

PROBLEMS OF PHONE ASSIGNMENT IN THE DESCRIPTION OF THAILAND LISU PHONOLOGY

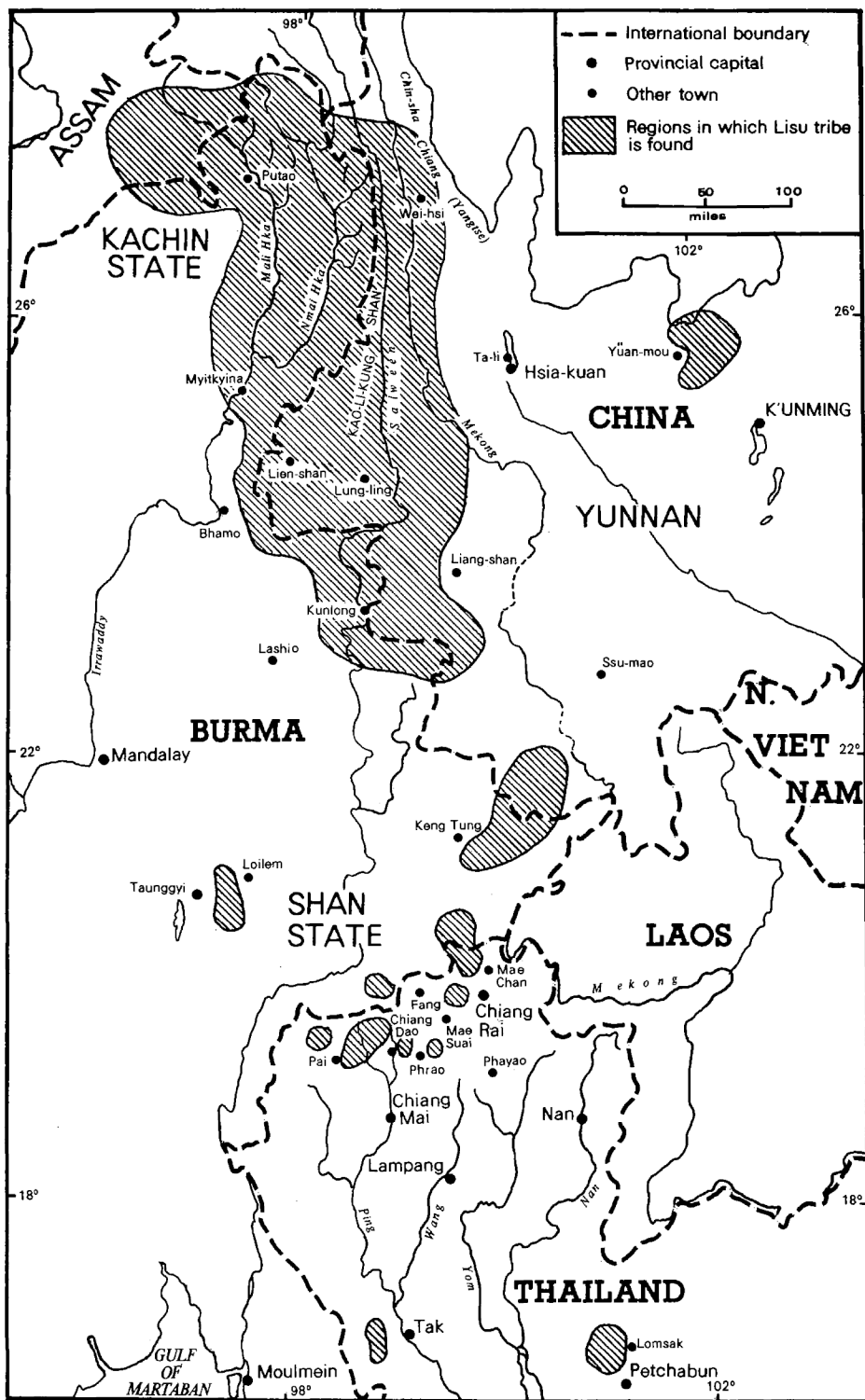
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0. INTRODUCTION

Lisu is a Tibeto-Burman language belonging to the Lolo group in which Lahu, Akha and I (Nosu) are also members. There are at least five major dialects of Lisu found in the border areas between Burma and China, and Burma and Thailand (see map). Some of these dialects are mutually unintelligible, even though they share a large common vocabulary. This is because some of the dialects have one set of postpositions, conjunctions and other grammatical markers, while other dialects have completely different sets. The dialect described in this paper is the most aberrant in all probability, being heavily Sinicised, but it is the only major dialect spoken in Northern Thailand.¹

The phonology of the Thailand dialect presents a number of problems for a phonemic analysis. Many of these problems have to do with the impossibility of assigning phones to phonemes in a unique way, while others are concerned with the item-and-arrangement nature of phonemic theory. In many of these problems the criteria usually associated with phonemics requires that one assign to a phoneme an allophone consisting not of a discrete "segment" of speech, i.e. not a phone, but of a characteristic or phonetic feature of a phone, the other features of which are assigned to other phonemes. In all of these cases a theory of phonology which is based on phonological rules of the item-and-process type would prove to be far more adequate. These rules would achieve the same sort of results for the phonology that sandhi rules achieve for morpho-phonemics.

The problems discussed in this paper have not been dealt with specifically in the descriptions which have been produced thus far,²



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but in fact the differences between these descriptions are usually related to one or other of the problems dealt with here. In order to discuss the problems within the framework of the phonology of Lisu as a whole, I will first outline one possible phonemic solution, and base the discussion on this. As the problems are identified, suggestions will be made about the ways the original solution can be modified.

1. A PROVISIONAL DESCRIPTION OF THE PHONEMIC SYSTEM

1.1 INITIAL CONSONANTS

	Labial	Simple Alveolar	Complex Alveolar	Palatal	Velar	Glottal
Stops: voiceless unaspirated	p	t	ts	c*	k	ʔ
voiceless aspirated	ph	th	tsh	ch*	kh	
voiced	b	d	dz	j*	g	
Fricatives: voiceless	f	s		ʃ*	x*	h
voiced	v*	z		y*	ɣ	
Nasals	m	n		ɲ*	ŋ	
Lateral		l		ʎ*		

(Items marked * are problematical and will be discussed.)

