

# Austronesian Phonological Change

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## Introduction

The purpose of this paper is to attempt to systematise the phonological changes which have occurred in Austronesian languages since Proto-Austronesian, in other words to describe the sound laws which connect Proto-Austronesian to its daughter tongues. As far as possible, I shall try to formalise the changes in terms of phonological features. However, I am well aware that this will pose some difficulties, partly since the phonetic shape of the phonemes in Proto-Austronesian often is a matter of debate.

## Proto-Austronesian

The first complete reconstruction of the Austronesian proto-language was made in 1934-38 by the German linguist Otto Dempwolff<sup>1</sup>. Although some of his conclusions have been subject to criticism since then, no-one can doubt the enormous value of his work, and all later reconstructions are basically revisions or additions to his *Urindonesisch* (here abbreviated UIN).

Shortly after WWII, Isidore Dyen published a series of articles criticising some of the reconstructed phonemes in UIN, and especially adding a complete series of his own to the already existing system. Most of his results are based upon distinctions found only in the Austronesian languages of Formosa, and which must be considered to be original to Proto-Austronesian. However, the phoneme system evolved by Dyen (called Proto-Malayo-Polynesian, here abbreviated PMP) was far too complex to be able to be a representation of the actual phonemes of Proto-Austronesian<sup>2</sup>, and its

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1. *Vergleichende Lautlehre* (here abbreviated VL); see bibliography.

2. One example of this is the reconstruction of 9 different sibilants (S<sub>1</sub>-S<sub>6</sub>, plus x<sub>1</sub>, x<sub>2</sub> and X).

value lies mainly in the fact that he shows many distinctions and phonetic changes which yet remain to be explained.

The reconstruction from which I shall trace the development of Austronesian phonemes is Otto Christian Dahl's Proto-Austronesian (here abbreviated PAN<sup>3</sup>). The advantages of Dahl as opposed to Dempwolff and Dyen is that he (like Dyen) makes great use of the Formosan languages, and that his reconstruction attempts to avoid a too cumbersome series of phonemes.

### Morphological alternation in Austronesian

There are several morphological tools extant in Austronesian languages, which should be mentioned at this stage, since they have in some cases been invaluable for the reconstruction of Proto-Austronesian phonology.

a) Reduplication implies the prefixation of the initial consonant in the stem, separated from the original initial by the svarabhakti vowel [ə]. This is still a productive process in several Austronesian languages e.g. Indonesian «berapa» (how many?) > «beberapa» (some). This was of great importance for identifying the initial proto-phoneme in Tagalog «dalawa» (two) as a consonant which has the reflex «d» in initial position, and «l» in medial position: \*d<sub>3</sub>ə-d<sub>3</sub>uSa > \*d<sub>3</sub>a-d<sub>3</sub>ua > \*da-luwa > dalawa<sup>4</sup>.

b) Iteration implies repeating the entire stem, and is also a productive process in modern Austronesian languages, e.g. Indonesian «jalan» (walk, road) > «jalan-jalan» (to take a walk). However, there are also cases where the process has formed a new lexical item and ceased to be productive.

c) Repetition implies repeating the entire stem, with the exception of the final consonant (including vowels at syllable boundaries, which in this case are reinterpreted as approximants). It occurs for instance in Ngadju Dayak, ex «bawoi» (pig) > «bawo-bawoi» (like a pig).

d) Prenasalisation is a productive process in verbal morphology in many Austronesian languages, taking two forms: nasal accretion and nasal substitution, colloquial Indonesian (due to Javanese influence) «gadó» > «nggadó» (to snack) and Javanese «tipis» > «nipis» (thin) respectively. It occurs both by itself or in connection with prefixes such as Indonesian «meN<sup>5</sup>-». In both cases the nasal involved is homorganic, but it is conceivable that it, even in cases where it occurs by itself, may have evolved from a prefix, whereby the nasal may have been assimilated to the point of becoming homorganic<sup>6</sup>.

3. For practical reasons I shall use the term Proto-Austronesian to refer to the proto-language as such, and PAN to refer to Dahl's reconstruction thereof.

4. Reduplication in Tagalog numerals is a well-known phenomenon cf \*təlu > \*tə-təlu > tatló («three»).

5. The capital -N- marks a consonant with the one fixed feature + nasal, but homorganic with the following consonant.

6. Unfortunately we get no help from vowel-initial stems in for example Indonesian («apa» = what? > «mengapa» = why?), since the null-phoneme ['] in initial position is a reflex of an earlier glottal closure, which would automatically take «ŋ» as its homorganic nasal. Cf that «h» takes «ŋ» as its homorganic nasal: «hirup» > «menghirup», «breathe».

e) Nasal infixation is also a productive process in verbal morphology in modern Austronesian languages, for example Atayal «kitaʔ»/ «mitaʔ» < «\*k-m-itaʔ» (to see), but has also occurred as a homorganic nasal accretion to the medial consonant in several cases already in Proto-Austronesian, as evident from the fact that we find doublets in several languages, whereby one language has a reflex of the nasal, whereas another does not. E.g. «\*bi(n)t<sub>1</sub>uq» (star) > Tagalog «bitún», Pazeh «bintún». This nasal occurs homorganically in almost all cases, but there is one exception: Javanese has «ŋ» as prenasalisation before «s», a fact that was unsatisfactorily explained by Dempwolff <sup>7</sup> as a dissimilation on the lines of: «\*n'tʔ» > «\*ns» > «ŋs». Dahl 1976 (p. 99) mentions another theory which may explain the nature of this prenasalisation: an «emphatic» or «expressive» nasal infix «ŋ», which has been assimilated to a homorganic nasal before all stops, *after* «\*tʔ» had developed into «s», and therefore «ŋs» has survived unchanged.

Special care should be taken with points d) and e), as they may show cognacy between stems which apparently are entirely unconnected (e.g. Javanese «pakan» = fodder and Malay «makan» = eat). Likewise, no reconstructions of nasal-stop clusters in medial position can be certain, unless the daughter language also has such nasals, since it may be a case of doublets of a nasalised and a non-nasalised consonant <sup>8</sup>.

### Syllable structure in Austronesian

A great help in the reconstruction of Proto-Austronesian was the discovery <sup>9</sup> that Austronesian has a very strict syllable structure. The basic structures are as follows:

CVC  
CVCVC  
CVCVCVC <sup>10</sup>.

This precludes the possibility of consonantal clusters, except in two cases:

- 1) where the monosyllabic CVC structure has been repeated, i.e. (CVC)<sub>1</sub>(CVC)<sub>2</sub>, where (CVC)<sub>1</sub> is identical to (CVC)<sub>2</sub> (iteration, see above).
- 2) where the intervocalic C is preceded by a homorganic nasal (or by the nasal infix «ŋ»).

### The phonemes

The phoneme system reconstructed by Dahl in 1981 is as follows (the additions marked to the right of the table are changes to the phoneme system made since 1976):

7. VL §53 (f).
8. See Milner 1963 pp. 31-33 for a more detailed discussion.
9. Mentioned already in VL. Please note, however, that this does not reflect on the syllable structure in modern Austronesian languages. Especially Tagalog has many cases of clusters of two consonants.
10. Very rare cf. \*Halimau «predator».

Vowels: /a/, /i/, /u/, /ə/

Nasals: /m/, /n/, n'/, /ŋ/

Voiceless stops: /p/, /t<sub>1</sub>/, /t<sub>2</sub>/, ʔ/k'/, /t'/, /k/, /q/

Voiced stops: /b/, /d<sub>1</sub>/, /d<sub>2</sub>/, /d<sub>3</sub>/, ʔ/d'/, /g'/, /g/ -Z

Voiceless fricatives: /θ/, /S<sub>1</sub>/, /ʃ/, /H<sub>1</sub>/, /H<sub>2</sub>/ + θ (+H<sub>1</sub> or H<sub>2</sub>)

Voiced fricatives: ʔ/B/, /S<sub>2</sub>/, /l,r/ /ʃ/ + B, + S<sub>2</sub> (-l or r)

Phonemes marked by a ʔ are listed as dubious (by which he means that their very existence is uncertain) by Dahl 1981. However, I include them to make the system complete.

