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REGISTER IN TIBETO-BURMAN LANGUAGES OF NEPAL: A COMPARISON WITH MON-KHMER[1]

WARREN W. GLOVER

SUMMARY

A widespread phenomenon in Mon-Khmer languages is a binary division of phonological systems, realised frequently as two contrastive voice qualities in vowels. The term *register* has been given to this opposition, which in different languages has different phonetic realisations. Register probably finds its historical source in the loss of a voicing distinction in initial consonants.

This paper presents evidence from Tibeto-Burman languages of Nepal for a phenomenon similar in phonetic realisation but systematically different in that it is a four-way rather than a two-way division. A hypothesis relating the phenomenon to a postulated historical voicing contrast in both word-initial and word-final consonants is presented.

1. VOICE REGISTER IN SOUTH EAST ASIA

1.1 *PHONOLOGICAL CONTRAST*

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[1]This paper is based very largely on the work of Dr Richard S. Pittman who developed the hypothesis presented and organised the comparative examples.

The field work on which this paper is based was undertaken in Nepal by Mr and Mrs Ross Caughley, Mr Chuda Mani Bandhu, and Mr Ballabh Mani Dahal (Chepang), Misses Doreen Taylor and Fay Everitt (Tamang), Misses Maria Hari and Anita Maibaum (Thakali), Mr and Mrs Kent Gordon (Sherpa), and my wife and myself (Gurung) under the auspices of the Summer Institute of Linguistics and of Tribhuvan University, Kathmandu, to which organisations I wish to express gratitude for their practical support. I thank also Dr Pittman and other colleagues of the Summer Institute of Linguistics in Nepal, and Ken Gregerson and Richard Phillips in Viet Nam, for access to their unpublished materials.

I am grateful to Howard McKaughan, Richart Pittman, and C.L. Voorhoeve for their comments on a draft of this paper. The responsibility for shortcomings that remain rests with me.

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It has long been recognised that many languages of South East Asia exhibit a binary division of the vowel system, involving frequently a difference in quality of voice in the vowel articulations. The precise phonetic realisations of the opposition differ in different languages, and in any one language the opposition is frequently realised by a complex of several phonetic exponents. However, in many languages quality of voice is impressionistically the most prominent exponent of the opposition. The term *register* thus seems appropriate to describe it.

1.2 *PHONETIC REALISATIONS*

The term *voice register* was first proposed by Henderson (1952:151) in describing contrastive syllables in Cambodian. She associated with the first register 'a "normal" or "head" voice quality, usually accompanied by relatively high pitch' and with second register 'a deep rather breathy or "sepulchral" voice, pronounced with lowering of the larynx, and frequently accompanied by a certain dilation of the nostrils'. Phillips (1962:2) proposed extension of the term register for use 'generally in Mon-Khmer languages wherever there is a distinction (whether phonemic or not) in which some vowels (or syllables) sound deeper or breathier or looser than others. The term is sufficiently noncommittal that it will permit a redefining of the contrast for each particular language.' Numerous other works dealing with the widespread distribution in Mon-Khmer languages of the phenomenon of register are surveyed by Gregerson (1969).

Gregerson points out that terms used to describe the distinction have generally been impressionistic rather than articulatory and notes that one common expression for the distinction, namely tense/lax, has been used with opposite significations by Jacob (1968:4) in describing Cambodian, and Shorto (1966:400) in describing Mon, on the one hand, and by Jenner (1966:34)[2] in a survey of Khmer register phenomena on the other. The use of the former authors, associating tenseness with first register, is shared by Phillips (1962) in describing Hre, Sedang, and Mnong Bunor, three Viet Nam languages of the Bahnaric group in the Mon-Khmer family. The confusion may be a result of differing focus of observation. Thus the muscles of the vocal cords are lax during articulation of a breathy vowel, but Hari (1969:22) comments also on the tightening of the front throat muscles during pronunciation of a lax (breathy) vowel in Thakali. Since the vocal cords appear the primary

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[2] I have not been able to consult Jenner's article. My information is from Gregerson (1969).

articulator in breathiness, the use of the term *lax* to denote breathy vowels seems preferable. On the other hand, in describing Twi, a language of West Africa, Stewart (1967:201) also notes the terminological confusion. He suggests an explanation in terms of the impressions of tenseness or laxness in African vowels being opposite to those predicted by European phonetics.

There is confusion also on the term *pharyngealisation*. It has been used in the sense of pharyngeal constriction by Phillips (1962:8) for *first* register vowels in Sedang. But Jenner (1966:34) and Noss (1966: 92) use the term in the opposite sense, namely of pronunciation with the pharyngeal cavity distended, in describing *second* register vowels in Cambodian. Phillips' use, applying the term to a constriction of the air stream, seems more in line with normal phonetic usage, and is adopted by Pike (1947:22a).

