Australia and New Guinea: Sundered hemi-continents of sound

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ABSTRACT

Humans have occupied Sahul for at least 65,000 years; until 9,000 years ago Australia and New Guinea were one continent. Apart from the Austronesian arrival around New Guinea's coasts 3,200 bp, there is no evidence of linguistic immigration into Australia or New Guinea. It is therefore surprising that they form two distinct phonological realms rather than sharing some similarities across this relatively recent human boundary. I survey the principal characteristics of both Australia and New Guinea, then make this more concrete by focussing on languages of Southern New Guinea, close to Australia. Although modern languages from this region differ strikingly from Australian languages in their region, reconstruction of their ancestral sound-systems by the comparative method suggests this has not always been the case, suggesting earlier similarities spanning the Torres Strait have gradually been erased as these languages converged in their phonological systems with other Papuan languages to their north.

**Keywords**: Australian languages, Papuan languages, Sahul, sound change, convergence.

1. WELCOME TO SAHUL

For many ICPhS delegates, the salient geographical unit you are visiting – perhaps for the first time – is the continental country of Australia, whose northernmost sea boundary lies in the Torres Strait 3165 kilometres to the north of Melbourne. But had the conference been held somewhat earlier – say, 8,000 BC – you would have come to a different, much larger continent, Sahul, uniting Australia, New Guinea and some smaller islands, only sundered into the two hemi-continents of Australia and New Guinea by rising seas around 7,000 BC (David et al [1]). Had you wished, you could have taken a long hike after the congress, through (modern) Port Moresby in modern Papua New Guinea and across to (modern) Jayapura on the north coast of Indonesian Papua.

Humans have occupied Sahul for at least 65,000 years (Clarkson et al [2]), with occupation dates indicating early colonisation of most of the region [Map 1]. It is thus Sahul, not the geographically recent southern hemi-continent of Australia, which is the geographical entity that has formed the background to most human history here, and to the formation and development of most of its languages – including the roughly 1300 autochonous modern languages which make it one of the epicentres of linguistic diversity across the globe.

Map. Early Sahul occupation dates, also showing the location of the Yam & Pahoturi languages
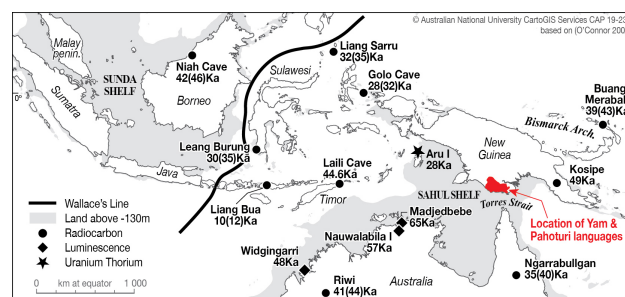
A word on terminology: the languages fall into three groups: (a) Australian (displaying multiple typological similarities and likely to be all related), (b) Austronesian (coasts and islands of New Guinea; relative latecomers to the region, at around 3,500 years ago, and found across a vast area bounded by Taiwan, Madagascar, New Zealand and Easter Island), and (c) the diverse congeries of languages lumped together as 'Papuan'. This latter term does not denote any phylogenetic or typological unity but simply means 'language of Sahul which is neither Australian nor Austronesian'; the more than 860 'Papuan' languages fall into over sixty currently unrelatable families and isolates (Palmer [3]).

Our tendency to see the region in terms of modern geography/geopolitics – neatly separating Australia to the south and Papua New Guinea and Indonesian Papua to the north – has masked the surprise we should feel at some curious facts. First, Australian languages – whether ultimately all related or just a giant Sprachbund – stop at the continental boundary. Conversely no languages with claims to have Papuan relatives are found on the Australian side, outside the eastern Torres Strait. Beyond this, the linguistic worlds on the two hemi-continents are as different as any two regions on earth. Of special interest to this conference are the striking differences in phonological systems, to be discussed below.

