lateral or rhotics. The other stops and nasals also can be initial. Apicals and palatals, other than stops, can occur finally. They permit *rrC*, *rC* and *yC* clusters (among others). Guugu Yimidhirr (Haviland 1979) is typical.

Gugu-Yalandji (Oates & Oates 1964a, 1964b) differs in that it permits word-final /w/. In Djabugay (Patz 1991) *rrC* is common but *rC* and *yC* are quite uncommon and /r/ seems to be closer to /y/ in this respect than to /rr/. In Yidiny (Dixon 1977) *rrC* is common but *rC* and *yC* are not infrequent. In Dyirbal (Dixon 1972) /rr/ forms part of nine different clusters, some quite common, /r/ takes part in only four, two quite rare and none very frequent, and /y/ takes part in twelve, most of them quite uncommon. The glide /r/ can occur initially in a word.

In Mari languages *rC* seems hardly (if at all) to occur. It may be possible in Gugu-Badhun but the facts are doubtful, as one might expect for a language known only from a few aged and not very competent speakers. Sutton (1973) lists the following words with *rg*: *gurgila*, a section name, *mirgi*, a placename (contrasting with *mirgi* 'coals'), *nargurru* 'bloodwood' or 'boxwood' and *yurmbu* 'pull, push'. Of these, *gurgila* corresponds to *gurgila* in other languages, and *nargurru* is doubtful because *narrguru* is given for 'coolibah' (and the names 'box' and 'boxwood' are often used to refer to coolibah). Sutton also gives two *r*-final words, *bagur* 'sword' and *yagir*, a placename, and again this is atypical of Mari languages. Both features may result from diffusion from languages like Dyirbal. This may also account for *y*-initial clusters, which do not occur in the southern members of the group. Final /rr/ (or /d/) is found in most languages of the group, but not in Margany and Gunya (Breen 1981a). The combination *rrC* is common, and as Mari languages either do not contrast two apical series or, if they do (Margany and Gunya), do not neutralise this contrast in clusters, the difference between *rr* and *r* is best attributed to a difference in manner of articulation.

New South Wales languages are generally conventional in disallowing rhotics and laterals initially and allowing /l/ and /rr/ but not /r/ finally (except in the west where all words are vowel-final). Clusters of *rrC* are permitted but clusters of *rC* are not; since there is no apical contrast (alveolar vs retroflex) this difference must be attributed to a manner of articulation difference. The inland languages Ngiyambaa (Donaldson 1980:46) and Yuwaalaraay (Williams 1980:23) do not allow any apical initially. They allow /y/ (but not /ny/) initially in clusters and word-finally.²² This contrasts with the situation in southern Mari languages, where /ny/ but not /y/ is found in these situations (and see Sutton (1973:37–42) on the change from ancestral /ny/ to /y/ in some northern Mari languages). Yaygir (Crowley 1979) has three rhotics, a voiced trill, a retroflex glide and a voiceless trill. Crowley shows that the voiceless trill has descended from an earlier retroflex glide following a long vowel. These are the only phonemes that are not permitted word-initially (although the contrast between /d/ and /l/ is neutralised in this position). Both *rrC* and *yC* clusters are permitted; Crowley does not list any clusters with the voiceless trill, but there does seem to be one on page 370. All four nasals, as well as /l/, /rr/ and /y/, can occur finally. In Gumbaynggir (Eades 1979) *rrC* clusters are, as usual, acceptable, *yC* and *wC* are uncommon and *rC* is not allowed. The

²² Austin (pers. comm.) points out that Yuwaaliyaay (a dialect of the same language as Yuwaalaraay) has lenited medial *r* to *y* or zero while *rr* remains unchanged.

nasals /n/ and /ny/ can also occur initially in heterorganic clusters. All four nasals, as well as /l/, /rr/, /y/ and /w/, can occur word-finally. In Baagandji (Hercus 1982:48) /r/ is extremely marginal in clusters: there is one example of *mh* (and, since /nh/ does not otherwise occur as second member of a cluster and interdentalals do not otherwise take part in heterorganic clusters, this must be regarded as doubtful).