In the vowel system of Twi, Stewart described *tongue root position* as a decisive articulator (1967). Gregerson (1969) has pointed out a remarkable parallel between the register phenomena in South East Asia and those described in terms of tongue root position for Twi.

The key observation by Stewart is the correlation between *vowel openness* and tongue root position. Close vowels have advanced tongue root; open vowels have retracted tongue root[3]. This is paralleled by Jenner's conclusion that in Khmer 'tongue height, critical in deliberate as well as normal speech, is the most stable index of register' (1966:42), and by Phillips' observation (1962:14) that in Mnong Bunor vowels with a second register quality are higher than those with a first register quality. Phillips also notes (1962:5) that in Hre the second register vowels /ə̀/ and /ɜ̀/ are higher in aperture than their first register counterparts.

Voice quality has been linked with tongue root position in Pike's description of pharyngeal modification of vowels (1947:21,22). He speaks of a 'fuller' or 'deeper' resonance produced by one or more of 'lowering of the larynx ... fronting of the tongue so that the root of the tongue is farther from the wall of the throat and/or ... the spreading apart of the faucal pillars'; on the other hand he describes a 'choked up' pronunciation with the tongue backed in the mouth. With the former terms may be compared Henderson's 'sepulchral' for second register

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[3]This correlation is what may be expected from a consideration of the physical positioning of the tongue tissue, but most phonetic texts have omitted any comment on it.

in Cambodian (1952:151) and Ward's 'hollow' for Maasai in Africa (1937)[4]. With the latter, compare Phillips' 'tight, pharyngealised' and 'pharyngeal rasp' for first register in Sedang (1962:8) and Stewart's 'creaky' and 'choked or even strangled' for Twi and Fante in Africa (1967:196).

Acoustic analysis provides a further parallel between the register phenomena in Mon-Khmer and the correlation of tongue root position and vowel openness (and voice quality) in West Africa. Comparing Miller's study of Brou vowels (1967) and Pike's work on Twi (1967:138) Gregerson points out that 'the open Twi vowels and the first register open Brou vowels have consistently higher frequencies than their close or second register counterparts' (1969:8-9). Tone, in the sense of pitch of voice, is also mentioned as an exponent of register in Cambodian by Henderson (1952:151), with first register syllables normally higher in pitch than second register syllables.

In the light of the parallel phonetic realisations, in Mon-Khmer on the one hand and Twi and Fante on the other, of the division of the vowel systems, it seems reasonable to extend the term register beyond the Mon-Khmer family to apply to Twi and Fante, and, on the evidence of similar parallels as we shall see below, to Tibeto-Burman[5].

1.3 *ORTHOGRAPHIC AND HISTORICAL CONSIDERATIONS*

Difference in register has been associated in South East Asia historically with voicing and devoicing of consonants, especially stops. In many orthographic systems in Asia a contrast in the consonant symbols derived respectively from the Devanagari voiced and voiceless consonant symbols (used for Sanskrit) is used to mark syllable modifications like tone. Tibetan, Thai, Laotian, and Burmese are examples. Thus Henderson (1952:152) notes that first and second register in Cambodian are signalled orthographically by consonant symbols corresponding respectively to the symbols for voiceless and voiced consonants in Sanskrit. Noss (1962:92) also comments on the correlation in Modern Standard Cambodian between initial consonants and register, which he calls 'pharyngealization'. The historical nature of this correlation is argued for Tai

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[4] I have not been able to consult Ward's article. My information is from Stewart (1967:199).

[5] Gregerson (1969) offers evidence for extending the concept of register, linked with tongue root position, to a number of other widely diverse language families.

languages by Li (1966:88) who concludes:

> 'the distinction between the voiced and the voiceless consonants seems to prevail in all dialects, and may be assumed for the Proto-Tai system. The accompanying feature of register, high for the voiceless and low for the voiced, has some phonetic basis, but is only a dependent feature. It becomes a distinct feature only when the voiced consonants become unvoiced as is the case of stops in practically all dialects, or when the voiceless consonants, such as the voiceless nasals and liquids, become voiced.'

For Mon-Khmer, Phillips (1962:1) cites Haudricourt and Martinet's conclusion (1946) that the historical voicing of syllable-initial stops is correlated with vowel aperture: the words previously having voiced stops now have vowels more close in aperture than those which originally began with voiceless stops.

It should be noted that the historic voicing contrast does not necessarily relate to voicing in the modern languages. In modern Cambodian a stop voicing contrast exists but it does not correspond with register, nor therefore with the distinction represented in the traditional orthography (Henderson 1952:153). Likewise, the voicing of consonants in modern Tai dialects presents a complex picture (Li 1966).

1.4 In sum, then, the phenomenon of voice register in some languages of South East Asia and of West Africa may be described as a correlation of a number of phonetic exponents including creaky/breathy voice quality, pharyngeal constriction/opening, vowel openness/closeness, high/low pitch, and, historically, voiceless/voiced initial consonants.