This should puzzle more people than it has. The biological realm does not align neatly with the Torres Strait – southern New Guinea has wallabies, echidnas, and melaleucas, while Cape York has

cassowaries, birds of paradise and tree kangaroos. The ancient geographical layout would have favoured cultural continuity across the low lands now flooded. Why should the scission between hemi-continents have left such a neat division rather than a messier picture with some 'Australian' languages sprawling in New Guinea and some 'Papuan' languages in Australia, even if New Guinea was always more typologically diverse than Australia and languages related to those (now) in Australia would have been found in hills and plains south of the central cordillera? This paper thus asks: does this apparent deep cleavage still hold up as comparative reconstruction takes us back deeper in time?

2. CONTRASTING SOUNDSCAPES

The two hemi-continents of interest offer vastly different phonological worlds.

The Australian languages are famous for the 'theme and variations' similarity of their sound inventories (Fletcher & Butcher [4]; Fig. 1), characterised by 'long flat' consonant inventories with paired stops and nasals at 4-6 points of articulation, no fricatives, rich liquid inventories, heterorganic stop clusters, simple vowel systems (typically 3 or 5 qualities, with or without length) lacking a nasalisation contrast or other suprasegmental modifications to vowels, and no tone.

Figure 1. Prototypical consonant inventory of Australian languages (Fletcher & Butcher [4])

labial		coronal			velar
	apical		laminal		
p	t	ʈ	t̪	c	k
m	n	ɳ	n̪	ɲ	ŋ
	l	ɭ	l̪	ʎ	
	r	ɻ			
w					j

Most differences in Australian phonologies involve minor changes to this schema, suppressing the apical and/or laminal contrast, or reducing the number of liquids. Some areas introduce a second stop series (long/short, fortis/lenis) and/or a glottal stop. Some (e.g. Arandic) have innovated pre-stopped nasals and/or developed secondary articulations such as labialised or prepalatalised obstruents. A minority of languages, particularly in the Daly and Cape York regions, have some fricatives. But these differences are very much variations on a theme, and for most we now have good accounts of how the phonemes that are non-canonical for an Australian language.

Compare this with the situation for Papuan languages. New Guinea, the only region of the world (other than Polynesia, where all languages are related) where more than half the languages sampled in WALS (Maddieson [5]) have 'small' consonant inventories (6-14 phonemes). About half the Papuan

languages are tonal (Donohue [6]), in stark contrast to the total absence of tone as a phonological contrast among Australian languages. Other common features of Papuan phonologies are: reduced number of nasals compared to stops (e.g. often lacking palatal or velar nasals), small liquid inventory (e.g. frequent lack of /l/ vs /r/ contrast), and relatively few place contrasts.

For example, languages of the Lakes Plain family (Foley [7]) have tiny consonant inventories, lacking primary nasals altogether. Clouse [8] reconstructs *p, *t, *k, *b, *d, plus possibly *w and *j for proto-Lakes Plain and many of its descendants have barely expanded this: Iau simply adds an s and lenites b to f. Vowel inventories are slightly more complex (seven in Doutai and Kirikiri, eight in Iau), but the languages possess tonal phonologies of great complexity (eleven tonal patterns in Obuitai).

Passing from this snapshot of New Guinea languages as a whole, let us make the contrast with Australian phonologies more specific by considering the phonological systems of two languages lying maximally close to Australia, just north of the Torres Strait: Nen (Yam family) and Idi (Pahoturi family). Fig. 2 gives the Nen consonant inventory.

Figure 2. Nen consonants (Evans & Miller [9])

bilabial	dental/ alveolar	palatal	velar	labial-velar	glottal
p, b	t̪, d		k, g	k͡p, g͡b	
ᵐb	ⁿd		ᵑg	ᵑg͡b	
		dʒ			
		ⁿdʒ			
m	n	ɲ			
	s				h
		j		w	
l, r					

The deviations of the Nen system from typical Australian inventories is striking. Most important are the lack of any laminal stops, the lack of any retroflex series, the presence of an /s/ (and an /h/, rather marginal), the lack of /ŋ/, and the presence of coarticulated k͡p, g͡b and ᵑg͡b. Another fundamental difference, of phonotactics rather than inventory, is that whereas almost all Australian languages permit rich combinations of heterorganic sonant plus stop clusters Nen (like other Papuan languages) simply allows homorganic prenasalised stops. Other sonant plus stop clusters get broken up by an epenthetic schwa. So far we have stressed the difference between Nen and Australian languages.