In western Queensland only two languages are known to have *rC* clusters. One is Warluwarra (Breen 1971a). This language has some unusual features in its phonotactics, among which are a comparative paucity of *rr*-initial clusters and a handful of *rC* clusters. There are no *rrp* clusters at all (in a vocabulary of something over 1,000 items), ten *rrk*, twelve *rrh* (/h/ is a velar glide), one *rrw* and one *rrtj*. There are three *rh* clusters. There are also five examples of a retroflex fricative which is phonemicised as a geminate /r/.²³

The other is the non-Pama-Nyungan Lardil (Hale et al. 1981). This permits final /rr/ and /r/, although /rr/ alternates with /d/ in that position; *rrC* and *rC* clusters are permitted. There may be a complementary distribution between /rr/ and /d/ in clusters; /rr/ can be followed by stops, /w/ or (rarely) /y/ while /d/ can be followed by nasals (and in these clusters it itself alternates with the nasal /n/). There is a single word in the dictionary with *rmg*—*wurngeewurngee* ‘to drone, buzz (of bees)’, which could well be onomatopoeic. The related Yukulta (Keen 1983) does not permit *rC* clusters (although it does share with Lardil the unusual feature of *Cy*—as well as *Cw*--clusters).

The north-west Queensland languages Kalkutungu (Blake 1979a) and Ngawun (Breen 1981b) contrast alveolars and retroflexes in final consonants and do not allow glides in this position. Since they allow /rr/ but not /r/, this suggests that /r/ but not /rr/ is grouped with /y/ and /w/.

In north-east South Australia only Ngamini has *rC* clusters (*rp* and *rk*), but Austin (1988a:242) shows that these have arisen by a sound change in which /l/ or /rl/ has become /r/.

Clusters of *rC* seem to be an extremely marginal feature of the Western Desert dialects. Gugada has *rp* and *rk* according to Platt (1972). (Platt, incidentally, groups /r/ and /rr/ together as ‘continuants’.) Glass and Hackett (1970), who group /rr/ and /r/ together as ‘vibrants’, say that *rp* occurs across a morpheme boundary and *rk* intramorphemically. However, in the Ngaanyatjarra word list (Glass 1988) I found only three words involving a morpheme (*kuwar*: *kuwar-kuwarpa* ‘mad, confused’, *kuwarmara* ‘unable to understand’, *kuwartjingarnu* ‘caused to become confused’) and two English loanwords: *waarka* ‘work’ and *wiirpa* ‘wheat’. The two Western Desert dialects mentioned by McGregor (1988), Yankunytjatjara and Yulparija, do not have *rC* clusters.

Pintupi was one of Dixon’s (1980) sample of languages, referred to above. Its *rC* clusters are highly marginal. Hansen and Hansen (1978:39) make the cryptic comment that: “The infrequent occurrence of the apico-postalveolar rhotic (r) in consonant clusters is considered non-typical of desert dialects”. Any reader with experience with the Western Desert language will know that it is the occurrence of these clusters, not their infrequency, that is non-typical. Hansen and Hansen give eight examples and go on to say that: “In the speech of speakers from the South Eastern dialects, the apico-postalveolar rhotic (r) may fluctuate with the apico-alveolar (rr) in the above examples”. In the third edition of their very substantial

²³ This seems to be similar to the voiceless trill described by Crowley (1979) for Yaygir.

dictionary (Hansen & Hansen 1992) there are some discrepancies with the examples referred to above, but these seem to be due to inadvertent omission of either the *rC* form or the *rrC* form (K. Hansen pers. comm.). The closely related Kukatja also has a dozen or so examples of *rC* in a word list with thousands of entries (D. Nash pers. comm., referring to the then unpublished word list by A. Peile and H. Valiquette; see Valiquette (1993)).

Yindjibarndi (Wordick 1982) has *rC* clusters which, as the cognates Wordick gives with neighbouring languages show, are descended from *rlC* clusters. There is also a cluster *yk*. Watjarri (Douglas 1981) does not have *rC* clusters, while *rrC* is common. The alveolar/retroflex opposition is not neutralised in heterorganic clusters. Austin (pers. comm.) says that *rC* clusters are entirely absent from Western Australian coastal languages from Watjarri to the Pilbara.