Some of these have rather uncertain phonetical values, which is the reason why the phonemes have been rendered in a notation other than IPA. However, for my purpose, it is of vital importance to be able to specify which features of each phoneme have survived, and therefore I have chosen to take each phoneme at the phonetic value tentatively given by Dahl in 1981<sup>11</sup>. Phonemes marked by a ʔ here symbolise that the phonetic value is uncertain. I have reordered the phonemes in accordance to their assumed phonetic value.

	s+V	s-V	Aff+V	Aff-V	Fr+V	Fr-V	N
Lab	b (b)	p (p)			β (B)		m (m)
Dent	d (d <sub>1</sub> )	t (t <sub>1</sub> )	dz (d <sub>2</sub> )	ts (t <sub>2</sub> )		s (S <sub>1</sub> )	n (n)
Retr	ɟ (d <sub>3</sub> )				ʃ ʔ (S <sub>2</sub> )		
Lat					l,r (l,r)	ʎ (ʎ)	
Pal <sup>12</sup>	ʃ (d')	c (k')	ʃj ʔ (g')	cç ʔ (t')	θ (θ)		ɲ (n')
Vel	g (g)	k (k)			ʁ (ʁ)		ŋ (ŋ)
Uv/Pha		q (q)				ħ ʔ (H <sub>2</sub> )	
Glottal						h (H <sub>1</sub> )	

### Evolution of Phonemes

The first problem we encounter when tracing the development of phonemes from the proto-language to modern languages is a question of ordering, since phonemes have an unpleasant habit of merging across the

11. With one exception, however. I find Li's (1985) interpretation of /\*S<sub>2</sub>/ as [ʃ] more probable than Dahl's tentative reconstruction [z], for reasons which will be stated when we examine the reflexes.

12. For practical reasons I class the interdental fricative \*θ under the palatals, since it has merger with «t'» outside Formosa, and in fact in most languages inside Formosa as well.

convenient boundaries which we have set up, and in fact also across different boundaries in different languages<sup>13</sup>.

The most convenient method is still to work downwards through the above table.

One consequence of the strict syllabic system is that we not only have to consider the phonemes as such, but also in terms of where they occur in the word. We have three possible consonant positions: initial, medial (= intervocalic) and final, and the reflexes of a certain phoneme differ often depending on the position. Likewise, we must also consider the possibility of a separate development of phonemes preceded by a homorganic nasal in all daughter languages *except* those from Formosa, where no cognates with homorganic nasals have been found<sup>14</sup>.

The languages I have chosen are partly those upon which Dempwolff builds his first reconstruction, as well as the other languages treated in VL. To complete the series I shall add the Formosan languages Atayal, Paiwan and Tsou, being representatives of the three Formosan language subgroups.

### Labials

Of the labials listed in the phonemic system of Proto-Austronesian, one is marked as dubious, i.e. /\*β/. The idea of the existence of /\*β/ derives from irregular reflexes of Dempwolffs /\*b/ in Javanese, which sometimes has /w/ instead of the expected /b/. /\*β/ would then be the proto-phoneme for those instances where Javanese shows /w/ instead of /b/. For practical purposes, we can classify /\*β/ with /\*b/, except in cases where Javanese has a /w/-reflex.

/*b/	+ bilabial	/*p/	+ bilabial	/*B/	+ bilabial	/*m/	+ bilabial
	+ voiced		– voiced		+ voiced		+ voiced
	+ stop		+ stop		+ fricative		+ nasal

/\*b/ has the following reflexes in our example languages:

	I	M	F	nM
Atayal <sup>15</sup>	b	b	p	–
Tsou	f	f		–
Paiwan	v	v	v	–
Malay	b	b	p	mb
Javanese	b	b	b	mb
Tagalog	b	b	b	mb
Toba Batak	b	b	p	mb

13. Naturally, this situation is fortunate for anyone dealing with reconstruction, since it is the only way we still can trace many of the phonemes of Proto-Austronesian.

14. Dahl's explanation is that the Formosan languages must have separated from the common Austronesian group a very early stage, before the development of the «emphatic» «ŋ»-infix.

15. It is interesting to note that the Mayrinax dialect of Atayal (cf Li 1985), which is the most conservative dialect of the language, has retained final /\*b/, while the other dialects have devoiced it. Furthermore, the Paljawan dialect has replaced final labials with velars, giving the following reflexes: /\*b/ > /k/, /\*p/ > /k/, /\*m/ > /ŋ/.

	I	M	F	nM
Ngadju Dayak	b	w	p	mb
Hova	v	v	-f-/-∅	mb, b
Fijian	v	v	∅	mb
Tongan	f	f	-f-/-∅	p

/\*p/ has the following reflexes in our example languages:

	I	M	F	nM
Atayal	p	p	p	-
Tsou	p	p		-
Paiwan	p	p	p	-
Malay	p	p	p	mp
Javanese	p	p	p	mp
Tagalog	p	p	p	mp
Toba Batak	p	p	p	pp
Ngadju Dayak	p	p	p	mp
Hova	f	f	-f-/-∅	mp, p
Fijian	v	v	-v-/-∅	mb
Tongan	f	f	-f-/-∅	p

/\*β/ has the following reflexes in our example languages:

	I	M	F	nM
Javanese	w	w	b	mb

For the other languages of /\*b/ - a near-complete merger has taken place. It is to be remembered that /\*β/ is highly hypothetical in itself.

/\*m/ has the following reflexes in our example languages:

	I	M	F
Atayal	m	m	m
Tsou	m	m	
Paiwan	m	m	m
Malay	m	m	m
Javanese	m	m	m
Tagalog	m	m	m
Toba Batak	m	m	m
Ngadju Dayak	m	m	m
Hova	m	m	-m-/-na
Fijian	m	m	-m-/-∅
Tongan	m	m	-m-/-∅

## Dentals

The first reconstruction of the dentals made by Otto Dempwolff was a double system of two voiced and two voiceless phonemes, i.e. /\*d/ and /\*ḍ/, as well as /\*t/ and /\*ṭ/. These phonemes were chosen to account for the distinction between dental and alveolar in Javanese<sup>16</sup>. He found traces in

16. It should however be noted that Dempwolff never constructed a complete alveolar series, only \*ḍ and \*ṭ. His \*ṇ existed only as a homorganic nasal to the aforementioned stops.

Tagalog pointing to certain distinctions there as well, and postulated d-r-d as the Tagalog reflexes of /\*d/, and l-l-d as the Tagalog reflexes of /\*d/. As far as /\*t/ was concerned, the reflexes were identical as for /\*t/, everywhere except in Javanese. He did, however, note a certain irregularity in the Tagalog reflexes, which he considered to be unexplained exceptions.

Dahl 1976 presents an alternative explanation which takes into account the reflexes in Formosan languages. He postulated a triple series of voiced dentals, and a double series of unvoiced dentals, which he termed /\*d<sub>1</sub>/, /\*d<sub>2</sub>/, /\*d<sub>3</sub>/, /\*t<sub>1</sub>/ and /\*t<sub>2</sub>/. Having reconstructed these with data from Formosa, he noted that their reflexes were regular in Tagalog, and then rebuilt the dental phoneme system in PAN using these proto-phonemes instead of Dempwolffs /\*d/ and /\*t/. This of course caused problems in Javanese, but these were easier to explain as a phoneme split on the lines of:

$$\begin{array}{ccc} *d_1 & & d \\ *d_2 & > *d > & \\ *d_3 & & d \end{array}$$

The reason for this split would be influence from Sanskrit, which has exactly the same distinctions. The problems caused by the «irregular» appearance of Javanese «r» where /\*d/ (or /\*d/) would be expected can be explained as follows: the three /\*d/-s merged in initial and medial position to /\*d/. In final position \*d<sub>2</sub> and \*d<sub>3</sub> merged to /\*d/, while \*d<sub>1</sub> remained as /\*d/. Final /\*d/ was devoiced, while /\*d/ started developing into /r/. Apparently the trend /\*d/ > /r/ was the natural one, more common in words of common usage, while a parallel evolution, under influence from Sanskrit, started reviving the /d/-phoneme, but more or less at random filling the gaps with /d/ or /d/.