EXAMPLES supporting above analysis of initial consonants:

pa	tá	tsa	cá	ká	ʔa
<i>exchange</i>	<i>deposit</i>	<i>vine</i>	<i>cook</i>	<i>stab</i>	<i>waft</i>
pha	tha	tsha	chá	kha	
<i>glide</i>	<i>here</i>	<i>hot</i>	<i>rob</i>	<i>copulate</i>	
ba	da	dza	ja	gàgà	
<i>in milk</i>	<i>clever</i>	<i>rice</i>	<i>cold</i>	<i>dawdling</i>	
fà	sa		ʃa	xə	ha
<i>infected</i>	<i>easy</i>		<i>clean</i>	<i>good</i>	<i>send</i>
vă	zà		ɣə	ʎə	
<i>love-charm</i>	<i>son</i>		<i>homespun</i>	<i>weave</i>	

ma	na	na	na
ripen	sore	satiated	overturn

la	la
come	bright

Unassigned phone: [u], e.g. [ua] 'a snare'

1.2 SYLLABLE NUCLEI

1.21 Vowels

	Front	Central	Back
High	i*	ɨ*	u
Mid	e*	ə	ɔ
Low	æ		a

Unassigned phones: [∅] [ɥ⁺] [ɥ^u]

EXAMPLES supporting vowel analysis:

phi	tɨ	phɨ
seedless	stretched	picture

phe	phə	phɔ phɔ
divorce	loosen	flabby

phæ	pha
brush past	glide

EXAMPLES of unassigned phones: [ph^h∅³] 'bladder'

[ph^fɥ⁺³] 'drift'

[ph^fɥ^u³] 'silver'

1.22 Syllabic Nasals

/ŋ/, e.g. /ŋkhə tsf/ 'night-time'

1.3 SEMI-VOWELS (PRE-NUCLEAR)

/ɣ/ /w/

EXAMPLES: /phɣa/ 'fan out'; /swá/ 'castrated'.

1.4 FINALS

/y/ /w/ /n/

EXAMPLES: /túy/ 'vouch for'; /ʃaw/ 'saltpetre'; /pún/ 'stake'.

1.5 SUPRASEGMENTALS

1.51 Tones

*High level /' / [⁵]

Mid level /unmarked/ [³]

Low level /' / [¹]

*Mid rise /' / [³⁻⁵]

High fall /' / [⁵⁻²]

EXAMPLES: /má/ 'teach'; /ma/ 'ripen'; /mà/ 'plough'; /mǎmpé/ 'a bow'; /mâ/ 'please'.

Unassigned pitch phones: [³⁻⁴] [¹⁻⁴]

EXAMPLES: [mu: ³⁻⁴] 'have seen'; [mu: ¹⁻⁴] 'is old'.

1.52 Laryngealisation: /_ /

EXAMPLES: /thì nyi/ 'one day'; /thì nyi/ 'one finger's span';
/mà mù/ 'not old'; /mà mù/ 'not weeding'.

2. PROBLEMS OF CONTOID ASSIGNMENT

2.1 PALATALS

Before turning to a detailed discussion of the palatal series and its status, it is necessary to first consider the distribution of the other syllable onsets consisting of a full consonant initial followed by a palatal 'semi-vowel' /y/. The following is a chart of this distribution with examples:

pʸ	/pʸa/	'flatten'	ʔʸ	/ʔʸa/	'bounce'
ph	/phʸa/	'fan out'			
bʸ	/bʸa/	'burn'			
			hʸ	/hʸa/	'hundred'
mʸ	/mʸa/	'many'			

Since syllables having the canonical form CyV are so well established, it is apparent that if the palatal series of consonants can be interpreted as a series consisting of palatalised consonants (i.e. as Cy syllable onsets of the /pʸ/ type) rather than of single simple phonemes, then a great economy can be achieved in the total phoneme inventory. There would be seven fewer phonemes, while the description of syllable

structure is in no way complicated further.

2.11 Continuants

With the exception of [ʌ] the palatal continuant phones can be ascribed to either the alveolars or the velars. Rather than having one palatalised alveolar phoneme /ɪʲ/ and all the rest palatalised velars, it seems better to maintain some symmetry in the chart and treat the whole series as alveolars. Some support for this interpretation comes from the fact that a number of words commencing with /n/ and followed by /i/ (but not all such words) fluctuate in pronunciation from alveolar nasal initial to palatal nasal initial, i.e. where there is fluctuation it is between palatals and alveolars rather than between palatals and velars.

/nʲme/~/nyʲme/ 'today'; /nʲitsʲ/~/nyʲitsʲ/ 'button'.

The following are the main allophonic variations of the continuant initials when these co-occur with /ʲ/.

/sʲ/ [ʃ] Voiceless blade-alveopalatal deeply grooved fricative. Occurs with front and central vowels³, and with [ø]: /sʲf/ [ʃi⁵] 'to cement together'; /sʲʔ/ [ʃʔ¹] 'blood'; [ʃø¹] 'walk'.

[ç] Voiceless blade-palatal slit fricative. Occurs with back vowels. /sʲa/ [ça³] 'clean'.

In the speech of some speakers only the first allophone occurs, with all vowels.

/zʲ/ [j] Voiced blade-palatal slit fricative. Occurs with non-laryngealised high and mid vowels, and with [ø]. /zʲə/ [je¹] 'to flash'; [jø¹] 'use'.

[ʲ] High front on-glide. Occurs before /a/ and laryngealised vowels. /zʲátsʲ/ [ʲa⁵tsʲ³] 'appearance'; /zʲə/ [ʲə³] 'do'. In all unstressed syllables the latter allophone only occurs.

/hʲ/ [ʃ^h] Nasalised voiceless high front breathy vowel. Occurs with /a/. /hʲə/ [ʃ^ha¹] 'Serow goat'.

/mʲ/ [mʲ] Voiced bilabial nasal during which the tongue adopts a high front vowel position. Release of this contoid results in a brief high front on-glide. /mʲə/ [mʲa¹] 'many'.

/nʲ/ [n] Voiced blade-palatal nasal. Occurs before back vowels, [ø] and all laryngealised vowels. /nʲá/ [na⁵] 'surfeited'; [nø⁵] 'short'; /nʲi/ [ni³] 'a finger's length'.

[nʲ] A voiced tip-alveolar or tip-alveopalatal nasal followed by a brief high front on-glide. Occurs with non-laryngealised front vowels.

/nʷi/ [nʷi³] '*classifier for days*'.