Yolngu languages, as exemplified by Djapu (see §3), have *rC* and *yC* clusters, but */r/* does seem to be closer in its phonotactics to */rr/* than to the semi-vowels.

In Yanyuwa (Kirton 1967)²⁴ all rhotics and glides can occur word-initially but only */rr/* finally; *rrC* clusters are common, *rC* rare and *wC* and *yC* non-existent. Garrwa and Wanyi (Breen forthcoming) allow any consonant except */ly/* and */rr/* word-initially, while the permissible stem-final consonants, all rare, are */ny/*, */l/* and */rr/*. Glides do not occur initially in clusters. The status of these two languages with respect to Pama-Nyungan is unclear (Blake 1988).

The remaining languages to be considered in this section are all non-Pama-Nyungan. In Burarra (Glasgow & Glasgow 1967) all consonants can occur initially and finally. The number of *rrC* clusters is fairly limited. There are a large number of possible *rC* clusters, but most of them involve an apical second member. There are also a large number of *yC* clusters. In Iwaidja (Pym 1979) */w/*, */r/* and */y/* can occur word-initially but not finally, while */rr/* can occur finally but not initially. A third rhotic, a retroflex flap */rd/*, cannot occur in either position. Retroflexes other than */r/* cannot occur initially, while both retroflexes and alveolars (but not all of either set) can be word-final. A *w-r-y* grouping seems to be indicated by these facts; in particular, if */rr/* and */r/* were grouped together one would expect */rr/*, as the alveolar member of the pair, to be the one that occurred word-initially. There are a number of possible *rrC* clusters, but only two *rC* and two *rdC*. Heterorganic *nC* and *mC* are both found; *yC* is not permitted but *nyC* (including heterorganic) is. Heterorganic *ngC* is permitted, but not *mC* or *wC*.

In Umbugarla (Davies 1989) */rr/* is perhaps the only consonant that does not occur word-initially while it is one of the most frequent word-final consonants (as also is */r/*). Most consonants, but perhaps not */w/*, can occur finally. Both rhotics occur cluster-initially, while */y/* and */w/* do not. Laragia (Capell 1984) disallows only */l/* and */rr/* initially, while finally it allows plosives and nasals (other than retroflexes) but of the other consonants only */l/* and */rr/*. There are a number of *lC* and *rrC* clusters, as well as stop-initial clusters, but *rw* is the only *rC* permitted and *yC* and *wC* are not permitted. In Ngalkan (Merlan 1983) all apico-alveolars are extremely rare initially; there is only one example of morpheme-initial */rr/* and it is never word-initial. Retroflexes (including */r/*) are common initially. Any consonant can be word-final. There are a good number of *rrC* and *rC* clusters (more of the former), fewer *yC* and only two *wC* (one of them *wʔ*).

²⁴ Jean Kirton put in many years of dedicated work on this language and her recent death is a great loss to her Yanyuwa friends, to the Summer Institute of Linguistics and to Australian linguistics.

In Nunggubuyu (Heath 1984) /rr/, /r/, /w/ and /y/ can all occur initially and finally, although final /w/ is rare. There are many *rrC* and *rC* clusters, some *yC* (paralleling *nyC*) and few *wC*. The situation for *lC* is not noticeably closer to that for *rrC* than is that for *rC*. In Ngandi (Heath 1978b) there is a rule retroflexing all word-initial apicals except /rr/; this is part of a wider complementary distribution of the two apical series. However, initial /rr/ is very rare; Heath can quote only one example. The clusters *rrC* and *rC* are common, *yC* and *wC* much less so. Mara (Heath 1981) is similar except that word-initial /rr/ does not occur at all. Again in Alawa (Sharpe 1972) initial /rr/ is not permitted. This may be attributed to the loss of the alveolar/retroflex distinction in this position, although other initial apicals are interpreted as alveolar. There seems to be some justification for challenging this interpretation (see Merlan 1983:9). Initial /r/ is not very common; /rr/ is much more common and less restricted in clusters than /r/ or /y/ while there is only one permitted *wC* cluster.