2. APPLICATION OF THE REGISTER CONCEPT TO TIBETO-BURMAN

2.1 *DATA FROM THE GURUNG BRANCH*

The concept of register has proved particularly helpful in the analysis of Gurung (G), Tamang (T), and Thakali (Th), which comprise the Gurung branch of the Bodish section of the Bodic division of the Sino-Tibetan family (Shafer 1955:101)[6].

In approaching the phonological analysis of Gurung I made little progress initially, working within a theoretical frame of syllable-tone with pitch as a constant contrastive feature. At this point Richard Pittman suggested that the emic contrasts in the data would be more evident to a native speaker than to an investigator relatively unfamiliar with the phonological systems of the area, and that therefore the intuitions of the native speaker might be used effectively for establish-

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[6] Shafer's Murmi is an alternative name for Tamang.

ing oppositions which were difficult for the unfamiliar ear to detect[7]. An adaptation of the rhyming method for checking vowel contrasts, described by Thomas (1965), was found fruitful along these lines (Glover 1969a), revealing contrasts in terms of variables of voice quality and stress (or intensity). Pitch was found to be affected by both variables.

The classification according to these variables of monosyllabic nouns, verb roots, and numerals produced four sets which fell clearly into two groups of two sets each: a clear group, comprising intense and relaxed sets, and a breathy group, comprising rising and low sets. The labels cited are impressionistic ones used by investigator and informant together in characterising the different sets, but the sets are distinguished by a bundle of phonetic features, not all of which are present in all utterances. Pitch alone can not be used to characterise the sets because of many conditioning factors, including voicing of an initial stop, place in the word, place in larger phonological units, vowel articulatory position, and vowel nasality (Glover 1969b: 55-8). However, in minimal contrasts between the sets there is a consistent pattern of pitch in terms of three levels. The four sets, with typical identifying features and examples, are listed in Table 1.[8]

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[7] In the current linguistic climate this suggestion may appear very obvious, and its truth self-evident. But the principle involved - of regarding the informant's judgements on the data as themselves legitimate data - is not trivial.

[8] The tone orthography used in this paper for the Tamang, Gurung, Thakali, and Sherpa examples was developed first for Gurung, in which language presence of postvocalic h represents a breathy syllable, and a clear syllable is represented by the absence of h. Within each group presence of q represents the higher-pitched (intense, or rising contour) set, and absence of q the lower-pitched (relaxed, or low level) set. When the hq notation is extended to Tamang, Thakali, and Sherpa it does not necessarily imply the same phonetic values as in Gurung, but the extension is based on:

a) the identification of cognates,
b) convenience of comparison, and
c) the adaptability of the notation to the contrasts phonemic in the particular language.

The use here of the hq notation means of course that examples cited from Taylor (1969), Hari (1969,1970), and Gordon (1969) have in general been altered by transliteration from the various notations used by these authors in their descriptions.

Upper case vowels are nasalised, and upper case T and D represent retroflexed stops. Burton-Page (1955) has argued cogently that Gurung T is historically *tr, and the Written Tibetan cognate drug *'six'* (Shafer 1967:124) may be compared in this connection with Gurung Tuhq. I have concluded that the presence in Gurung of loanwords from Nepali with retroflexed T and with the sequence tr has established T as a phoneme. In the reconstructed TGTh forms, however, the original cluster is preserved in the orthography.

In Tamang, Taylor (1969) and Hari (1970) agree that voicing of stops

(continued on page 7)

TABLE 1: Contrastive sets in Gurung

	CLEAR		BREATHY	
	INTENSE	RELAXED	RISING	LOW
Pitch:	High.	Mid.	Low-mid glide.	Low.
Breathiness:	Absent.	Absent.	Reduced.	Marked.
Intensity:	Loud, fortis.	Relaxed, lenis.	Non-contrastive.	Non-contrastive.
Length:	Short.	Long.	Long.	Long.
	mwiq *'hair'*	mi *'tail'*	mwihq *'money'*	mih *'person'*
	ngiq *'seven'*	ngi *'we'*	tihq *'load'*	tih *'time'*
	syeq *'louse'*	sye *'meat'*	prehq *'eight'*	preh *'stick'*
	tsaq *'that'*	tsa *'vein'*	ngahq *'five'*	tsah *'son'*
	phoq *'stomach'*	pho *'deer'*	prohq *'cliff'*	poh *'leaf'*
	kuq *'nine'*	ku *'chest'*	Tuhq *'six'*	tuh *'pail'*

Thakali has been analysed by Hari (1969) as also possessing four suprasegmentally contrastive sets of morphemes: clear high level, clear extra-high falling, breathy low rising-falling, and breathy low level. Her description of the breathy/clear distinction is instructive (1969:22):

> 'The tongue and lip position of the breathy vowel is the same as for the clear vowels, but the breathy vowels have a different voice quality. For the clear ones the Adam's apple remains raised while for the breathy ones the Adam's apple is lowered and the throat expanded. This results in a larger resonance chamber in the back of the mouth ... At the same time the pitch of the breathy vowel is [considerably] lower than the pitch of the clear one in the same stress position. ... it is only in overdistinct speech that a breath is audible. In normal speech, it is the low pitch and the lax voice quality which are prominent. When a person is pronouncing a breathy word, we can observe externally the tightening of the muscles of the front part of the neck and if a person has a protruding Adam's apple the lowering of it is also visible.'