/lʷ/ [ʌ] Voiced blade-palatal lateral. Occurs only with /a/.

/lʷá/ [ʌa⁵] '*shining brightly*'.

2.12 Stops

Palatal stop phones and the corresponding palatal affricate phones have complementary distribution, and this creates a serious problem. With the alveolar series the simple-stop : complex-stop contrast is established beyond doubt by the existence of such minimal pairs as:

/tà/ '*accuse*', /tsà/ '*to shift*';

/thà/ '*fruitful*', /tshà/ '*urgent*';

/dà/ '*draw water*', /dzà/ '*eat*'.

Thus, if both palatal stop phones and palatal affricate phones are assigned to the alveolar series (i.e. as /Cʷ/) one has to adopt the undesirable position that alveolar stop phonemes have affricate allophones, or the reverse, that alveolar affricate phonemes have stop allophones. This contradicts the distinction maintained above between simple and complex alveolar stops. It is tantamount to saying that stops and affricates both contrast with and complement each other. Such a position can only be adopted at the expense of logical consistency.

A possible means of circumventing the problem is to assign the palatal stop phones (and the affricate variants) to the velar series. In support of this analysis is the fact that the palatal stop phones fluctuate freely with palato-velar stop phones. This analysis achieves the same economy in the number of phonemes, but destroys the symmetry of the consonant chart since the palatal continuants are treated as an alveolar-plus-semi-vowel series, while the stops will be treated as a velar-plus-semi-vowel series.

A number of possible interpretations are thus possible, and the choice made will depend on the relative importance one attaches to such factors as phoneme economy, theoretical consistency, and chart symmetry. If phoneme economy is chosen as the main criterion, then a solution which treats the palatal phones as stop-plus-semi-vowel combinations will be chosen over one which treats the palatals as an autonomous series of full phonemes. If theoretical consistency is the main criterion, then in order to maintain unique assignment of phones to phonemes, the stop palatals will be treated as either an autonomous series of full phonemes, or as velar-plus-semi-vowel combinations. If, however, chart symmetry is to be the main criterion, then the palatal stop series will be treated as alveolar-plus-semi-vowel sequences.

For the purposes of this paper I will take as given the importance of economy in the phoneme inventory. This narrows the number of rival interpretations down to (i) the velar-plus-semi-vowel solution, (ii) the simple-alveolar-plus-semi-vowel solution, and (iii) the complex-alveolar-plus-semi-vowel solution. The final choice between a velar or an alveolar solution will depend entirely on whether theoretical cohesion (uniqueness) or chart symmetry is the more important criterion. The choice is not determined by phonemic theory one way or another, and to this degree the choice must be arbitrary, and *ad hoc*.

If an alveolar solution is adopted, the choice between (ii) and (iii) remains. Presumably the reason why an alveolar solution would be chosen would be because the symmetry of the consonant chart was deemed important, and this criterion would then require that the palatal stops be assigned to the simple alveolars rather than to the complex alveolars, since this is the series to which the palatal continuants have been ascribed. However, in support of the assignment of the problem phones to the complex alveolars, is the fact that before /u/, /wa/ and [y^u] there is free fluctuation between the palatal affricate phones and the complex alveolar affricate phonemes:⁴

[^ctʃwa³⁻⁵]~[tswa³⁻⁵] 'to scratch'

[^ctʃhwa⁵]~[tshwa⁵] 'to visit'

[^cdʒwa³]~[dzwa³] 'to help'

Assuming somewhat arbitrarily that the palatal phones are to be ascribed *in toto* to the simple alveolar series, then the following is the distribution of the 'stop' allophones:

/tʃ/ [^ccç] [c] [^ckʏ] Voiceless blade-alveopalatal affricate with slit fricative release, fluctuating freely with voiceless blade-palatal stop and with voiceless blade-palato-velar stop. Occurs with front vowels, /a/ and [ø]. /tʃi/ [^ccçi⁵]~[ci⁵]~[^ckʏi⁵] 'to clear jungle'; /tʃá/ [^ccça⁵]~[ca⁵]~[^ckʏa⁵] 'to cook'; [^ccçø⁵]~[cø⁵]~[^ckʏø⁵] 'to breed'.

[^ctʃ] Voiceless unaspirated blade-alveopalatal affricate with grooved fricative release. Occurs before /t/ /u/ /wa/ and [y^u]. /tʃʔ/ [^ctʃʔ⁵] 'to cough'; /tʃu/ [^ctʃo¹] 'clan'; /tʃwáphù/ [^ctʃwa⁵pho¹] 'mosquito net'; [^ctʃy^{u5}] 'to hollow out'. Some people have [^ctʃ] before /a/ in some words which the majority of Thailand Lisu pronounce with an initial /ts/. As mentioned above, there is free fluctuation between /tʃ/ and /ts/ before /u/ /wa/ and [y^u].

/thʃ/ [^ccçh]~[ch]~[^ckhʏ] Aspirated equivalents of analogous allophones of /tʃ/ above.

[^htʃ] Aspirated equivalent of analogous allophone of /tʲ/ above. Distribution of allophones is as for allophones of /tʲ/. A few speakers have [^htʃ] before /a/ where the majority of speakers have initial /tʃ/. In the speech of some speakers too [^htʃ] occurs before front vowels, in free fluctuation with the other allophones. /thʲə/ [^hcʰe¹] ~[che¹]~[^hkhʲe¹] 'gamble'; /thʲə/ [^hcʰa¹]~[cha¹]~[^hkhʲa¹] 'rob'; [^hcʰhø¹]~[chø¹]~[^hkhʲø¹] 'speak'; /thʲt/ [^htʃhʲ[†]³] 'barking deer'; /thʲù/ [^htʃho¹] 'six'; /thʲwá/ [^htʃhwa⁵] 'a bunch'; [^htʃhv^u¹] 'thorn'. There is free fluctuation between /thʲ/ and /tʃh/ before /u/, /wa/ and [v^u].

/dʲ/ [jj]~[j]~[^gy] Voiced blade-alveopalatal affricate with slit fricative release, fluctuating freely with voiced blade-palatal stop and with voiced blade-palato-velar stop. Occurs with front vowels, with /a/, laryngealised /u/ and with [ø]. /dʲi/ [jjⁱ¹]~[jⁱ¹]~[^gyⁱ¹] 'rub against'; /dʲálæ/ [jja¹læ¹]~[ja¹læ¹]~[^gya¹læ¹] 'naked'; /dʲu/ [jj^u³]~[j^u³]~[^gy^u³] 'afraid'; [jjø¹]~[jø¹]~[^gyø¹] 'domestic animals'.