Tiwi (Osborne 1974) is, not surprisingly, atypical among Australian languages in not having *rrC* or *lC* clusters. It has *rC* 'clusters' only because retroflex stop, nasal and lateral are analysed as /r/, /rn/ and /rl/ respectively;²⁵ /rr/ never occurs initially, while /r/ and /l/ rarely do.

Maranungku (Tryon 1970) has the usual two rhotics, classed as alveolar resonants. /rr/ is not word-initial at all, otherwise all consonants can occur both initially and finally. The clusters *rrC* and *rC* are permitted, although much less freely than *lC*, while *yC* is restricted to *yt* and *ytj* and there is no *wC*. In MalakMalak (Birk 1976) the two rhotics are among the three consonants that cannot occur word-initially or as the second member of a cluster; the other is /ly/. There are no word-final restrictions on single consonants. There are a large number of clusters and very few restrictions on their composition; one is mentioned above and another is that there are no *yC* or *wC* clusters, however, *rrC* and *rC* clusters are common and have a similar distribution to *lC*. Finally, in Jingulu (Chadwick 1975) the two rhotics are an alveolar trill and a retroflex flap. The trill is never word-initial, while the two rhotics are among the restricted set of phonemes that can occur finally. Both rhotics can occur as first member of a cluster, while /y/ and /w/ cannot.

Another feature of the Top End of the Northern Territory, not referred to above, is the presence in most languages (including the Pama-Nyungan YolNu languages) of *Cy* clusters. *Cr* is permitted too in several languages while *Crr* is permitted (but rarely) in Nunggubuyu and Burarra. These languages all permit *Cw* too, but these (especially /w and *rrw*) are common (but not generally frequent) in many languages in other parts of Australia.

7. DISCUSSION

There seem to be two areas where the glide /r/ commonly occurs as the first member of a consonant cluster. One of these is north-east Queensland and the other the Top End of the Northern Territory.

A comparison of the phonotactics of liquids and glides in some north-east Queensland languages suggests a division into three groups:

/y/ occurs word-initially, word-finally and as the first member of consonant clusters;

/l/, /rr/, /r/ do not normally occur initially but occur in the other positions;

²⁵ See Breen (1992:39-40) for a criticism of this analysis.

/w/ occurs initially but not in the other positions.

There is no phonotactic reason to link /rr/ with /r/ in preference to /l/.

In the Top End *rC* clusters seem to be an areal feature, occurring across a wide variety of languages, both Pama-Nyungan and non-Pama-Nyungan. However, /rr/ is unusual among consonants in this area in that it is rare or disallowed word-initially (as it is in most of Australia). The semi-vowels /y/ and /w/ pattern fairly well together, given their articulatory differences. The glide /r/ resembles /l/ in its phonotactics more than it does /rr/ or the semi-vowels. /rr/ seems to belong in a single-member group in some languages, but may be logically grouped with /r/ in some languages that have two apical series.

It seems, therefore, that there may be no region (though there may be individual languages) in which a grouping of /rr/ with /r/ is indicated by the phonotactics.²⁶ Still less is it appropriate for Australia as a whole (see McGregor 1988).

The traditional alternative to grouping /r/ with /rr/ is, of course, grouping it with /y/ and /w/ as 'glides' or 'semi-vowels', although some linguists have declined to group the rhotics and glides at all; see, for example, Chadwick (1975:2), Sommer (1969:37)—whose chart is, however, arranged in a rather confusing way—and Donaldson (1980:15). This grouping is phonotactically rather heterogeneous, but this is entirely natural²⁷ and follows from the features associated with their points of articulation; for example, /w/ cannot be word-final in most languages just as the other labials, /p/ and /m/, cannot. This is not an argument against grouping it with /y/ and /r/. The differences between /r/ and /rr/, however, cannot be explained away by such considerations; for example, as mentioned earlier, many languages with the alveolar-retroflex opposition preserve this opposition in clusters—having both *np* and *mp*, *lk* and *rlk* for instance—but still allow *rrC* and not *rC*.

Areal features, crossing genetic language group boundaries, are common in Australia; the loss of the stop-tap distinction described above is just one of several in its general area, pre-stopping of nasals and laterals being another, an opposition between apical tap and trill a third and initial dropping a fourth, to mention just phonetic and phonological features. The classic survey of diffusion in a heterogeneous area is, of course, Heath (1978a) for south-east Arnhem Land.