As far as the voiceless counterparts are concerned, we find that /\*t/ is exceedingly uncommon and is probably solely due to Sanskrit influence, which fits very well with other data that shows PAN /t<sub>1</sub>/ and /t<sub>2</sub>/ as having merged completely outside Formosa (and to a certain extent also inside Formosa). As far as /\*S<sub>1</sub>/ is concerned, the interpretation as a sibilant comes solely from Formosan data - reflexes elsewhere are merged with /\*H/.

/*d <sub>1</sub> /	+ dental	/*t <sub>1</sub> /	+ dental	/*d <sub>2</sub> /	+ dental
	+ stop		+ stop		+ affricate
	+ voice		- voice		+ voice
/*t <sub>2</sub> /	+ dental	/*S <sub>1</sub> /	+ dental	/*n/	+ dental
	+ affricate		+ sibilant		+ nasal
	- voice		- voice		

/\*d<sub>1</sub>/ has the following reflexes in our example languages:

	I	M	F	nM
Atayal	r	∅	ʔ	-
Tsou	ts			-
Paiwan	d'	d'	d'	-
Malay	d	d	t	nd
Javanese	r/d, d	d	t	nd

	I	M	F	nM
Tagalog	d	r,l	d	nd
Toba Batak	d	d		nd
Ngadju Dayak	d	(d')	t	
Hova	r	r	-r/-tra	ndr
Fijian	r	r	-t/-∅	ndr
Tongan	l	l	-t/l/-∅	∅

/\*t<sub>1</sub>/ has the following reflexes in our example languages:

	I	M	F	nM
Atayal	t	t	t	-
Tsou	t	t	t	-
Paiwan	t'	t'/t	t'/t	-
Malay	t	t	t	nt
Javanese	t/t	t/t	t	nt/ŋt
Tagalog	t	t	t	nt
Toba Batak	t	t	t	tt
Ngadju Dayak	t	t	t	nt
Hova	t	t	-t(r)/-tra	nt
Fijian	t	t	-t/-∅	nt
Tongan	t	t	-t/-∅	t

/\*d<sub>2</sub>/ has the following reflexes in our example languages:

	I	M	F	nM
Atayal	r			-
Tsou	ts			-
Paiwan	dz	dz	dz	-
Malay	d	d	r	nd
Javanese	r,d/d	r,d	r	nd/ŋd
Tagalog	l	l	d	nd
Toba Batak	d	d		nd
Ngadju Dayak	d,r	d	r/t	nd
Hova	r	r	-r/-tra	ndr
Fijian	r	r	-t/-∅	ndr
Tongan	l	l	-l/-∅	∅

/\*t<sub>2</sub>/ has the following reflexes in our example languages:

	I	M	F	nM
Atayal	s	s(>l/_ +nas)	t	-
Tsou	t,ts	ts	ts	-
Paiwan	ts	ts	ts	-
Javanese	t	t	t	nt

For other languages on our list, cf /\*t<sub>1</sub>/. A merger has taken place outside Formosa, excepting Javanese. As can be seen, the only difference as far as Javanese is concerned, is that the phoneme «t» only occurs as a reflex of /\*t<sub>1</sub>/.

/\*S<sub>1</sub>/ has the following reflexes in our example languages:

	I	M	F
Atayal	∅,s	s	s
Tsou	ts/s	s	s
Paiwan	s	s	s
Malay	∅	∅	∅
Javanese	∅	∅	∅
Tagalog	h,∅	∅,h	∅
Toba Batak	∅	h	∅
Ngadju Dayak	h,∅	h	h
Hova	∅	∅	∅
Fijian	ʔ, y/—a	∅	∅
Tongan	∅	∅	∅

/\*n/ has the following reflexes in our example languages:

	I	M	F
Atayal		n	n
Tsou	n	n	n
Paiwan		n	n
Malay	n	n	n
Javanese	n	n	n
Tagalog	n	n	n
Toba Batak	n	n	n
Ngadju Dayak	n	n	n
Hova	n	n	-n/-na
Fijian	n	n	-n/-∅
Tongan	n	n	-n/-∅

### Retroflex \*ɖ and \*ʃ

The retroflex series is rather incomplete, and both reconstructions are basically tentative. The reason for the reconstruction of /\*d<sub>3</sub>/ as a retroflex was basically the evidence from Paiwan (as we have seen, the phonetic shape of Paiwan /d/-s has been the basis of the PAN reconstruction), and the reason for reconstructing /\*S<sub>2</sub>/ as a retroflex is the fact that the reflexes in Formosa are universally /s/, /h/ or /x/, thus rendering the interpretation /ʃ/ possibly not the «most probable», but at least the least improbable.

/*d <sub>3</sub> /	+ retroflex	/*S <sub>2</sub> /	+ retroflex
	+ stop		+ fricative
	+ voice		- voice

/\*d<sub>3</sub>/ has the following reflexes in our example languages:

	I	M	F	nM
Atayal	r		ʔ	
Tsou	(e)			
Paiwan	ɖ	ɖ	ɖ	
Malay	d	d		nd
Javanese	r/ɖ	ɖ	r	nd/ɳɖ
Tagalog	d	l	d	nd

Toba Batak	d		r	nd
Ngadju Dayak	d	r(d)	r	
Hova	r	r	-r-/-tra	
Fijian	r	r	-t-/-Ø	
Tongan	l	l	-l-/-Ø	Ø

/\*S<sub>2</sub>/ has the following reflexes in our example languages:

	I	M	F
Atayal	h	h	h
Tsou	Ø	Ø	Ø

For reflexes from other languages on our list cf /\*S<sub>1</sub>/. A complete merger has taken place outside Formosa. The reflexes in Atayal give support to Li's (1985) interpretation of the phonetic shape of /\*S<sub>2</sub>/ as [ʃ], not [z]. Dahl<sup>17</sup> tentatively accepts an idea forwarded by Tsuchida, that /\*S<sub>2</sub>/ was pronounced [z], because it has voiced a following stop in one example (\*ma-liS<sub>2</sub>əpit' > Bunun «manisbis», «thin»), and because it is conceivable that a [z] may have been more easily lost between adjacent vowels than an [s], by virtue of also being voiced. However, due to its usually lax pronunciation, the same could be said to hold for [ʃ]. The overwhelmingly voiceless reflexes seem to point to a voiceless fricative, and, as far as I can see, the voicing of the /b/ in «ma-nisbis» may well be secondary ([ʃ] > [ʒ] > [z]), probably as a result of intervocalic position in the proto-form.

Moreover, if we examine the data from Sediq<sup>18</sup> (/\*S<sub>1</sub>/ > /s/, /\*S<sub>2</sub>/ > /x/), we find that an evolution /z/ > /x/ is rather inconceivable, while we in fact have concrete examples of an evolution of /ʃ/ > /x/, cf some dialects in Southern Sweden: «skön» («beautiful») /ʃø:n/ > [xø:n], [x<sup>h</sup>ø:n].

### Laterals

Originally in Dempwolff's reconstruction, among the least problematic phonemes were /\*l/ and /\*n/, which remained unchanged in the daughter languages which he investigated. However, evidence from Formosa has shown that there appears to be some strange correspondence between proto-l and proto-n, evident among other things in the example Atayal «laqi?» being cognate with Indonesian «anak».