[dʒ] Voiced blade-alveopalatal affricate with grooved fricative release. Occurs with /t/, non-laryngealised /u/, [v^u] and /wa/. /dʲt/ [dʒ[†]³] 'tusks'; /dʲu/ [dʒo³] 'have'; [dʒy^u³] 'herds'; /dʲwa/ [dʒwa³] 'down there'. There is free fluctuation between /dʲ/ and /dʒ/ before non-laryngealised /u/, before /wa/ and [v^u].

Adopting the above solution to the assignment of the palatal phones yields the following much fuller chart of Cʲ syllable onsets:

pʲ	tʲ	ʔʲ
phʲ	thʲ	
bʲ	dʲ	
	sʲ	hʲ
	zʲ	
mʲ	nʲ	
	lʲ	

The above statement, which treats each palatal as a sequence of phonemes rather than as a unit phoneme, masks one of the major problems. With phones such as [tʃ] which is ascribed to the sequence of phonemes /tʲ/, it is impossible to segment the phone into discrete units in a unique way. Which part of the phone is to be ascribed to /t/ and which to /ʃ/? And which part of the phone [c] is to be ascribed to /t/ and which to /ʃ/? It is quite obvious that no satisfactory answers can be

given to these and related questions about all of the phones in the palatalised series. All that can be stated is that when these two phonemes /t/ and /ʔ/ co-occur as a syllable initial, they fuse in some way, and are pronounced in ways which can then be specified. Such a rule is adequate, but it is not a phonemic rule.

2.2 VOICED LABIAL FRICATIVE

Two phones, [v] and [ʋ] have a distribution which is very nearly complementary:

	/e/	/æ/	/ə/	/u/	/a/	[v̥ ⁺]	[v̥ ^u]
[v]	x	x	x		(x)	x	x
[w]	(x)			x	x		

The contrast between [va] and [ʋa] occurs on only two words I know of, both of them borrowings. One of these contrasting forms [va³⁻⁵] '*aphrodisiac*' is fully assimilated, and the other [va³ thi³] '*calendar*' is fast becoming so.

The contrast between [ve] and [ʋe] is not very well established. Words of the form [ʋe] usually have an alternative form [ʋoʋ], but two or three do not. Many of these words are borrowings from Yunnan Mandarin which have been assimilated by most adult speakers. My conclusion is that this is a fairly recent contrast, but one which is becoming firmly established.

One remaining problem is that syllables having the form [ʋo] fluctuate freely with [ʋwo] and even [ʋo]. Similarly [ʋe] fluctuates freely with [ʋwe]. A possible interpretation of this data is that /ʋ/ has a zero allophone which occurs before /wa/ and which fluctuates freely with [ʋ] before /we/ and /wu/.⁵

2.3 VOICELESS VELAR FRICATIVE

The contrast between /h/ and /x/ is not well established. There is a high degree of complementation in their distribution:

	[i]	[e]	[æ]	[ə]	[o]	[ɔ]	[a]	[ĩ]	[ẽ]	[ã]	[õ]	[ö]	[õ]	[ã]
[h]	x	x	x	(x)			(x)	x	x	x	x	x	x	x
[x]				x	x		x							

As a general rule, syllables having [h] initial have nasalised vowels (and in fact the initial is usually nasalised too), with the exception of low tone syllables where the nasalisation is lost in all but

very careful speech. There is however a strong tendency for the nasalisation to disappear in syllables with mid tone when these have other than primary stress. Thus on both low and mid tones a contrast occurs between [h] and [x] in normal speech, and even in careful speech when the utterances are phrases or sentences. It seems likely that the nasalisation is a non-phonemic secondary phonetic feature concomitant with the occurrence of [h].

Some support for this hypothesis comes from the fact that the same rule of nasalisation also applies to the only other glottal consonant, namely /ʔ/. Furthermore the front vowels do not co-occur with [x] and this is a feature of distribution which is shared with the whole velar series.

3. PROBLEMS OF VOCOID ASSIGNMENT

3.1 /i:/e/

The contrast between these vowels is fully established only with the bilabials. With the simple alveolars, however, the situation is very complex with a few forms contrasting and with many more in which there is free fluctuation.

EXAMPLES of the distribution of these two vowels are:

/pí/ 'to cover', /pé/ 'to turn into a were-tiger';
 /phí/ 'slow', /phé/ 'level';
 /bí/ 'beautiful', /bé/ 'pendulous';
 /mí/ 'tasty', /mé/ 'late';
 /dí le/ 'full-grown', /de le/ 'recovered';
 /tí mǎ/ 'graveyard', /té mǎ/ 'cloth dyed with indigo'.

BUT, when the tones of the syllables commencing with alveolars are taken into consideration, it is evident that the distribution of /i/ and /e/ is also complementary in many cases and involves free fluctuation in others. The following chart exemplifies the distribution:

C = Contrast. There is contrast between /i/ and /e/ in the speech of virtually all speakers.

FF = Free Fluctuation, in the speech of virtually all speakers.

Ex.FF = Exceptions fluctuate freely. In the speech of some speakers the /i/ and /e/ contrast is maintained, but in the speech of others there is free fluctuation on these forms.

Comp = Complementary Distribution. On the particular tone in question either /i/ or /e/ occurs but not both.

	NON-LARYNGEALISED				LARYNGEALISED	
	High Tone	Mid Tone	Low Tone	Mid- Rise	Mid Tone	Low Tone
/t/	C	FF	C	FF	C	Comp
/th/	Comp	FF	FF	Comp	Comp	-
/d/	-	C	C	-	Comp	Comp
/tʰ/	Comp	FF	Comp	Comp	Comp	C
/thʰ/	Comp	C	C	Comp	-	C
/dʰ/	-	C	Comp	-	Comp	Comp
/sʰ/	Comp	Comp	Comp	FF	Ex.FF	C
/zʰ/	C	Ex.FF	Ex.FF	Comp	C	Comp
/n/	Comp	C	Ex.FF	C	-	C
/nʰ/	Comp	Comp	Comp	Comp	Comp	Comp
/l/	C	C	C	C	Comp	C

The high falling tone has been excluded from this chart because there are very few forms with which it occurs.