Clearly, sound changes spread across major linguistic boundaries, and they probably always have. There may have been no barriers, other than Bass Strait and Van Diemen Gulf, capable of blocking the movement of changes. Differences between languages might inhibit borrowing in certain circumstances, as Heath points out, but this would not generally be the case. This leads me to reflect on the meaning of terms like Proto Australian and Proto Pama-Nyungan, and to what degree they relate to any genuine protolanguage.²⁸

²⁶ Perhaps I should say 'primary grouping'; /r/ and /rr/ may group together on another level. Several examples are noted in the paper; another is the dissimilation process described for Yidiny (Dixon 1977:100). Another such secondary grouping would be that of apical nasals and laterals with /rr/—the consonants that occur initially in heterorganic clusters in many languages.

²⁷ A point I overlooked until Mary Laughren brought it to my attention.

²⁸ While I was writing this paper, Bob Dixon sent me the first two chapters of an early draft of a manuscript on Australian languages, under the names of Dixon, Sands, Green and Green, with a request for comments. I had not read Baldi's volume at that time, and it was this manuscript that originally inspired me to think about the reality of the reconstructed protophoneme inventories.

Johnson (1990:422–423) details two opposing influences on languages in an area of Cape York Peninsula: on the one hand, as a result of intermarriage between different exogamous patrilineal clans (or patriclans) or different language groups, and a situation where multilingualism is normal, “strong pressures exist to promote borrowings”. On the other hand: “Equally strong but opposing forces act to maintain patrillect [speech variety associated with a patriclan] distinctiveness...Patrillect is a marker of patriclan membership and thus a symbol of identity”. Dixon (1990:397) speaks of the pressure from conservative neighbours inhibiting change in a language—or at least change away from the norm, as well as the fact that “Australian Aborigines have a strong awareness of language, which is looked upon as a principal marker of membership in tribe, and in local group within tribe”.

Johnson, dealing with a language comprising a group of closely related patrillects, refers (p.423) to the “vocabulary pool” that is available to all speakers of the language. In the same volume, Grace (1990:169–170, quoting Grace 1981:263–264), speaking of two neighbouring and closely related Melanesian languages of New Caledonia, which have been substantially differentiated by rapid and seemingly irregular sound change, says: “In the situation which I have described [with, for example, inter-language marriage common and much multilingualism] we may imagine that each individual conceives of the immediate linguistic reality in terms of pools of linguistic resources...In fact, in some degree the linguistic resources of the whole island would have constituted a single pool”. It would seem, then, that while this situation could explain rapid differentiation for a period on a small scale, it would also lead to homogenisation on the island-wide scale.

Johnson and Grace are each describing a small-scale situation involving closely related languages and a small area. Grace comes to the conclusion that the synchronic unit which undergoes a change is not necessarily a language at all, but may be much smaller—one dialect of a language. However, Dixon (1990:400) notes that: “Mapping linguistic parameters across the 200-plus languages of the continent gives a picture that bears a distinct resemblance to the dialect map for a single language”. With a time-scale of tens of thousands of years, we might then be able to think of the whole of Australia as a “pool of linguistic resources”. And the synchronic unit that undergoes a change may be something bigger than a language—a language group, for example.

If sound changes (and other changes) could spread throughout the continent, then the Australian language family as a whole must have had a certain amount of cohesion. As Dixon (1990:400) says: “... it does seem that the tree model of genetic relationship, which is so useful for other language families, may not be the appropriate model for the Australian family.” McConvell (1990:7); says that: “It is simply not possible, given the amount of knowledge we now have about rates of language change around the world, to regard the Pama-Nyungan language family as a 40,000 year old grouping”. (See also Blake 1990; O’Grady 1990b.)

Bellwood (1991) outlines a dilemma posed for linguists by this relative homogeneity of Pama-Nyungan. If, as this homogeneity suggests, it is only a few thousand years old, and if, as is generally assumed, it descends from a single language, this language must have spread over most of the continent, supplanting older languages, during that few thousand years. But this sort of wholesale takeover seems to be always associated with the spread of a revolutionary new technology, or with conquest. Neither of these possibilities fits with what we know of Australian culture.