In Thakali 'breathiness is relevant only on the first syllable of a

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8 *(continued from page 6)*

is nonphonemic. In word-initial position it is predictable from tone, with words of the breathy group having voiced initial stops and words of the clear group voiceless initial stops. However they retain the voicing distinction in the orthography for a variety of reasons, including the fact that informants found voicing much easier to describe than tone. Although the voicing distinction of stops is redundant in the Tamang orthography, it is retained here also because of the great interest of this phonetic feature for comparative purposes.

morpheme' and in disyllabic morphemes the second syllable is clear, but 'the contrastive pitch features ... are spread over both syllables of the morpheme' (Hari 1969:33,36).

Tamang phonology has presented especial difficulties in analysis. Over a period of three years several scholars, most of them members of the Summer Institute of Linguistics, have worked on it. Pittman (1969, 1970) and Taylor (1969) record various stages of the analysis, and the most recent work (October, 1970) by Hari appears definitive.[9]

Hari (1970:11) reports for Tamang a system exactly parallel to those for Gurung and Thakali:

> 'there is not only a contrast between tense and lax voice quality, but within each group we have also a pitch contrast. In *tense* we have a high falling contour contrasting with a mid rising contour. The latter one is only slightly rising and in the contrast system it can be viewed as basically level. In *lax* a mid falling contour contrasts with a low slightly falling contour [which] is viewed as basically level.'

Further, she describes the morpheme, whether of one, two, or more syllables, as the basic unit on which the contrastive pitch system operates (1970:19). Each component of a compound word retains its own distinctive pitch contour (1970:23), but only some suffixes, such as -maahq *'plural'*, are tonally distinctive and act tonally like the second

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[9] There are several discrepancies between the analyses presented by Taylor (1969) and Hari (1970). Hari's work inspires the greater confidence because

(1) she was able to draw on a growing body of experience in the systems of the area, in particular her own experience in Thakali and, more generally, that of Hale and other colleagues, including the work done by Taylor, in collaboration with Miss Fay Everitt and Dr Sarah Gudschinsky in 1968, and with Drs Richard Pittman, Kenneth Pike, and Austin Hale in 1969. Pittman's papers (1969, 1970) reflect a stage of the Tamang analysis earlier than that recorded in Taylor (1969).

(2) Hari's analysis describes (1970:25ff.) the conditioning effects of CV-patterns and intonation on pitch, which effects were the source of much confusion in earlier work.

(3) Hari's conclusions are in much better accord with the closely related Thakali and Gurung. This is most evident in the simplicity of the contrastive system she describes, but also in specific cognates. Thus she describes as lax (breathy) many words which Taylor describes as clear but which have breathy cognates in Gurung: T gihq G kihq *'thatch'*, T gyuuhq G kyuhq *'sheep'*, T glahq G klahq *'ox'*, T mahqr G maahraq *'gold'*, T yohq G yohq *'thief'*, to name but a few. It may be noted in Table 1 that 'reduced breathiness' is a feature of the -hq set in Gurung.

On the basis of Taylor (1969) one would conclude that breathiness is a phonemically contrastive feature separate from the four tones, but not fully independent. Taylor writes (1969:32): 'Breathiness occurs only with vowels having high, mid, and low stressed tones. All unstressed vowels are clear.' However the copious examples in Taylor's paper afford only six breathy instances out of a total of ninety high stressed words: /cú^{h}ŋ-pa/ *'to sell'*, /kú:^{h}-pa/ *'to bend'*, /p^{h}í:^{h}-pa/ *'to peel'*, /myú^{h}r/ *'overflow'*, /ná^{h}m/ *'rain'*, /pé^{h}-pa/ *'to separate'*. Unfortunately Hari (1970) does not discuss these specific words.

morpheme of a compound noun. Hari states (1970:22) that 'distinctive suffixes occur only with lax vowels' and her examples suggest that the converse is also true, so that all suffixes with lax vowels are distinctive and those with tense vowels are neutral - but she does not make this generalisation explicit.