From the chart above it can be seen that the contrast between /i/ and /e/ has to be posited, but with the realisation that with certain consonants in the alveolar series, the contrast is not always relevant. The mere fact of positing two phonemes to account for the contrast requires that a further position be made that literally scores of Lisu morphemes have alternative phonemic shape, for which there is no phonological or morphophonemic conditioning that can be deemed to cause the alternation.

No front vowels at all occur with complex alveolars, velars nor non-palatalised fricatives.

With /ʔ/ there is no full contrast between /i/ and /e/ when the syllable tones are taken into consideration. In non-laryngealised syllables, /i/ occurs after /ʔ/ with high tone, while /e/ occurs with mid and low tones. In laryngealised syllables /i/ occurs with high tone, /e/ with mid tone, and there is free fluctuation between the two with low tone.

With /h/ initial /i/ only occurs as a non-laryngealised vowel. It contrasts with /e/ only on high tone. /e/ does not occur on mid tone, and /i/ does not occur on low tone. Only /e/ occurs laryngealised.

This already complex situation is further complicated by the fact that Lisu speakers in Thailand can be graded on a continuum. One hesitates to call these gradations dialects since there are no geographical or social divisions between the groups associated with each gradation,

and members of the same family often represent two different grades on the continuum as far as the contrast between /i/ and /e/ is concerned.

At one end of this continuum are speakers who maintain a strict contrast between /i/ and /e/, and in whose speech there is sometimes complementation between the two vowels in the context of tone, but no free fluctuation, or very little. At the other end of the scale are speakers who maintain the contrast on some forms with bilabial initials, lose it on other forms with the same initials, and lose all contrast between the two vowels with both plain and palatalised alveolar initials. In between are speakers who maintain the contrast on the bilabials, and on some of the forms having alveolar initials, but who lose the contrast on other forms with the same alveolar initials. I think this latter group represent the majority in Thailand.

This situation can be represented by a chart on which the symbol : represents contrast, and ~ represents free fluctuation (only contrast and free fluctuation are represented, not complementary distribution):

Grade I [pi : pe] [ti : te] [ci : ce]

Grade II [pi : pe] [ti : te] [ti ~ te] [ci : ce] [ci ~ ce]

Grade III [pi : pe] [pi ~ pe] [ti ~ te] [kʷi ~ kʷe] ⁶

Thus, taking the population as a whole there will be forms which everyone agrees contrast because one form has /i/ and one /e/, but other forms will be said to contrast by some speakers, but not by others, and some forms will fluctuate freely in the speech of the majority but be kept apart by a minority. In order to achieve a generalizable analysis it seems necessary to posit two phonemes /i/ and /e/ and then posit further that in Lisu literally scores of words have alternate phonemic shapes - a situation akin to the English situation with the word 'neither' but multiplied many times over.

Roop⁷ has made an interesting attempt at a solution to this problem by treating [i] as /y/, and [e] as /i/. This ingenious solution would account in part for the free fluctuation after some of the forms with palatal initials for those speakers toward one end of the continuum. For these speakers it accounts for some of the variation in some forms, but a great deal of variation in phonemic shape of a large number of words still has to be posited. The solution would apply best to speakers toward the Grade III end of the scale, but ignores the fact that for speakers nearer the Grade I and Grade II sections of the scale (probably the majority) a contrast is maintained consistently between such forms as: [y⁵] 'he' : [ye⁵] 'unconscious'

[ʃ¹] 'thirst' : [ʃe¹] 'kill'

[chi¹] 'defecate' : [che¹] 'gamble'

One of the results of Roop's solution is that the palatal stops and affricates have to be assigned to the velar phonemes since there are contrasts between such forms as [thi] and [chi]. Roop assigns the former to /thyi/ and the latter to /khyi/. A position then has to be adopted that /i/ is the only vowel that occurs with the palatalised alveolar stop initials. This contrasts with the situation that holds with /sʏ/ and /nʏ/ (palatalised alveolar continuant initials) where /i, e, u, a, ø/ (Roop's phonemes) all co-occur.⁸

3.2 /i/:/i̥/

The validity of this contrast hinges on the assignment of the phones [z̥[†]] which occurs after alveolar fricatives and affricates, and [z̥[†]] which follows the palatalised alveolar fricatives and stops. These phones have complex articulation which is not adequately represented in my notation. With [z̥[†]] the tongue tip remains in the position adopted for the initial [s] or [z] while the blade of the tongue remains in a neutral position roughly that of a forward central high vowel. At the syllable peak there is friction at the tongue tip, and simultaneously the voicing produces a forward central high vowel. After the syllable peak the friction is reduced slightly by a slight dropping of the tongue tip, with the result that the vowel quality dominates. Thus this phone is at one and the same time well forward of cardinal [i] and thus not a true vocoid, and also a forward central high vocoid depending on whether the alveolar fricative or the forward central vowel position is taken as the focal point of attention.

If the non-palatalised alveolars are examined it becomes apparent that [z̥[†]] and [i] have complementary distribution:

	t	th	d	ts	tsh	dz	s	z	n	l
[i]	x	x	x						x	x
[z̥ [†]]				x	x	x	x	x		

Turning now to the articulation of the phone [z̥[†]], the tongue tip remains in the retracted alveolar position adopted for the fricative [ʃ] or the fricative release of the affricate phones [tʃ] [tʃ^h] or [dʒ], while the blade of the tongue remains in the neutral vowel position referred to above. Articulation again consists of a syllabic fricative (this time slightly retracted and more deeply grooved) with a simultaneous forward central high vowel which dominates after the syllable peak, when the friction is lessened by slight dropping of the tongue tip. Here

again the phone can be referred to as forward of [i] or back of [i] depending on whether the non-vocoid fricative or the concomitant forward central high vowel is taken as the focus of attention.

When the distribution of [ʒ[†]] is compared to that of [i], however, the contrast between them is seen to be well-established:

	t ^y	th ^y	d ^y	s ^y	z ^y	n ^y
[i]	x	x	x	x	x	x
[ʒ [†]]	x	x	x	x		

A fact not reflected in the phonetic notation at this point is that [ʒ[†]] is usually articulated with lip-protrusion which does not affect the quality of the vowel.