Passing to its neighbour Idi (Fig. 3) we see a much more Australian-like inventory: pairings of stops and nasals at five points of articulation (except for the lack of a retroflex nasal), a retroflex stop series, and three liquids.

Idi is a bit more 'Australian-like' than Nen in its consonant inventory – it has three liquids, and a

retroflex series, both typically Australian but unusual in the Papuan context. , However, like Nen, it has such Papuan (and non-Australian) features an /s/, no stop series in the laminals, a prenasalised stop series (instead of a series of heterorganic nasal-stop clusters as in Australian langauges), asymmetries between stops and nasals in place of articulation and a labio-velar series (labio-velar in Idi as opposed to labial-velar in Nen). So while some of its features – especially the retroflex series – are unusual in the Papuan context, but most others are typical of Papuan languages, particularly in southern New Guinea.

Figure 3: Idi consonant inventory (Anonymous [11])

bilabial	dental	retroflex	palatal	velar	labio-velar
p, b	t, d	ʈ, ɖ		k, g	kʷ, gʷ
m	n		ɲ	ŋ	
ᵐb	ⁿd	ⁿɖ		ᵑg	
			dʒ		
			ⁿdʒ		
	s				
	l, r		ʎ		
w			j		

Summarising this section, (a) Papuan languages lack the 'long flat' structure of Australian consonant inventories, have fewer nasals than stops, have smaller consonant inventories overall, often lack velar nasals and rarely elaborate coronal stop or nasal contrasts, but make use of a wide range of suprasegmentals (nasalisation, but especially tone) totally absent from Australian language (b) despite the wide variation in Papuan phonologies, no Papuan language has a consonantal inventory which falls in the range of Australian systems (c) even if we go to that part of the Papuasphere closest to Australia, Southern New Guinea, the languages there differ significantly in their phonological organisation from the Australian languages to the south across the Torres Strait.

3. WORKING BACK TO THE PAST

So far our argument has focussed on modern-day phonological systems. But does this picture still hold if we employ the comparative method to reconstruct what earlier phonological systems look like? This is what we begin to do in this section.

Though our understanding of Yam and Pahoturi phonology is still basic by world standards, intensive fieldwork over the last decade has laid the foundations for some initial hypotheses about the historical phonology of the region (Evans et al [11]). We now examine some results of reconstructive work using the comparative method.

3.1. Proto-Yam

Our reconstructions of proto-Yam are based on word-lists collected for around 20 varieties since 2010.

Space, and the scope of findings so far, prevent a full exposition so we focus on just three issues central to the Australian vs Papuan contrast.

3.1.1. Initial velar nasals

Though Nen and its Yam neighbours lack a velar nasal phoneme, reconstruction through correspondence sets shows the ancestral language proto-Yam (pY) to have had one [12]. Within the Nambu branch, to which Nen belongs, most languages lack ŋ but Némé has initial n and Dre – known only from recent work with the septuagenarian last speaker, retains ŋ. The other main branch of the family, Tonda, attests ŋ in some languages but many lose it, giving initial vowels just as in Nen. Sample correspondence sets: pY *ŋægi 'coconut' > Nen ag, Nama æs, Namo aʃ, Neme næg; Wara, Komnzo, Anta ŋatsi; pY *ŋatər 'rope, string', Nen ædər, Kánchá, Wára ŋatər, Komnzo ŋaər; pY *ŋærɨ 'person', Arammba ŋarɨ, Nen, Nama, Nambo ær, Neme næru, Dre ŋarɨ. Possession of velar nasal phonemes brings proto-Yam closer both to the Pahoturi River families to the east of Nen and Nmbo, and to the Australian languages to the south.