Based on data from Formosa, and especially from Paiwan, Dahl offers an alternative reconstruction of UIN /\*l/ and /\*n/ as three phonemes: /\*l/, /\*ɭ/, and /\*n/. Outside Formosa, /\*ɭ/ has merged with /\*l/ in initial position, and with /\*n/ in medial and final position. Here, as in many other cases, the phonetic value of the proto-phonemes is taken to be that in Paiwan. The reflexes for /\*n/ have already been dealt with in the section on dentals. The feature definitions and reflexes of /\*l/ and /\*ɭ/ follow below:

/*l/	+ lateral	/*ɭ/	+ lateral
	+ voiced		+ voiced?
	- velarised		+ velarised

17. Cf Dahl 1981 pp. 38-39.

18. Quoted in Dahl 1981 cf footnote 17.

/\*l,r/ has the following reflexes in our example languages:

	I	M	F
Atayal	y	Ø,i	
Tsou	r ?	r	
Paiwan <sup>19</sup>	l	l	l
Malay	l	l	l
Javanese	l	l	l
Tagalog	l	l	l
Toba Batak	l	l	l
Ngadju Dayak	l	l	l
Hova	l	l	-na
Fijian	l	l	-l-/-Ø
Tongan	l	l	Ø

/\*ɬ/ has the following reflexes in our example languages:

	I	M	F
Atayal	l	l	l
Tsou	h/k	h/k	Ø
Paiwan	ɬ	ɬ	ɬ
Malay	l	n	n
Javanese	l	n	n
Tagalog	l	n	n
Toba Batak	l	n	n
Ngadju Dayak	l	n	n
Hova	l	n	-r-/-tra
Fijian	l	n	-r-/-Ø
Tongan	l	n	Ø

## Palatals

Already Dempwolff discovered that many proto-words appeared as doublets in different languages, one form having /\*d/ and one having /\*d'/. Of course, it would be exceedingly difficult, if not impossible, to avoid the reconstruction of /\*d'/ at least at a later stage in Proto-Austronesian, since the reflexes are clearly different from any non-palatal /\*d/ in the daughter languages.

Dyen attempted to solve the problem using a new proto-phoneme \*Z, which was to have reflexes combining those of /\*d/ and /\*d'/. His reasons for this were that some doublets in some languages only showed reflexes of /\*d'/ and others only of /\*d/.

Dahl 1981<sup>20</sup> found a solution which could avoid creating another proto-phoneme. Based on the fact that PMP \*k', \*d', \*Z and \*n' never occur

19. Li (1985) gives the reflexes of /\*l/ and /\*ɬ/ in Paiwan as /L/ and /l'/ respectively. I can see no reasons for this, when comparing with the data given in Dahl 1976. However, since Dahl does not mention which dialect of Paiwan he uses as a source, the differences could be the result of treating different dialects. On the other hand, Dahl does mention (Dahl 1976, p. 83) that /l/ «appears to contain a palatal element» –this may be an explanation.

20. Cf Dahl 1981 pp. 97-99.

in final position, he postulated that they might be historical evolutions of non-palatalised phonemes followed by /\*i/. This can in fact also explain cases where there is no such /\*i/. If this /\*i/ for some reason has become prevocalic (for example due to elision of the following consonant), it has likewise developed into an approximant [j], palatalised the preceding consonant, and may have disappeared. The problem of doublets is then easily solved by rule ordering: if the palatalisation stage is before the elision of the /\*i/, the consonant becomes palatalised. If the /\*i/ disappears before the consonant becomes palatalised, it remains unpalatalised.

This explanation serves to solve a few problems concerning doublets, and is not intended to remove the palatals from the phoneme system. Here we simply see what may have been a phonemic change in pre-Proto-Austronesian. By the Proto-Austronesian stage the palatals are secure in their positions as phonemes.

As far as /\*Z/ is concerned, then, /\*Z/ encompasses cases where /\*d<sub>1</sub>/ received an «i»-infix in some languages, notably Malay and Ngadju Dayak (although the Ngadju Dayak evidence may be loans from Malay, cf Dyen 1956), which palatalised the /\*d<sub>1</sub>/ and caused it to merge quietly with /\*d'/ in the cases concerned. This would imply that the palatals as such are original in Proto-Austronesian, having however merged with their corresponding dentals in Formosa, while /\*Z/ is a late development, evident only in the Malay-influenced area, and reflects original cases of /\*d<sub>1</sub>/ which have «shifted» to /\*d'/. The hypothesis seems reasonable.

I list the features and reflexes of the palatal phonemes below. I have included /\*θ/ among the palatals, since it has more or less universally merged with /\*t'/. However, the phonetic reasons for such a merger are difficult to guess. It is conceivable that /\*θ/ was a proto-phoneme at the Formosan stage, and never actually was distinguished outside Formosa (i.e. a phoneme split inside Formosa, possibly due to a substrate?).

/*d'/	+ palatal	/*k'/	+ palatal	/*g'/	+ palatal	/*t'/	+ palatal
	+ stop		+ stop		+ affricate		+ affricate
	+ voice		- voice		+ voice		- voice
/*θ/	+ interdental	/*n'/	+ palatal				
	+ fricative		+ nasal				
	- voice						

/\*d'/ has the following reflexes in our example languages:

	I	M	F	nM
Atayal	r		-	
Tsou	ts ?		-	
Paiwan	dz (d')		-	
Malay	d'	d'	-	n'd'
Javanese	d'	d'	-	n'd'
Tagalog	d	r	-	nd
Toba Batak	d'	d'	-	n'd'
Ngadju Dayak	d'	d'	-	
Hova	z	z	-	
Fijian	o	o	-	s
Tongan	h	h	-	h

/\*k'/ has the following reflexes in our example languages:

	I	M	F	nM
Atayal			–	–
Tsou			–	–
Paiwan <sup>21</sup>	ts ?		–	–
Malay	t'	t'	–	n't'
Javanese	t'	t'	–	n't'
Tagalog	s	s	–	ns
Toba Batak	s(t')	s	–	ts
Ngadju Dayak	t'	t'	–	n't'
Hova	ts	ts	–	–
Fijian	o	o	–	s
Tongan	h	?	–	h

/\*g'/ has the following reflexes in our example languages:

	I	M	F	nM
Atayal	–	g/r		
Tsou	–	∅		
Paiwan <sup>22</sup>	d ?	d		
Malay	–	d	t	
Javanese	–	r	r	(r)
Tagalog	–	l	d	(l)
Toba Batak	–	g	k	ŋg
Ngadju Dayak	–	r		nd
Hova	–	r	-r/-tra	
Fijian	–	o		s
Tongan	–	h	-h-/∅	h

/\*t'/ has the following reflexes in our example languages:

	I	M	F	nM
Atayal		h		–
Tsou	s	s	s	–
Paiwan	t	t	t	–
Malay	s	s	s	ŋs
Javanese	s	s	s	ŋs
Tagalog	s	s	s	(s)
Toba Batak	s	s	s	(s)
Ngadju Dayak	s	s	s	

21. Dahl 1976 p. 82 mentions a tentative cognacy between UIN «k'aiŋ» «viscous, together» and Paiwan «tsaiŋ», «united, connected». If the cognacy is valid, he goes on, it could be evidence for a merge between /\*k'/ and /\*t<sub>2</sub>/ in Formosa, parallel to that between /\*d'/ and /\*d<sub>2</sub>/, and /\*n'/ and /\*l/ respectively. He also mentions a merger between /\*Z/ and /\*d<sub>1</sub>/, but proceeds in Dahl 1981 to remove /\*Z/ from the PAN phoneme inventory altogether.

22. Paiwan /d/ appears to be a reflex exclusively of PAN /\*g'/ (see Dahl 1981 p. 78). Since Paiwan /d/ does occur initially, it may be a hint that /\*g'/ originally also occurred in initial position. However, the words concerned do not have cognates outside Formosa, and may be loans.

	I	M	F	nM
Hova	s	s	-s/-/∅	
Fijian	o	o	-o/-/∅	s
Tongan	h	h	-h/-/∅	h

/\*θ/ has the following reflexes in our example languages:

	I	M	F
Atayal		s	s

For other languages in our list see /\*t'/ - a complete merger has taken place.