Though the details of contrast in each language, Gurung, Tamang, and Thakali, differ, the discovery of cognates across the three languages establishes a correlation of the four sets, as shown for monosyllables in Table 2 (from Pittman 1970:2). The use of KK, KG, GK, and GG as set labels is explained under 2.2. Examples from the three languages, with reconstructed Proto-Tamang-Gurung-Thakali (TGTh) forms are given in Table 3, adapted from Pittman and J. Glover (1970:6) but with the Tamang stop-initial words of the GK set marked breathy after Hari's analysis (1970 - see footnote 9).[10] As there is no contrast between the clear sets in Thakali monosyllabic nouns and particles the q which distinguishes the corresponding sets in Tamang and Gurung has been omitted in Thakali. The identification of contours characterising the Thakali clear sets in Table 2 is based on the recognition of cognates in verb stems: G noqba Th naaqwa *'to carry'*, G tshaqba Th tshaqwa *'hot'*, G tshaba Th tshawa *'grazing* (Th); *to graze (animals), shepherd* (G)*'*.

TABLE 2: *Correlation of the four sets in Gurung* (G), *Tamang* (T), *and Thakali* (Th) (from Pittman 1970:2, with Hari's characterisation of Tamang added in parentheses)

	KK	KG	GK	GG
G:	Clear, intense.	Clear, relaxed.	Breathy, rising.	Breathy, low.
T:	High stressed. (Clear, high falling.)	Unstressed. (Clear, mid level.)	Mid stressed. (Breathy, mid level.)	Low stressed. (Breathy, low level.)
Th:	Clear, high level.	Clear, extra-high falling.	Breathy, low rising-falling.	Breathy, low level.

[10] For the reconstructed TGTh forms I have retained Pittman and J. Glover's (1970) notation whereby the voicing of stops, initial and/or final, is used to indicate class membership and the h or q is then redundant and omitted: *syet (KK) *'louse'*, *khyab- (KG) *'to apply a tika'*, *bret (GK) *'eight'*, *byab (GG) *'feather'*. However, this use of voicing of the final stop finds no support as such in current descriptions of the daughter languages. Whereas the examples cited rest on Tamang forms cited as khyabpa *'to apply a tika'*, byab *'feather'*, Taylor's (1969:8) description of the distribution of allophones of /p/ would assign a voiceless allophone in each of these cases (in word-final position, and word-medial after a clear vowel), and Hari (1970:35) writes the latter as byahp *'feather'*.

TABLE 3: Tamang-Gurung-Thakali cognate sets

KK

TGTh	T	G	Th	English
*kaaq	kaaq	koq	kaa	*blood*
*kuq	kuq	kuq	ku	*nine*
*khuq	khuq	khuq	khu	*soup*
*leq	leq	leq	le	*tongue*
*liiq	liiq	liq	li	*face*
*miiq	miiq	mlq	mi	*eye*
*phoq	phoq	phoq	pho	*stomach*
*saaq	saaq	soq	saa	*breath*
*syet	syeqt	syeq	sye	*louse*
		noq-	naaq-	*to carry*
		tshaq-	tshaq-	*to be hot*

KG

TGTh	T	G	Th	English
*khyab-	khyap-	khyaa-		*to apply a tika*
*min	min	ml	min	*name*
*mu	mu	mu	mu	*sky*
*na	na	na	na	*nose*
*pha	pha	pha	pha	*husband*
*phii	phii	phi	phi	*rind*
*ra	ra	ra	ra	*goat*
*ru	ru	ru	ru	*horn(s)*
*sa	sa	sa	sa	*earth*
*sung	sung	sU	sung	*mouth*
		tsha-	tsha-	*to graze*

GK

TGTh	T	G	Th	English
*bliq	blihq	plihq	plihq	*four*
*braq-	brahq-	prahq-	prahq-	*to walk*
*braaq	braahq	prohq	praahq	*flour*
*bret	brehqt	prehq	prehq	*eight*
*diqm	dihqm	dlhq	tihqm	*house*
*druuq	Duuhq	Tuhq	Tuhq	*six*
*gyuuq	gyuuhq	kyuhq	kyuhq	*sheep*

(continued on page 11)

TABLE 3: Tamang-Gurung-Thakali cognate sets - continued

GK - *continued*

TGTh	T	G	Th	English
*mahqng	mahqng	mOhq	mahqng	*ghost*
*mehq	mehq	mehq	mehq	*cow*
*ngiihq	ngiihq	nglhq	ngihq	*two*
*yohq	yohq	yohq	yohq	*thief*

GG

TGTh	T	G	Th	English
*dza	dzah	tsah	tsah	*son*
*dzang	dzahng	tsOh	tsahng	*nest*
*go	goh	koh	koh	*upper back*
*lih-	lih-	lih-	lih-	*to be heavy*
*miih	miih	mih	mih	*person*
*ngoh	ngoh	ngoh	ngoh	*forehead*
*maah	maah	moh	maah	*younger sister's husband*
*ngeeh	ngeeh	ngeh	ngeh	*milk*
*baa	baah	poh		*leaf*
*byo	byoh	pyoh		*mat*
*byab	byahp	pyaah		*feather*