3.1.2. Retroflex series

Nen and its Yam neighbours likewise lack retroflex consonants, but reconstruction plus consideration of a wider sample of Yam languages points to their presence in proto-Yam (Carroll et al [12]). Many examples of /s/ in Nen descend from pY *ʈ; the same cognates show up in Nen, Nmbo and Nama as /s/, as /r/ in Dre and Neme, but retain their retroflex quality as ʈ in Len, Namo and Namat. Within the Tonda branch, they mostly appear either as /t/ or /tʃ/ but in just one language – Nggarna – their retroflex quality is retained. A sample cognate set spanning the whole language family (though with different finals across the two branches) is pN *ʈən 'tooth' > Namo ʈən, Len ʈəl, Nama sən, Namat ʈən, Dre, Neme rɨn, Nambo, Nen sən, pT *ʈəl > Ngkolmpu tər, Tamer, Smerki ʈəl, Komnzo tʃər. Thus proto-Yam, unlike such descendant languages as Nen, likely had retroflex stops, like the Pahoturi languages to its east. Going further (with no space to demonstrate this here), it appears that at least in the Nambu branch no /s/ can be reconstructed, all contemporary examples in e.g. Nen deriving from pY *ʈ, pY *ʂ or recent loans from English.

3.2. Proto-Pahoturi

We focus here on liquids in this small family of six languages (Idi, Ende, Em, Agob, Taeme and Kawam). All modern Pahoturi languages have precisely three liquids (r, l plus either ʎ or ɻ). But correspondence sets (Evans et al. [13]) suggest five liquid phonemes should be reconstructed: *r, *ɻ , *l,

*ʎ and a fifth whose most likely realisation was [l̪]. Sample sets (using M for 'Em'; others abbreviated to first letter) are:

*r: /r/ in all; e.g pP *doroŋ 'dog' > M, K doroŋ, E, T dɔɹəŋ, A dərəŋ

*l: /l/ in all; e.g. pP *ʈule 'foot' > A, M ʈule, E ʈɪle, K tʃule, T ʈəl.

*ɻ: ɻ in A, M, E, r in K, l in I,T; e.g. pP *boɻ 'thigh' > A, M boɻ, K bor, I, T bɪl, E bəɻ

*ʎ: ʎ in I, T, l elsewhere; e.g. pP poroʎ 'dry' > I præʎ, T pərɛʎ, A, K, M porol, E pəɹəl

*l̠: ɻ (A, M, E), r (K), l (E), ʎ (T); e.g. pP *gal̠ 'canoe' > I gæl, T gæʎ, E, M gɑɻ, K gɛr. This is the correspondence set whose exact phonetic status is least clear and other possible phonetic values could be postulated.

Leaving aside the uncertainty about the fifth reconstructed liquid phoneme, the evidence summarised here makes it clear that proto-Pahoturi possessed five liquid phonemes – highly unusual for a Papuan language, but rather normal for an Australian language.

3.3. Recap

We do not yet have complete reconstructed phoneme inventories either for proto-Yam or proto-Pahoturi, but the results summarised in this section indicate that the systems of both of these language families begin to look more similar to Australian phonologies as the comparative method allows us to work back to their earlier systems. Within the Yam family, we see evidence for ancestral velar nasals and for ancestral retroflex stops, hence two apical series, and for the innovative nature of /s/. For proto-Pahoturi, where the modern languages already have both velar nasals and retroflexes, we see evidence for the kind of rich set of liquid phonemes typical of Australian languages and not at all usual among Papuan languages. More work is needed to reconstruct both proto-Yam and proto-Pahoturi in detail, but it is already clear from our partial results that both proto-Yam and proto-Pahoturi look much more Australian-like than their contemporary descendants.

4. CONCLUSIONS

Nine millennia span less than a seventh of the human history of Sahul,. But it is a much longer period than that for which linguists are generally willing to contemplate evidence of relatedness between modern languages. The lack of demonstrably related languages across the seas sundering Sahul into its component hemi-continents is thus, from one point of view, not surprising – simply too much time has passed for us to see traces of the original situation. Yet it is far from clear that language families all change at the same rate. In trying to make sense of this dizzyingly complex part of the linguistic world we should re-open the question of whether, at least in

some regions, evidence of ancient connections remain. (Note that I have not argued for cognate forms – merely for similarities in phonological typology which are non-committal between phylogenetic connectedness and ancient areal convergence). The evidence presented here suggests that a comprehensive campaign of phonological documentation combined with comparative reconstruction may show that some traces do persist after all. The direction of change through time – with Yam and Pahoturi languages becoming less Australian-like over millennia– suggest the effects of long and inexorable convergence with their Papuan neighbours once they were cut off from the Australian phonological zone by the waters of the Torres Strait. Compartive reconstruction allows us to glimpse back to a time, long ago, when these two phonological realms were less different than they are now.

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