/\*n'/ has the following reflexes in our example languages:

	I	M	F
Atayal	l ?	l	-
Tsou	h	h	-
Paiwan <sup>23</sup>	ɬ ?	ɬ	-
Malay	n'	n'	-
Javanese	n'	n'	-
Tagalog	n	n	-
Toba Batak	n	n	-
Ngadju Dayak	n'	n'	-
Hova	n	n	-
Fijian	n	n	-
Tongan	n	n	-

### Velars

The development of velars appears to have been rather straightforward, with the exception of the velar fricative /\*ɣ/, which has evolved into /r/ or /z/ in several languages. However, this counts as evidence as concerns the phonetic identity of /\*ɣ/.

/*g/	+ velar	/*k/	+ velar	/*ɣ/	+ velar	/*ŋ/	+ velar
	+ stop		+ stop		+ fricative		+ nasal
	+ voice		- voice		+ voice		

/\*g/ has the following reflexes in our example languages:

	I	M	F	nM
Atayal				-
Tsou				-
Paiwan	g			-
Malay	g	g	ɣ	ŋg
Javanese	g	g	g	ŋg
Tagalog	g/k	g/k	g	ŋg
Toba Batak	g	g	k	ŋg
Ngadju Dayak	g	g	k	ŋg
Hova	h	h	-ka	ŋg
Fijian	k	k	∅	ŋg
Tongan	k	k		k

23. Here, too, Li gives /l'/ as a reflex.

/\*k/ has the following reflexes in our example languages:

	I	M	F	nM
Atayal	k,q		k	-
Tsou	∅	k, ɔ		-
Paiwan	k	k	k	-
Malay	k	k	ɔ	ŋk
Javanese	k	k	ɔ	ŋk
Tagalog	k	k	k/ɔ	ŋk
Toba Batak	h/g	h/g	k	kk
Ngadju Dayak	k	k	k	ŋk
Hova	h	h	-h/k/-ka	ŋg
Fijian	k	k	-k/-∅	ŋg
Tongan	k	k	-k/-∅	k

/\*ɣ/ has the following reflexes in our example languages:

	I	M	F
Atayal	g	g(r/_i)	g
Tsou	∅,r	∅,r	∅
Paiwan	∅	∅	∅
Malay	r	r	r
Javanese	ɔ	∅	ɔ
Tagalog	g	g	g
Toba Batak	h,(r)	r	r
Ngadju Dayak	r	r	r
Hova	z	z	-z/-∅
Fijian	ɔ	∅	∅
Tongan	∅	∅	∅

/\*ŋ/ has the following reflexes in our example languages:

	I	M	F
Atayal	ŋ	ŋ	ŋ
Tsou		ŋ	
Paiwan		ŋ	ŋ
Malay	ŋ	ŋ	ŋ
Javanese	ŋ	ŋ	ŋ
Tagalog	ŋ	ŋ	ŋ
Toba Batak	ŋ	ŋ	ŋ
Ngadju Dayak	ŋ	ŋ	ŋ
Hova	-	n	-n/-na
Fijian	ŋ	ŋ	-ŋ/-∅
Tongan	ŋ	ŋ	-ŋ/-∅

We notice here that there appear to be no reflexes whatsoever of PAN /\*g/ in Atayal and Tsou, and only two in Paiwan<sup>24</sup>. The reasons for this are difficult to guess, but one possibility is that /\*g/ is a later development in

24. \*gat<sub>2</sub>əl > gatsəl «itch»; \*gafut<sub>2</sub> «scrape» > garuts «comb».

Austronesian, **after** the migration to Formosa, in which case the two Paiwan words may be loans. However, it is more probable that PAN /\*g/ has evolved beyond recognition –and that the cognacy of Formosan and non-Formosan forms remains to be established.

### Uvulars and pharyngeals

The rather ambitious plural suffix to the title can not hide the fact that the PAN phonemic system only had one of each of these –which all have been constructed from aberrant reflexes of UIN \*h and \*‘/. It should be noted that the exact phonetic shape of these proto-phonemes is rather uncertain, as are the reflexes in the various languages. Since in many languages there is free variation between intervocalic h and Ø, or even ʔ, many of the correspondences between these back phonemes may be coincidental, and in fact large-scale merging has taken place with /\*h/, /\*q/, /\*h/, /\*S<sub>1</sub>/, /\*S<sub>2</sub>/, /\*H<sub>1</sub>/ and /\*H<sub>2</sub>/, at any rate outside Formosa. /\*q/ has survived as a uvular stop in Atayal and Paiwan (as well as Thao, also from Formosa), but the reflexes are very irregular in other languages.

/*q/	+ uvular	/*h/	+ pharyngeal
	+ fricative		+ fricative
	– voice		– voice

/\*q/ has the following reflexes in our example languages:

	I	M	F
Atayal	q	q	q
Tsou		ʔ	ʔ
Paiwan	q	q	q
Malay	h, Ø	Ø <sup>25</sup>	h
Javanese	Ø	h, Ø	h
Tagalog	ʔ	ʔ	ʔ
Toba Batak	ʔ	Ø	Ø
Ngadju Dayak	Ø(h)	Ø	Ø
Hova	Ø	Ø	Ø
Fijian	ʔ, y/___a	Ø	Ø
Tongan	ʔ	ʔ	-ʔ-/-Ø

/\*H<sub>2</sub>/ has the following reflexes in our example languages:

	I	M	F	nM
Atayal		Ø	Ø	

25. The Malay reflex of «\*q» is «-h-» between equal vowels, otherwise «Ø». The same holds for Tagalog.

For the other languages in our list of /\*H<sub>1</sub>/. A complete merger has taken place.

### Glottal fricative /\*h/

The reflexes of /\*h/ are also rather irregular, which is understandable, considering how easy it is to elide an intervocalic /h/.

/\*H<sub>1</sub>/ has the following reflexes in our example languages:

	I	M	F
Atayal	h	h	h
Tsou	∅	∅	∅
Paiwan	∅	∅	∅
Malay	∅	h	h
Javanese	∅	h	h
Tagalog	h	ʔ	ʔ
Toba Batak	ʔ	∅	∅
Ngadju Dayak	h	h	h
Hova	∅	∅	∅
Fijian	ʔ,y/—a	∅	∅
Tongan	ʔ	ʔ	ʔ/∅

### Vowels

The Proto-Austronesian vowels are the only phonemes which are relatively straightforward. The reconstructed vowel system of PAN has four vowel phonemes: /\*a/, /\*i/, /\*u/ and /\*ə/. The first three have remained unchanged in the daughter languages, as a regular reflex (although there are many cases of irregular reflexes, assimilation or unexplained variation, as well as vowel changes depending on phonetic context)<sup>26</sup>. /\*ə/, however, has shifted in all possible directions, sometimes splitting because of phonetic context, sometimes merging with some other phoneme.

The reflexes of PAN /\*ə/ are as follows:

	1st syllable	2nd syllable
Atayal	u, ə	u
Tsou	o	o
Paiwan	ə	ə, u
Malay	ə	a
Javanese	ə	ə
Tagalog	i	i
Toba Batak	o	o
Ngadju Dayak	e (a)	e
Hova	e	i
Fijian	o	o
Tongan	o	o

26. The development into a 5- or 6- vowel system in many Austronesian languages is usually due to lowering of /u/ and /i/ to /o/ and /e/ in certain contexts, either depending on position in the word (such as Tagalog: /u/ > /o/ in a final syllable) or phonetic context (ex au > o in many languages).