2.2 *REGISTER AND THE K/G HYPOTHESIS*

The data present a systematic[11] phonological contrast between the clear and breathy groups very similar to that described as register in Mon-Khmer. A glance at Tables 1 and 2 shows the general correlation between the clear/breathy groups and high/low *pitch*. Articulatorily, the clear and breathy groups in Gurung are correlated in the writer's observation with the position of the *tongue root*, backed and fronted respectively; and we have noted Hari's remarks on their correlation in Thakali with the lowering or raising of the Adam's apple. Further, Table 3 shows that the *voicing of initial stops* in Tamang is clearly an exponent of the contrast between the breathy and clear groups, and Burton-Page (1955:113) cites 'potential voicing' of syllable initials as a feature of Tone-2 (breathy) words in his description of a more

[11] 'Structural typology should (by definition) proceed from systematic comparison.' (Uspensky 1968:19).

western (Gandrung) dialect of Gurung.[12] The exponent of *vowel openness* is less satisfying. The only evidence known to me, Burton-Page's examples, show closer vowels for the (clear) Tone-1 words than for the (breathy) Tone-2 words, as shown in Table 4. This is contrary to the expectations from the Mon-Khmer and West African studies (Miller 1967, Stewart 1967).

TABLE 4: Tone and vowel openness in Gurung (from Burton-Page 1955:113,114)

	TONE-1 (clear)		TONE-2 (breathy)	
			ɦ—	
i:	ɲi [ɲi?]	*'seven'*	ˋɲi [ɲɪ:]	*'two'*
			ɡ̥—	
e:	kwẽ [kwẽ̥?]	*'clothes'*	ˋkwe [gwɛ:]	*'honey'*
			ɦ———	
a:	khamu [khamɔ]	*'he comes'*	ˋyamu [jɑ:mɔˈ]	*'he goes'*
			ɦ—	
o:	khlyõ [kl̥yõ̥?]	*'place'*	ˋso [ʒo̥:]	*'breath'*

Some acoustic analysis has been performed on Gurung data (Ghachok dialect), apparently confirming the auditory analysis, but I have not yet seen the results (Hinton 1970).

Thus tongue root position and impressionistic exponents of register account for a bifurcation of Gurung phonology and, less clearly, of Tamang and Thakali. However, there are four, not two, sets to be explained, and the contrast between, say, 'clear intense' and 'clear relaxed' in Gurung seems itself parallel to the widespread register contrast in South East Asia.

At this point the data from Chepang, a languge of the West Central Himalayish section of Sino-Tibetan (Shafer 1955:101) spoken in the foothills south of Kathmandu, suggested an explanation of the four-box systems of the languages of the Gurung branch. In Chepang every consonant except s and h occurs both voiced and voiceless, and final, and to a very slight degree initial, voiceless consonants 'tend to raise syllable pitch ... relative to syllables with voiced consonants or open

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[12]The 'potential voicing' described by Burton-Page in the Gandrung dialect has been observed by the writer also in the Ghachok dialect of Gurung, but it is there in contrast with full voicing of word-initial stops, both in clear and breathy words: piqba *'to be shy'*, piba *'to be born'*, biba *'to stay'*; grihq *'one'*, krih *'dirt'*, kihq *'thatch'*.

syllables' (Caughley 1969:21).[13] Table 5 gives examples (from Caughley 1969:22-3) showing the variation in pitch contour on disyllabic words according to change in voicing on the consonants of each syllable.

TABLE 5: Chepang pitch conditioned by voicing

I. INITIAL SYLLABLE

/sip.ru/	[s͡ɪp.r͡ʊ]	*'a snake'*
/nek.ma/	[n͡ɛk.m͡a]	*'this year also'*
/kim.ləm/	[k͡ɪm.l͡əˇm]	*'house'*
/baŋ.ləm/	[b͡aŋ.l͡əˇm]	*'stones'*

II. FINAL SYLLABLE

/lyum.phuk/	[lyʊm.p^{h}ʊk]	*'cave'*
/yam.rok/	[yæm.rɔk]	*'husk'*
/baŋ.taŋ/	[baŋ.t͡aŋ]	*'stone place'*
/baŋ.ləm/	[baŋ.l͡əˇm]	*'stones'*

The Chepang system is beautifully simple, revealing a correlation between pitch and voicing uncomplicated by the other factors which have obscured the relationship in many other languages, and thus providing a clue for the analysis of comparable systems. It will be noted that in Chepang it is predominantly the final consonant which correlates with the suprasegmental feature, not the initial consonant as in the Cambodian orthography referred to above.