But maybe it is possible to regard Pama-Nyungan as very old. If changes spread back and forth across the continent, there may have been a cyclic situation, in which, say, a distinction between two laminal series began somewhere, spread throughout much of Australia, then was lost somewhere and this change spread over the continent, and so on. Given 40,000 years, there could have been several cycles of the type of changes that seem to have taken place in Australia—development and later loss of apical distinction, augmentation to eliminate monosyllabic words and later initial-dropping to re-establish the type, and so on. The fact that there are single-apical languages in which the apicals are alveolar (in much of eastern Australia) and others in which they are typically retroflex (e.g. Garrwa and Wanyi) suggests that our present single-apical languages do not just continue an original situation. There would be cycles of contraction and dilation of the phoneme inventories, affecting different parts of them at different times and in different places, but with a certain degree of cohesion.

Reconstruction to establish a protolanguage, then, will not establish an initial protolanguage, or even an intermediate one, but a system that would have existed at different times in different areas, and not at all in some, and that is dependent on the direction of change during the current cycle. For example, if there is a general development of a laminal distinction in progress, the ‘protolanguage’ will not have it; if we had been in a part of the cycle in which it was, in general, being lost, the ‘protolanguage’ will have the two laminal series. A change in direction in a trend may function like a singularity in cosmology and render previous history unrecoverable.

Perhaps the best we can do is establish a minimal phoneme set, maybe:

	<i>b</i>	<i>g</i>	<i>d</i>	<i>j</i>
<i>m</i>	<i>ng</i>	<i>n</i>	<i>ny</i>	
		<i>l</i>		
<i>w</i>		<i>r</i>	<i>y</i>	
<i>u</i>		<i>i</i>	<i>a</i>	

and list those additions that seem to be widespread enough or common enough to be thought of as belonging to the regular cycles, including, say:

splitting of *d* --> *d* and *rr* / merging of *d* and *rr*

development / loss of a laminal split

development / loss of an apical split

development / loss of extra laterals

development / loss of lenition and a voicing distinction

and similarly with phonotactics, perhaps a basic CVC(C)V word shape:

initial-dropping / augmentation

development of new clusters—*rC*, *yC*, stop-stop / simplification of clusters

and so on. There is no reason to think the ancestral language had only the basic structure. It might have had fifteen consonants or thirty;²⁹ its form is irretrievably lost.

I am assuming that the Pama-Nyungan/non-Pama-Nyungan distinction is genetic, although this is not critical for my speculations. Blake (1988), Evans (1988) and Heath (1990) all provide evidence that it is (not to mention O'Grady's many contributions to the reconstruction of Pama-Nyungan). The heterogeneity of non-Pama-Nyungan as compared with Pama-Nyungan is a problem, but may be explainable by barriers to borrowing that arose as the various typologies within the former differentiated, or by an attitude to language that prized distinctiveness. One of the early steps in my introduction to non-Pama-Nyungan languages was to study a comparative word list compiled by Charles Osborne (n.d.);³⁰ one hundred words in each of six (I think) languages of the far north of the Northern Territory: from memory, Tiwi, Larikiya, Wuna, Limilngan, Yiwaja and something else. Some of these languages are neighbouring on others, and yet there were just no correspondences, or maybe one, among the hundred words. My reaction was to think that the different groups were deliberately keeping their languages totally separate.³¹ Just one more problem for the historical linguists!

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²⁹ In the light of new ideas about trees in biology (see Stephen Jay Gould's *Wonderful life*) we should consider the possibility that very early languages (of which Proto Australian might be one) had vast numbers of phonemes and early sound changes were mainly to greatly reduce these.

³⁰ Which I am currently unable to find—if, indeed, I did actually have a copy of my own. I am responsible for the spellings of the language names in the list as I give it.

³¹ Laycock and Mühlhäusler (1990:864–865) mention a couple of examples of “naïve linguistic engineering”, the motive of which seems to be “the need for linguistically differentiating a group from all other groups”.

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