«Approximants»

It should be noted that there does occur a certain variation of the vowel phonemes /\*u/ and /\*i/ in intersyllabic position, since they then tend to be reinterpreted as approximants [w] and [j], and these then have a separate development in the daughter languages. I have followed Dahl in not including them in the phoneme system of Proto-Austronesian, but the information as such is still of value, and therefore I include them in the following development chart. I repeat that what follows is what happens to /\*u/ and /\*i/ when they occur at syllable boundaries:

/\*u/

	I	M	F
Atayal	∅,u		w
Tsou	∅,v		au>o
Paiwan	v	v	w
Malay	∅	w,∅	iu>i
Javanese	w	w	∅
Tagalog	w	w	w
Toba Batak	–	o,∅	
Ngadju Dayak	–	w	w
Hova	v	v	au>u
Fijian	w	w	au>o
Tongan	v	v	au>o

/\*i/

	I	M	F
Atayal	–	j	i
Tsou	–	z	i
Paiwan	–	j	i
Malay	–	j	ui>i
Javanese	–	j	∅
Tagalog	–	j	j
Toba Batak	–	∅	∅
Ngadju Dayak	–	y	ui>oi
Hova	–	z	-z-,ai>i,ui>u
Fijian	–	o	ai>e
Tongan	ʔ	∅	ai>e,ui>i

Feature development in Austronesian phonemes

Here follows short formalisation of what may have been the processes involved in the development of Austronesian phonemes, together with speculations as to what this can tell us about the classification of Austronesian languages. I shall not go into the development of the postvelars, since

the reflexes are so irregular that no interesting generalisations could be made.

The following set of phonological rules can in no way be said to cover all examples, and in fact not even all changes which only occur in one language and one position. However, I shall try to include most regular changes, at any rate those that readily can be formalised or are of special interest. This of course implies that devoicing of consonants in final positions only will be mentioned in cases where it does not cover all consonants.

Further, I have made the following addition to the rule-writing system: Features in parentheses mean that the feature is **part** of the phoneme, but does not necessarily span the entire phoneme. Thus, (stop) means «stops of affricates», i.e. any phoneme containing a stop, and (fricative) means «fricatives or affricates», i.e. any phoneme containing a fricative.

Please note that the generalisations made here concern the phonetic changes in the example languages above, and that a generalisation such as «Formosan» implies that the development has taken place in Atayal, Paiwan and Tsou, but not necessarily that it is common throughout all the Formosan languages.

*Universal changes* (note that the changes are ordered <sup>27</sup>):

+ nasal	⇒ Hova -na/ __ #	(*m, *n, *n', *ŋ)
/*/	⇒ Hova -na/ __ #	
- labial		(dentals, retroflexes and palatals)
- velar	⇒ Hova -tra/ __ #	
+ velar		(*k, *g)
+ stop	⇒ Hova -ka/ __ #	
- vowel	⇒ Hova Ø/ __ #	(elision of final consonants)
- vowel	⇒ Oceanic Ø/ __ #	

*Labials*

*b	⇒ Hova: - stop /v/	
	⇒ Paiwan/Tsou: - stop	⇒ Paiwan /v/
		⇒ Tsou: - voice /f/
	⇒ Oceanic: - stop	⇒ Melanesian /v/
		⇒ Polynesian - voice /f/
*p	⇒ Hova: - stop /f/	
	⇒ Oceanic merge with *b (cf above)	

27. The ordering of changes does not necessarily imply that the order in all cases is strict, rather that following the changes in the given order does not lead to incorrect conclusions. Changes which may have taken place parallelly, or where the order is of no consequence, still have to be ordered, for purely graphical reasons.

*Dentals and retroflexes:*

- + sibilant    ⇒ Formosan /s/            /\*S<sub>1</sub>/  
              ⇒ elsewhere: postvelar
- /\*d/         ⇒ Paiwan /dʰ/
- /\*dz/        ⇒ Paiwan /dz/
- /\*q/         ⇒ Paiwan /q/
- + coronal                               (\*d<sub>1</sub>, \*d<sub>2</sub>, \*d<sub>3</sub>)
- + (stop)
- + voice       ⇒ Atayal: – stop/# \_\_ /r/  
              ⇒ Tagalog: /d/ \_\_ #  
              ⇒ Hova: – stop /r/  
              ⇒ Oceanic: – stop        ⇒ Melanesian /r/  
  ⇒ Polynesian + lateral /l/  
              ⇒ Javanese: – stop /r/ (interrupted process, \*d<sub>1</sub> mainly /d/)
- + dental                               (\*d<sub>1</sub>)
- + stop
- + voice       ⇒ Tsou: + (fricative)  
                  – voice            /ts/  
              ⇒ Tagalog: – stop/V \_\_ V /r/
- + coronal                               (\*d<sub>1</sub>, \*d<sub>3</sub>)
- + stop
- + voice       ⇒ Tagalog /d/ /# \_\_
- + coronal                               (\*d<sub>1</sub>, \*d<sub>2</sub>, \*d<sub>3</sub>)
- + (stop)
- + voice       ⇒ Tagalog: + lateral/V \_\_ V/l/  
              ⇒ Tagalog: + lateral/# \_\_ /l/  
              ⇒ elsewhere: – (fricative)/d/
- + dental                               (\*t<sub>2</sub>)
- + affricate
- voice       ⇒ Atayal: – (stop) /s/  
              ⇒ Paiwan, Tsou /ts/
- + dental                               (\*t<sub>1</sub>)
- + stop
- voice       ⇒ Paiwan + palatal /tʰ/  
              ⇒ /t/
- /\*n/         ⇒ everywhere: /n/
- + retroflex                             (\*S<sub>2</sub>)
- + fricative
- voice       ⇒ Atayal: + glottal /h/  
              ⇒ Tsou: ∅  
              ⇒ elsewhere: merged with \*S<sub>1</sub>

*Laterals*

- /\*j/         ⇒ Atayal, Tsou: – lateral   ⇒ Atayal: + palatal /i,j/  
  ⇒ Tsou: + trill /r/

- ⇒ elsewhere: /l/  
 /\*ɬ/ ⇒ Tsou: Ø/ \_\_ #  
 ⇒ Tsou: velar/postvelar /h,k/  
 ⇒ Paiwan /l/  
 ⇒ Atayal: – velarised /l/  
 ⇒ – velarised/# \_\_  
 ⇒ elsewhere: + nasal
- Palatals*
- + palatal  
 – nasal ⇒ Oceanic /\*θ/?<sup>28</sup> ⇒ Melanesian: + voice /o/  
 ⇒ Polynesian: + glottal /h/
- /\*d'/ ⇒ Formosa: merge with /\*d<sub>2</sub>/  
 ⇒ Tagalog: merge with /\*d<sub>1</sub>/  
 ⇒ Hova: – stop /z/  
 ⇒ elsewhere: /d'/
- /\*k'/ ⇒ Formosa: merge with /\*t<sub>2</sub>/?  
 ⇒ Tagalog, Toba Batak: merge with /\*t'/  
 ⇒ Hova: + dental  
 + affricate /ts/  
 ⇒ elsewhere: /t'/
- /\*t'/ ⇒ Atayal: postvelar  
 ⇒ Paiwan: – palatal /t/  
 ⇒ elsewhere: /s/
- /\*g'/ ⇒ Formosa: – palatal ⇒ Atayal /g/  
 ⇒ Paiwan: + dental /d/  
 ⇒ Tsou Ø  
 ⇒ Malay: merge with /\*d<sub>1</sub>/  
 ⇒ Javanese, Tagalog: merge with /\*d<sub>2</sub>/ ⇒ Javanese /r/  
 ⇒ Tagalog /l/  
 ⇒ Ngadju Dayak: merge with /\*d<sub>3</sub>/ /r/<sup>29</sup>  
 ⇒ Hova: /r/  
 ⇒ Toba Batak: – palatal /g/ (/k/ / \_\_ #)
- /\*n'/ ⇒ Formosa: merge with /\*ɬ/  
 ⇒ Tagalog, Toba Batak, Hova, Oceanic: merger with /\*n/  
 ⇒ elsewhere: /n'/
- /\*θ/ ⇒ Atayal: + sibilant /s/  
 ⇒ elsewhere: merger with /\*t'/

28. It is interesting to note that the rather improbable merger of PAN /\*θ/ with /\*t'/ may possibly have a parallel in the development of the Proto-Austronesian palatals in Oceanic languages, but in the other direction. If the Formosan distinction between PAN /\*θ/ and /\*t'/ should turn out to be a conditioned split in those languages where it occurs, we should maybe reconsider the phonetic value of the phoneme /\*θ/t'/ (possibly a palatalised interdental /t/?).