Three solutions to the problem of where to assign these phones suggest themselves.⁹

	[sʒ [†]]	[ʃi~çi]	[ʃʒ [†]]
Solution 1	/si/	/syi/	/sywi/
Solution 2	/si/	/syi/	/syi/
Solution 3	/sɪ/	/syi/	/syi/

In Solution 1 the fact that [i] and [ʒ[†]] have a complementary distribution is taken as crucial, and on the basis of this it is posited that these two phones are allophones of the one phoneme /i/. The contrast between [ʃi] and [ʃʒ[†]] then is accounted for by giving the lip protrusion mentioned above some prominence and ascribing it to /w/. The phonemicisation of these syllables is then /s^yi/ and /s^ywi/ respectively. The motivation for this analysis is economy, for it enables one to dispense with the /ɪ/ phoneme altogether. Syllables such as [kw³⁻⁵] 'creak' would be phonemicised as /ki/ since [w] and [i] have complementary distribution. Disadvantages of this solution are that /s/ and /z/ are then the only non-palatalised fricatives on the chart (apart from /h/ which is not a true fricative) which co-occur with /i/. Furthermore /k/ then becomes the only member of the velar series which co-occurs with /i/. The fact that the whole analysis hinges on the full phonological status of the lip-protrusion which accompanies the [ʒ[†]] phone makes the solution suspect, since this lip-protrusion is a secondary feature of the articulation which does not seem to be a distinctive feature in any way. The phone can be articulated without lip protrusion and is still accepted as correct by native speakers who in fact often articulate the phone in question themselves without any lip modification.

Solution 2 is weakly motivated. It keeps a full phoneme /ɨ/ and associates it with [ɜ̥[†]] but not with [ɜ̥[†]]. The only advantage of the solution is that the lip-protrusion feature mentioned above is not given primary articulatory status. One of the undesirable results of this solution is that it is tantamount to saying that [ɜ̥[†]] bears more resemblance to [i] than it does to [ɜ̥[†]] which is an unwarranted assertion. /s/ and /z/ are still the only fricatives to co-occur with /ɨ/ in this solution too.

Solution 3 maintains a regular non-occurrence of /ɨ/ with fricatives, and does away with the phonetic anomalies mentioned above, but does so at the cost of adding the phoneme /ɨ/ to the inventory.

The choice between the rival solutions will be somewhat arbitrary and will depend on one's personal opinion as to which factor is the most important, phoneme economy or consistency of distribution.

3.3 THE ASSIGNMENT OF [ø] [ɣ[†]] AND [ɣ^u]

Three possible solutions suggest themselves.

(i) These three phones are each given full status as independent phonemes, each one elementary in nature, i.e. none is deemed to be a combination of phonemes. The resulting chart of vowel phonemes is:

<i>Unrounded</i>		<i>Rounded</i>	
i	(ɨ)	ɣ	u
e	ə	ø	o
æ	a		ɔ

In this solution the phoneme (ɨ) may or may not occur, depending on the solution accepted above in 2.2. The phoneme /a/ is treated as a central vowel rather than as a back vowel, and the two phonemes /o/ and /ɔ/ represent the phonemes I have introduced in 1.21 as /u/ and /ɔ/ respectively. [ɣ[†]] is assigned to the new phoneme /ɣ/, [ø] to the new phoneme /ø/ and [ɣ^u] to the new phoneme /u/.

In favour of this solution is the rather neat dichotomy achieved between rounded and unrounded vowels. However this is achieved at the cost of three additional vowel phonemes. Certain other problems are left unanswered by this solution too, the most important being that a careful examination of the distribution of /ø/ reveals that there is completely complementary distribution between this vowel and /we/, and that in some cases there is also free fluctuation.¹⁰

	p	ph	b	t	th	d	ts	tsh	dz	k	kh	g	ʔ	f	v	s	z	x	ɣ	h	m	n	l
/ɸ/	x	x	x	x	x	x						x	x							x	x	x	x
/we/							x	x		x	x			x	x	x	x	x					

Furthermore, the assignment of $[\gamma^{\dagger}]$ to /ɣ/ as a rounded vowel is questionable, since $[\gamma^{\dagger}]$ is not phonetically rounded. As represented on the chart of phonemes, the only significant difference between /ɣ/ and /u/ is one of front : back opposition. This is grossly misleading, since phonetically there is another difference besides central versus back articulatory positions, namely unrounded versus rounded, the very feature that is being posited as being of primary importance in keeping the two vowel systems separate. To this writer these weaknesses are important enough to reject this solution, but this is something of an arbitrary choice once again, since it depends on the importance I attach to theoretical cohesion, and to phoneme economy. If the rounded : unrounded vowel system is accepted as being an important feature, then one would adopt this solution for this reason.

(11) Rather than giving the three phones in question independent phoneme status, each can be treated as a combination of phonemes, namely /w/ plus a vowel. $[\gamma^{\dagger}]$ can be assigned to /wi/, $[\emptyset]$ to /we/ and $[\gamma^u]$ to /wu/. This solution follows on from Solution 1 in 2.22 in which it is desired to avoid the position of the vowel phoneme /ɪ/. The above assignment of phones achieves the following charts of plain vowels and vowels following labialisation:

i		u	wi	wu
e	ə	ɔ	we	wɔ
æ		a		wa

This solution achieves the greatest possible vowel economy, and accounts for the $[\emptyset] : [we]$ complementation. It also achieves a measure of symmetry in the chart of sequences of /w/ followed by a vowel. These achievements are attained at the price of complicating the allophonic descriptions of both /i/ and /w/. Bearing Solution 1 of 2.2 in mind, the solution under discussion here results in the following allophony:

/i/ $[\text{i}]$, $[\text{z}^{\dagger}]$ and the vowel components of $[\text{z}^{\dagger}]$ and $[\gamma^{\dagger}]$ which are syllabic voiced fricatives with simultaneous high central vowel quality.

/w/ $[\text{u}]$, the lip-rounding component of $[\emptyset]$, and the labio-dental fricative component of $[\gamma^{\dagger}]$ and $[\gamma^u]$.

Thus in this solution phonemes are usually discrete phones, but some

phonemes have allophones which consist of one or two of the component features of certain phones rather than consisting of the whole phone. Thus when the single phone [ø] is assigned to /^we/, the rounding feature of this phone is assigned to one phoneme /^w/ while the mid front vocoid features are assigned to a different phoneme /e/.