Drawing a parallel with the Chepang data, Pittman and J. Glover (1970:1) have proposed an explanation for the 'four-box' systems of Tamang, Gurung, and Thakali in terms of the interaction of a binary register on each of two syllables of hypothetical disyllabic wordbases in a parent language. Notationally, they use K to represent voiceless consonants and G to represent voiced consonants in the parent. For the syllables, K and G represent first and second register respectively. The initial symbol dominates the final in determining the register of the word but the final determines (usually) secondary features. The word bases of the languages are therefore grouped as KK, KG, GK, and GG, as in Tables 2 and 3 above.

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[13] Voiced stops do not occur syllable final, but for pitch purposes open syllables fill this gap in the distribution pattern.

The data supporting this hypothesis may be summarised.

(1) The breathy/clear distinction in Gurung corresponds to that in Thakali and Tamang and sets up in each language two groups among words of any length.

(2) In Tamang the TGTh breathy/clear groups are further distinguished by a voicing contrast of word-initial stops. Thus Taylor (1969:8) describes the word-initial distribution of [p] as 'before high tone or a low unstressed vowel' and of [b] as 'before a non-high stressed vowel'.

(3) The breathy group in both Gurung and Thakali is further subdivided by contrastive contour versus low level pitch, and in Tamang 'a mid falling contour contrasts with a low slightly falling contour' (Hari 1970:11). The distinction is correlated across the three languages, although the contours are realised differently in the three languages: G low rising, T mid falling, Th low rising-falling.

(4) The intense versus relaxed distinction of Gurung clear monosyllables is realised in Tamang as high falling versus mid level (with a slight rise) contour. This distinction had earlier been described (Taylor 1969:3) as high stressed versus unstressed - an understandable impressionistic description of the contour contrast.

(5) The link in Chepang between voicing of final consonants and syllable pitch suggests a similar explanation for the pitch distinction evident within each register group (breathy and clear) of the TGTh languages.

2.3 *LHASA TIBETAN AND SHERPA* are both classified by Shafer (1955:100) in the Central Bodish unit of the Bodish branch of the Bodish section of the Bodic division of Sino-Tibetan. Sprigg (1955) described Lhasa Tibetan as exhibiting a two-term tone system, with pitch exponents of the two classes differing in different intonation contexts, of which he described three. He states for monosyllabic Noun+Particle words a voice quality exponent of tone (1955:153): 'Clear voice may be stated as an exponent of Tone One and breathy voice of Tone Two.'

Sherpa has been described by Gordon (1969) as exhibiting contrastive phonological levels of foot and word between the levels of syllable and phonological phrase (pause-group). The phonological word is defined by stress, whereas 'the phonological foot is the domain of contrastive tone and contrastive intonation' (Gordon 1969:45). The interrelationships of units on these levels is complex, with stress placement (in the word) conditioning variants of pitch patterns on phonological feet. However, Gordon described four contrastive types of phonological foot ranked 'in terms of four pitch levels and four degrees of tense/lax' (1969:55).

By analogy with Sprigg's description of Lhasa Tibetan Gordon (1969:4) described these four types as the intersections of two tones and two intonations, with exponents of tone and intonation describable best in terms of wave or process (1969:46-53). It must be kept in mind that, in the description of Sherpa, Intonation-1 and Intonation-2 represent contrastive foot types, not the same word appearing in contrastive positions in the sentence as in Sprigg's work on Lhasa Tibetan.[14] Table 6 (from Gordon 1969:46,50) shows the features characterising the four types of monosyllabic feet.

TABLE 6: Features of monosyllabic feet in Sherpa

TYPE	PITCH	FORTIS CONSONANT	TENSE VOWEL	LAX VOWEL	VOWEL LENGTH	GLOTTAL CLOSURE
1 (KK)	1	+ +	+ +	- -	-	+ +
2 (KG)	2	+	+	-	+	+ +
3 (GK)	3	-	-	+	+	+/-
4 (GG)	4	- -	- -	+ +	-	-

'With disyllabics the differential is carried primarily by pitch and intonation features' (Gordon 1969:52). A comparison of these features in Table 6, and in more detail in Gordon's paper, with those identifying the **TGTh** tone sets allows a correlation to be set up between Sherpa and **TGTh** systems as shown in parentheses in the first column of Table 6, and so for convenience the Gurung hq notation is here applied to the Sherpa examples. Although not very many cognates have been identified between Sherpa (S) and **TGTh** a few words which support the correlation of the two 'four-box' systems are shown in Table 7 (from Pittman and J. Glover 1970:6). Two counter-examples are G sa S saq *'tooth'*, G nglhq S ngiq *'two'*.[15]

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[14]Gordon (1969:4) and Pittman (1970:4) appear to have overlooked this difference. Their oversight does not affect the validity of Gordon's analysis, which is substantiated by very keen phonetic observation, but adds a little confusion in terminology. It is noteworthy that the difference between Sprigg's and Gordon's analyses is remarkably similar to the difference between Burton-Page's and my analyses of Gurung.