29. Another possible explanation may be loans from Malay or Javanese, which show the reflex /r/.

*Velars*

+ velar		(*k, *g)
+ stop	⇒ Oceanic: – voice /k/	
	⇒ Tagalog: – voice /k/ (partial merger, sometimes /g/)	
	⇒ Toba Batak: + voice /g/ (partial merger, sometimes /h/)	
	⇒ Hova: – stop	
	+ glottal /h/	
/*g/	⇒ elsewhere: /g/	
/*k/	⇒ elsewhere: /k/	
/*ɣ/	⇒ Atayal: + stop /g/	
	⇒ Formosa elsewhere: ∅ (occasionally /r/)	
	⇒ Tagalog: + stop /g/	
	⇒ Mal, TBatak,	
	NgDay, Ho: + dental	⇒ Hova: + sibilant /z/
		⇒ elsewhere: + trill /r/
	⇒ elsewhere: postvelar	
+ velar		(*ŋ)
+ nasal	⇒ Hova + dental	

As may be seen from the above tables, there appears to be very little symmetry in the system of sound changes in Proto-Austronesian –which in turn implies that the possibility of generalising further than I have done above is rather small. It would, of course, have appeared less chaotic if I had contented myself with a smaller group of example languages, or indeed with languages of a more homogeneous group (say, the languages of the Philippines or Melanesia). However, the mere fact that almost all subgroups of Austronesian are represented allows me to tentatively set up a table of historical developments within the Austronesian phonemic system.

**History**

As a conclusion, it is tempting to try to summarise what information we have about the history of Proto-Austronesian phonology. No attempts will be made to date the different developments in absolute time, only in relation to one another, and to what we can surmise were the movements of the Austronesian peoples.

- Phase α: Pre-Proto Austronesian, no palatals
- Phase β: -i- infixation occurs in some cases
- Phase γ: -i- infix causes palatalisation / infix disappears
- Phase 1: Earliest known stage
- Phase 2: Migration to Formosa, unknown number of waves
- Phase 3: Appearance of «emphatic» nasal infix /\*ŋ/
- Phase 4: Migration to Polynesia and Melanesia
- Phase 5: /\*t'/ becomes /s/
- Phase 6: Nasal infix /\*ŋ/ becomes homorganic before stops

Phase 7: Migration to Madagascar (ca 700 A.D.?)

Phase 7a<sup>30</sup>: Rise and fall of \*Z, Indonesian area.

The reasons for positing the above developments are recapitulated below:

– The three phases marked by Greek lettering constitute a speculative<sup>31</sup> description of a stage of development in Pre-Proto-Austronesian, viz, the appearance of palatals and palatal/non-palatal doublets. There are admittedly several language groups which lack palatals, but it is in this case more probable that the distinction has again been lost, since even Formosan languages do not lack palatals<sup>32</sup> as such, only certain ones (\*d', \*n', \*k').

– Formosan languages are the only group among the languages in the corpus which totally lack prenasalisation of medial consonants, therefore we can assume that the migration to Formosa took place before the development of prenasalisation (i.e. of the nasal infix /\*ŋ/).

– Oceanic languages have merged all (non-nasal) palatals to /o/ and /h/ respectively, including /\*t'/, which would allow us to assume that the Oceanic group separated from the Austronesian mainstream **before** /\*t'/ developed into /s/ –since this development would have prevented the evolution of /\*t'/ as a «normal» palatal, but **after** the appearance of the nasal infix /\*ŋ/– since Oceanic languages have prenasalisation<sup>33</sup>.

– The development of /\*t'/ to /s/ must precede the development of /\*ŋ/ to a homorganic nasal before stops, otherwise we cannot explain the survival of /ŋ/ instead of /n/ before stops. Note however that these are two processes which conceivably could occur independently –we have for example the evidence from Tsou that /\*t'/ has developed into /s/ although Formosan languages separated from Proto-Austronesian before the change became universal. Likewise, the development of /\*ŋ/-prefixed stops in Oceania shows that we here also are dealing with homorganic nasals, which, however, must have appeared independently after the migration.

– Since evidence for these developments can be found in Malagasy, we can assume that they occurred before the migration to Madagascar. However, we can but speculate as far as the appearance and disappearance of \*Z is concerned –it seems reasonable to place it relatively late, since it has apparently not interfered with the development and evolution of palatals in general, and has not spread as we would expect had it occurred earlier in the chronology.

This historical overview could be made much more detailed<sup>34</sup>, but

30. Phases 7 and 7a may well have been simultaneous –at any rate we have no way of knowing whether one preceded the other, since the data concerning \*Z is restricted to Malay and its neighbours.

31. There by not necessarily implying that the numbered phases are certain –just less speculative.

32. Of course I mean the *reflexes* of PAN palatals.

33. It should here be noted that that Polynesian languages in fact lack prenasalisation in the cases relevant to our reconstruction, but the distinction survives in the fact that prenasalised labials have survived as stops instead of being fricativised as their non-prenasalised counterparts.

34. I have deliberately omitted the development of the two-way /d/-/d/ distinction in

would then lose its clearness. Any more detail would imply the necessity of counting with alternative ordering, and is far beyond the scope of this paper. Moreover, the data required to set up an entire history of Austronesian would be enormous. However, the above chronology offers a possible historical description, and sections of it appear in Dahl 1976 and 1981. Its function is basically to be a skeleton upon which we can hang new data as they are found. The discovery of a new set of cognates implying hitherto unknown phonetic changes can be checked against the stages through which Proto-Austronesian has gone, and depending upon which developments have been «fed» or «bled» by the change, its place in the chronology can be determined. Note, however, that the only development which we can date <sup>35</sup> (the migration to Madagascar) occurred, as far as we can tell, after (or not before) stages 1 to 6, which thus renders us incapable of dating any of the other developments. Moreover, it should always be remembered that the *linguistic* separation of Malagasy from the other Austronesian languages need not necessarily coincide with the migration to Madagascar –we can only be sure that it did not occur long after the migration.

I have not mentioned in the historical overview changes which have occurred locally after the Austronesian diaspora –however, they are of course the main clues we have for dating the migrations of various groups. Once a language subgroup has been removed from the mainstream of common Austronesian development, it continues of course to evolve, but its evolution after a certain point can not be evidence as far as Proto-Austronesian is concerned.

One interesting point is the parallel situation in Oceania and Madagascar, as far as the simplification of the phoneme system is concerned –the disappearance of distinction between final stops in many cases (of the stops themselves in Oceania), with relics surviving before suffixes, the merging of palatals with their corresponding dentals, the fricativisation (and merging in Oceania) of /\*p/ and /\*b/, to name just some examples. These changes are incidentally widespread on Formosa as well, and can have two possible explanations:

a) That the original phoneme system in Proto-Austronesian contained no palatals, and no voiced/voiceless distinction among the labials <sup>36</sup>, and that these have evolved after the diaspora.

b) That simplifications of this kind are «natural», to such an extent

Javanese, since there is no way of dating it in relation to the other developments in the chronology. Unfortunately, the existence of a corresponding homorganic nasal /ŋ/ to /d/ is no evidence as to whether the process occurred before or after phase 6, since: i) once commenced, phase 6 has remained productive for native stems to this day and ii) medial /\*d/ which later developed into /r/ may have had a homorganic nasal without leaving any trace since the nasal would not have been likely to survive before /r/ anyway. This is very unfortunate, since all evidence supports the hypothesis that the development of /\*d/ to /r/ was interrupted by the evolution of the /d/-/d/-distinction, which in turn can be dated to roughly 100-300 A.D., when Sanskrit culture started making an impact on Javanese society (see Coedès 1968, pp. 18-19).

35. Cf Dahl 1991 chapter 11 and elsewhere in the book.

36. Or no labial stops at all! The alternatives here are virtually endless.

that we should not be surprised at finding the same development in different areas.