(iii) The remaining solution is basically the same as (ii) in general concept, but is linked with the third solution of 2.2 above rather than with the second solution, i.e. it is based on an analysis which posits the additional vowel phoneme /ɨ/. Thus /ɥ[†]/ is treated as /^wɨ/ rather than as /^wi/, yielding the somewhat asymmetrical chart of /^w/-plus-vowel sequences:

	^w ɨ	^w u
^w e		^w ɔ
		^w a

The basis for choosing between solutions (i), (ii) and (iii) will be that adopted when dealing with the problems raised in 2.2. With both (ii) and (iii) the problem of assigning features of phones to phonemes recurs, and once again the item-and-process type phonological rule achieves a better solution.

4. PROBLEMS OF ASSIGNMENT OF SUPRASEGMENTALS

In order to discuss these problems in the context of tone variation it is necessary to describe briefly the tonal variation which occurs with mid and low tones.

When a laryngealised vowel occurs in a syllable having mid tone, the pitch of the syllable is heightened optionally. It may occur with the same pitch as mid tone syllables having plain vowels, or it may have a higher pitch somewhere between high and mid tone. With verb forms in which the final syllable has a laryngealised vowel and mid tone, co-occurrence with the post-verbal aspect marker /-a/ results in a morpho-phonemic change in which the tone of the final syllable of the verb becomes higher. This pitch change is obligatory in this case, but the degree of heightening is optional. The syllable may even have the same pitch as high tone. This means that a verb form with mid-tone and a laryngealised vowel in the basic form and a verb form with high tone in the basic form may have non-contrastive forms in the positive aspect when followed by the marker /-a/, since both verbs may have high tone pitch. One result of this is that when eliciting verb forms it is necessary to elicit both positive and negative forms of the verbs in order to discover the basic tone. With mid tone syllables laryngealisation takes the form of tenseness of the vowel.

With laryngealised vowels in low tone syllables, however, there is regular pitch alteration, and the syllable has a phonetic mid-to-low falling pitch, in all forms. The laryngealisation in low tone syllables takes the form of glottalisation, with a final glottal stop if the syllable occurs before a pause.

The analysis which abstracts laryngealisation as a phoneme is thus one in which the pitch change is deemed to be non-phonemic. The only alternative¹¹, namely a solution which treats pitch changes as phonemic and the change in vowel quality as non-phonemic would have difficulty in accounting for the fact that the mid-high pitch fluctuates freely with the mid pitch in some forms but not in others.

4.1 // : ' /

Turning now to the phonemic status of the high tone and mid-rising tone, syllables differing in pitch and thus assigned to these two tonemes also differ in vowel quality as well.

A syllable with // tone has high level pitch and normal vowel quality, while a syllable with ' / tone has both a mid-to-high rising pitch and a pharyngealised vowel quality. There is at least the possibility of treating the pitch change as non-phonemic in keeping with the analysis suggested above, and treating the vowel quality distinction as the contrastive feature. The problem is that the vowel qualities under consideration are different from those mentioned above. With mid tone the vowel distinction in phonetic terms is one of tense versus lax vowels, while with the low tone it is plain versus glottalised vowels. The fact that both tenseness and glottalisation are associated with the larynx is what enables them to be treated as allophones of the same phoneme called laryngealisation. But neither the plain vowel quality nor the pharyngealised vowel associated with // and ' / can rightly be called 'laryngealised'. A possibility which suggests itself is a more abstract phoneme not associated with any particular phonetic articulation, but rather a dummy symbol representing [mid-high rising pitch plus pharyngealisation] when it occurs with high tone, [tense vowel quality] when occurring with mid tone, and [mid-low falling pitch and glottalisation] when occurring with low tone. Such a dummy phoneme would achieve both economy and symmetry. Only four tones would need to be posited instead of five, and the following distribution chart would result:

	PLAIN VOWEL	MODIFIED VOWEL (vowel-plus-/_/)
/'/	x	x
/mid/	x	x
/`/	x	x
/^/	x	

Under the previous analysis five tones occur with plain vowels, but only two with laryngealised.

A sub-phonemic feature which strengthens slightly the case for the dummy phoneme analysis is the fact that all syllables having this dummy phoneme and a consonant initial are articulated with a noticeably long hold of the initial, i.e. the release of the consonant is delayed, resulting in something like a long consonant.

The major drawback of this solution is that not only are sub-phonemic features being posited as phonemes (as in the allocation of [ø] etc.) but the features concerned are also such diverse entities as pitch frequency and vowel quality. To combine such diverse elements into one 'phoneme' is strange, to say the least.

4.2 THE ASSIGNMENT OF [³-⁴] AND [¹-⁴]

The status of these two pitch phones is dependent upon one's theoretical presuppositions about the nature of language, and of phonology in particular. If one holds to a position that phonology is an autonomous system independent of syntax, then two additional tonemes have to be posited.¹² If, on the other hand one holds a position that phonology and syntax are interdependent, then the problem is more easily resolved since all forms having the pitch phones mentioned above consist of a verb morpheme plus a post-verbal particle consisting of a laryngealised vowel. Accepting this fact as relevant to the phonology of Lisu, one can go on to state an item-and-process type general rule which indicates that when two adjacent syllables result in contiguous vowels, and both are in the same breath group, either of the vowels may lose its syllabicity and the result is one syllable having two tones, i.e. a tone glide. The details of the formation of the glides would need to be indicated:

(1) When a high tone syllable with a plain vowel, or a mid tone syllable with a laryngealised vowel, is followed by a mid tone laryngealised

vowel, then the resulting syllable has high tone.

(ii) When a syllable having mid to high rising pitch (whichever way this pitch is phonemicised) is followed by mid tone plain vowel the resulting syllable has mid tone.

(iii) When a syllable having mid to high rising pitch is followed by a mid tone laryngealised vowel, the tone on the resulting syllable is mid, having pitch allophone [³] gliding to pitch allophone [⁴] (the latter being the higher pitch associated, usually optionally, with laryngealisation of the vowel).

(iv) In all other cases the tone glides resulting from fusion of two syllables into one will be predictable from the tones of the original syllables. Either of the vowels loses syllabicity, but the tones remain, having one syllable as their domain instead of two.

5. THE STATUS OF DIPHTHONGS

Two kinds of phonetic diphthongs need to be distinguished in Lisu. The first type consists of a single syllable in which there is a glide from one vowel to another and in which the glide-vowel is of much shorter duration than the nuclear vowel which in turn is fully syllabic. This type I will call a **true diphthong**. The second type differs from the first in that the glided vowel is of the same duration as the main vowel, but only the latter is syllabic. This type I will call a **quasi-diphthong** for reasons which will be given below.

The true diphthongs occur in syllables which are morphologically simple, i.e. no more than one morpheme is involved, and the morpheme has an invariant phonemic shape in which the diphthong figures. The vocoids which occur as on-glides are [i] and [u] and these are treated as allophones of /y/ and /w/ respectively. These two glide vocoids also occur as off-glides, in which case they are treated as final /y/ and /w/ respectively.

With the quasi-diphthongs¹³ a morpheme boundary is always involved, and the phonemic shape of the component morphemes is variable in that in some occurrences of the two continuous morphemes the vowel of the first is glided while the vowel of the second is syllabic, but in other occurrences of the same two morphemes the vowel of the first is syllabic and it is the vowel of the second which is glided. In careful speech both vowels are sometimes syllabic resulting in two syllables, not one. This state of affairs can be diagrammatically represented as:

{CV}{V} → /CVV/ ~ /CṾV/ ~ /CṾṾ/

This representation is misleading in one respect, namely that the situation is not quite as simple as it appears here, since the coalescence of the syllables concerned often results in vowels changes taking place. The following are the usual rules of coalescence:

with preceding /æ/ or /a/ a following /e/ becomes /æ/ optionally;
 " " /i/, /æ/ or /ə/ " " /a/ " /æ/ " ;
 " " /æ/ or /a/ " " /u/ " /o/ " .

A rule of the above kind, while adequately accounting for the data requires that an item-and-process type of analysis be combined with the usual item-and-arrangement type analysis usually associated with phonemic phonology.

6. CONCLUSION

Throughout the preceding discussion it has repeatedly been apparent that to adequately and accurately describe Lisu phonology in phonemic terms one has time and time again to choose between a number of conflicting criteria in finally deciding which solutions to adopt. One can achieve economy, but at the expense of theoretical cohesion and logic; one can achieve simplicity in allophonic description, but at the expense of economy; one can strive for neatness and symmetry in the description of the phonology but one of the results of this is that hundreds of morphemes have to be described then as having variant phonemic shapes, i.e. the allomorphic description is vastly more complicated as a result. A solution which is both satisfactory and non-arbitrary seems to be impossible. Describing Lisu phonology in terms of Transformational grammar in which the basic elements are distinctive features rather than phones, and in which the phonological rules are of the required kind, would seem to be the only adequate way to attempt a description of Lisu phonology. It is intended that this will be attempted in part in a later paper.

NOTES

1. This article is based on some nine and a half years of field work, the first eight of which were sponsored by the Overseas Missionary Fellowship, and the final eighteen months by the Australian National University through a Commonwealth Research Scholarship.

The map showing the distribution of the Lisu language was compiled from eyewitness accounts. The Thailand distribution I have confirmed for myself, and in all other cases except the Assam and Yüan-mou concentrations, I derived my information from Lisu informants who themselves were from the areas concerned. The existence of the Assam group has been personally vouched for by a Lushai informant from the area, and the existence of the Yüan-mou group is confirmed from Chinese sources and from missionaries who lived with the Lisu in the area until 1948. It is not intended that the map should indicate anything about the relative density of any of the areas with regard to Lisu populations. Morse (*IJAL* vol.7, No.6, p.57) reports Lisu in Laos, but I have been unable to verify the existence of this group.

2. Nishida 1967, 1968a,b, 1969, Roop 1970 and Hope mimeo 1966. Many of the problems dealt with in this paper are also relevant to the more Northern dialects too, but here too the authors of the meagre material which is available have omitted any reference to these problems (cf. Burling 1967, Fraser 1922, Ruey Yih-fu 1948, Chinese Academy of Sciences 1959, *IJAL* vol.7, No.6).

3. See section 2.2.

4. Roop describes this fluctuation (pp.4,5) as 'marked retraction' of the articulatory position, but unfortunately this terminology masks the fact that the fricative release of the affricate stops under consideration is often virtually identical in articulation to the initial element of forms like [ʃø], which initial Roop himself analyses as /sy/, i.e.

the retraction is so marked as to coincide with articulation he describes as palatal.

5. This interpretation requires that the sequence /^wu/ also have two allophonic forms, [u] after /ɣ/ and [ɣ^u] elsewhere (see 2.3).

6. The loss of contrast between /i/ and /e/ seems to be correlated with the occurrence of the palato-velar variants of the phones treated as palatalised alveolar stops. Thus speakers at this end of the vowel contrast scale tend to be those speakers who have the palato-velar allophones rather than the alveopalatal or palatal allophones.

7. Roop 1970, pp.16,17.

8. Ibid. p.34.

9. I am excluding Roop's solution that [ʒ[†]] be analysed as /w†/ since it is possible to demonstrate that it is the palatalisation of the initial consonant that is the distinctive feature, rather than the lip-protrusion. Forms having this syllable nucleus can be articulated without lip modification, and are still accepted by native speakers, but the forms are no longer accepted once the palatalisation is absent, even though lip-protrusion remain. If the palatalisation disappears, native speakers claim that the form has become [sz[†]] which has a different meaning.

10. If one assigns [x] and [h] to one phoneme /h/ as Roop has done, then one has to posit a vowel phoneme /ø/ as the difference between forms such as [hø] and [x^we] is then attributed to contrasting vowels rather than to contrasting initials, and [ø] and [x^we] are no longer complementary at this point, although they remain so elsewhere. This analysis results in a vowel chart similar to Roop's which is:

		ɨ	
i	ø	e	u
e		a	o

11. Fraser 1922 adopted an analysis in which the pitch differences were deemed to be contrastive. I do not know whether the Teng-Yüeh (Lien-shan) dialect has concomitant vowel-quality contrasts or not. Fraser does indicate that the two low tones differ in that one is 'abrupt' which could presumably mean 'glottalised', which is the feature associated with this tone in most other dialects.

12. Roop posits only one of these, [¹-⁴], as a full toneme, and treats the other as a feature of intonation.

13. Roop treats these as full diphthongs, but recognises only some of the combinations which actually occur, ignoring others. He describes all of these diphthongs as involving a prominent vowel followed by an off-glide, but all of the forms which he cites which involve two morphemes do also occur as (i) an on-glide followed by a prominent vowel, and (ii) two separate syllables.

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