The second alternative is more likely, but there are a few problems. That such a simplification should have occurred in Formosa implies that the position of the Formosan languages as «conservative» (derived mainly from the enormously complex verbal system, fully functional in Formosa, but of which there only remain traces in for example Indonesia) must be reconsidered<sup>37</sup>. However, the data is hardly sufficient to clarify the point at this stage.

## Conclusion

By completely ignoring the information given to us by the varying grammatical systems in Austronesian languages, we get into a situation where the classification of Austronesian languages no longer is as straightforward as it was. On the one hand, we have the grammatically conservative languages of Formosa, which retain (or have independently developed?) sets of phonemic distinctions which are unknown outside Formosa, but which have lost (or never had?) a distinction between palatalised and non-palatalised consonants, while on the other hand, we have the «outer» language areas (Oceania and Madagascar), which lack the same phonemes as the Formosan languages (having, however, not merged the palatalised consonants with their non-palatalised counterparts, but with one another) –but do not have the typically Formosan phoneme distinctions.

An exceedingly simplified traditional classification of the Austronesian languages is in Formosan, Eastern and Western (Eastern consisting basically of Oceanic languages, and Western of the rest). This classification is based mainly on grammatical and lexicostatistical evidence, and takes less into account the phoneme correspondences between the languages. If we only consider the phoneme correspondences, we arrive at a classification more on the lines of Central/Indonesic<sup>38</sup> and Peripheral, with Peripheral comprising Formosan and Trans-Oceanic. Trans-Oceanic would then comprise the sub-groups Eastern (Oceanic) and Western (Malagasy).

This classification is a construction, and cannot claim to represent the actual development of Austronesian languages. However, this would be the logical conclusion we should have to draw if we were to accept phonological evidence as the only basis for classifying language families. Personally, I am of the opinion that there is no basis for revising the present (traditional)

37. The problem raised by the fact that the distinction of voice only has been lost among the labials, is not really a problem. Voiced dentals and retroflexes had a 3-way distinction, whereas their voiceless counterparts had a two-way distinction. This must have been a factor preventing merging. As far as the velars are concerned, they have merged in Oceania, but we have no information as to mergers on Formosa (in our three example languages), since, with the exception of the two examples quoted in the section of velars (footnote 24), we have no Formosan cognates.

38. I have coined the term to avoid associations with modern Bahasa Indonesia.

classification of Austronesian languages, and certainly not upon grounds as those I have given, given the knowledge that exists about the grammatical systems of the various languages, and the lexico-statistical evidence which supports the present classification. My «pseudo-classification» is and remains a thought experiment, and should be treated as such. I would not go as far as to say that phonological change should be ignored when classifying languages into families, but I hope that my example shows clearly enough the dangers of basing all classification on soundlaws<sup>39</sup>.

As far as the parallel developments in Oceania, Formosa and Madagascar are concerned, it is very improbable that we are dealing with anything other than coincidences, and it should be obvious from the results reached that phonological change is enormously productive (especially over such time-spans such as those with which we are dealing) and does not need to be derived from some «common» tendency within a larger sub-group. Despite many voices being raised to the contrary, I still consider comparison of grammatical structure (preferably along with lexicostatistics) to be one of the safest methods of investigating the historical development of a set of languages. This is however not intended as a denigration of the excellent work done by many historical linguists –the point is that the comparison of phoneme systems is no «universal medicine».

The work of Benedict and Sagart has traced Proto-Austronesian even farther back, linking it with Thai, Japanese and even Chinese, which would completely revolutionise our conception of the classification of Asian languages, if it were irrefutably proven. It should, however, be added that there is by no means any consensus among linguists as to the validity of these claims, and especially the newest theories, concerning Japanese and Chinese<sup>40</sup>, have met with certain scepticism (and, should in all fairness be added, considerable excitement) from other researches in the field.

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39. Another logical consequence of relying solely upon sound-laws would be that the peripheral lack of palatalised phonemes would point to a separation in pre-Proto-Austronesian times, which however is contradicted by the fact that the merging of palatals has occurred in different ways, and precludes the possibility of Oceanic languages never having had a palatalisation distinction (the palatals having merged with one another, cf above).

40. Benedict 1990 and Sagart 1990, respectively.

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## LABURPENA

«Austronesian phonological change» delako lana, austronesio protohizkuntza berre-raikiaren elementu fonemiko (Dempwolff eta Dahlek berreraikitua) eta austronesio hizkuntz familiako hizkuntz berri batzuen artean dauden korrespondentzi erregularrak deskribapen motza da.

Zenbait elementu fonemikoen berreraiketara batzu elkar konparatzen dira lan honetan, kasu askotan, berreginketa bat ala bestea aukeratzeko argudioak ematen direlarik.

Glotal eta ubular soinuak aipatzen ez direnez, korrespondentzi hauek ez dira oso erregularrak suertatzen.

Azkenik, (Dahlen lanetan oinarriturik) austronesioak izandako aldaketa fonologikoen orden kronologikoa egiten saiatzen gara, austronesio taldeetako migrazioen datu historikoz lagundurik zenbait puntuetan.

Era berean, austronesio hizkuntzetako sasi-sailkapen fonologikoa egiten da. Honek, hizkuntz sailkapenak egiterakoan eredu fonologikoa soilik erabiltzeak daukan arriskua erakusten delarik.

## RESUMEN

El trabajo «Austronesian phonological change» (Cambio fonológico austronesio) es una corta descripción de las correspondencias regulares entre los elementos fonéticos de la protolengua austronesia reconstruida entre otros, por Dempwolff y Dahl, y varios idiomas modernos de la familia austronesia. En este trabajo se comparan varias

reconstrucciones de algunos elementos fonémicos, y se dan argumentos para preferir una u otra reconstrucción en diferentes casos –aunque se evita de tratar los sonidos uvulares y glotales, no siendo bastante regulares las correspondencias. Finalmente se presenta una tentativa cronología de los cambios fonológicos austronesios (parte del cual es una sinopsis del trabajo de Dahl), en ciertos puntos comparada con datos históricos conocidos sobre las migraciones de los grupos étnicos austronesios– y se da una pseudo-clasificación fonológica de las lenguas austronesias, la cual demuestra el peligro que yace en considerar solamente aspectos fonológicos al hacer clasificaciones lingüísticas.

## RÉSUMÉ

Le travail «Austronesian phonological change» (Evolution phonologique austronaise) est une description brève des correspondances régulières entre les phonèmes de la proto-langue austronaise, reconstruée par Dempwolff et Dahl, et certaines langues modernes dans la famille austronaise. Certaines reconstructions de quelques phonèmes seront comparées et, d'autre part, des arguments seront présentés pour démontrer la préférence d'une de ces reconstructions –bien que les sons uvulaires et glottales soient évités, puisque les correspondances ne sont pas suffisamment régulières. Finalement, l'auteur présentera une chronologie tentative de l'évolution phonologique austronaise (où apparaîtront également des idées originalement présentées par Dahl); elle sera comparée avec des dates connues sur les migrations des peuples austronais une «pseudo-classification» phonologique des langues austronaises sera également présentée, pour illustrer le danger dans la considération aveugle des aspects phonologiques dans les classifications linguistiques.

## SUMMARY

The paper «Austronesian phonological change» is a short description of the regular correspondences between the phonemes in Proto-Austronesian, as reconstructed by Dempwolff and Dahl, *inter alii*, and several modern languages in the Austronesian family. In the paper, differing reconstructions of various phonemes are compared, and arguments are in each case given in support of one or the other of the hypotheses –however, uvular and glottal phonemes are totally ignored, the correspondences in these cases not being sufficiently regular. Finally, a tentative chronology of Austronesian phonological changes is presented (in part based upon the theories of Dahl), and compared, as far as possible, with known historical evidence concerning the migrations of the Austronesian peoples –and a phonological «pseudo-classification» of Austronesian languages is given, thereby demonstrating the dangers which lie in relying solely upon phonological evidence when working with linguistic classification.