[15]I am indebted to D.J. Prentice for drawing to my attention the fact that another tentative cognate given by Pittman and J. Glover - G khoplE S kapli *'skull'* - looks suspiciously like a common borrowing from Sanskrit, perhaps via Nepali kapal. Likewise G loh S loh *'year'* is probably a common borrowing from Tibetan lo. In Gurung the word is used only in the religious context of the twelve-year cycle with the years named after various animals, and the animal names themselves are borrowed, mostly, from the Tibetan names (Das 1902:1220-1).

TABLE 7: TGTh-Sherpa cognates in contrastive sets

TGTh	Sherpa	English	TGTh	Sherpa	English
	KK			KG	
*kyuq	tsyuq	*water*	*ama	mama	*mother*
*kaaq	thaqk	*blood*	*sa	sa	*earth*
	GK			GG	
*druuq	Tuhqk	*six*	*miih	mih	*person*
*gyuuq	luhqk	*sheep*	*nah	nahmjok	*ear*

For monosyllabic words in isolation the features described by Gordon as distinguishing the final -K from final -G sets were not pitch but fortis (KK) versus lenis (KG) articulation, and tense (GK) versus lax (GG) vowel as in Table 8 (from Gordon 1969:50).[16] Both distinctions are familiar from other descriptions of register, although it is curious that the feature tense/lax (clear/breathy), which is dominant in TGTh, is secondary in Sherpa. It may be noted that for Lhasa Tibetan Sprigg stated the clear/breathy contrast also only for monosyllabic words (1955:153).

TABLE 8: Monosyllabic Sherpa words in isolation

KK	KG	GK	GG
(high-fortis)	(high-lenis)	(low-clear)	(low-breathy)
saq	sa	cahq	dzah
'tooth'	'floor,ground'	'hen'	'rainbow'
	naa	naahq	saah
	'day after tomorrow'	'a wheat'	'copper'

2.4 PROBLEMS

The analysis throws some problems into bold relief.

(1) It is difficult to account for the (relatively few) cognates thus far recognised between Chepang and TGTh in terms of rules predicting Chepang's two-box system from the TGTh four-box system. Pittman (1970:7)

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[16] In Sherpa ts and dz represent alveolar stops with sibilant release, and c and j alveo-palatal stops with sibilant release (Gordon 1969:10,11). In Table 8 'beneath initial consonants ˌˌ indicates very fortis and ˌ fortis. ... The plus sign ₊ indicates laxness of vowel.' (Gordon 1969:50). These subphonemic features are added to the transcription for these examples only.

has suggested a hypothesis that K is dominant and G recessive, in the sense of dominant and recessive genes in biogenetics, so that TGTh KK, KG, GK all become Chepang high (K), and only TGTh GG becomes Chepang low (G), but he mentions several counter-examples.

(2) The behaviour of polysyllabic words is bewildering. In Tamang and Thakali the four-box system holds regardless of the length of the morpheme. In Gurung, however, the grouping of the breathy and clear words into sets varies with the length of the word, leading to a description in terms of accent, a contrastive high-pitch which may occur contrastively on any one syllable or on none (Glover 1969b). This pattern seems more in conformity with the K/G hypothesis extended for polysyllabic words, but appears aberrant compared with the other languages.

From a descriptive standpoint for the present-day Tibeto-Burman languages it must be emphasised that the phonetic realisations of the distinctions are very diverse. As Pittman has noted (1970:5):

> 'So far no pair of exponents whatever has been identified as constituting a common denominator basis for this contrast in every one of these five languages, or even in every opposition of any one of them. ...
>
> 'Advanced versus backed tongue-root position may be the articulatory contrast which most adequately summarises the opposition at all points, but the acoustic effects of this are highly variable. The K/G notation represents therefore a very broad spectrum of features, and not necessarily a contrast of voicing at all.'

3. CONCLUSION[17]

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[17] Richard Pittman, commenting on Dale Purtle's thesis that all tone languages of East and Southeast Asia are derived from a basic eight tone system and that these are in turn related to the two-register systems of Southeast Asia, says:

'Dale Purtle's "Speculations on the Genetic Relationship of Sino-Tibetan to the Languages of Southeast Asia", read December 29, 1969, at the San Francisco meeting of the Linguistic Society of America, and his "Tone from Vowel Register: an Asian Areal Feature", read at the winter meeting of the same society in New York, advance the hypothesis that the eight-tone tonal languages of East and Southeast Asia have arisen from an original 'vowel-register' language, of which Cambodian is the best modern representative. His thesis is further developed in a paper read at Cornell University October 9, 1970, "Reconsidering the Position of Tibeto-Burman within Sino-Tibetan".'

Richard Pittman states that the Purtle thesis can be translated into the system described in this paper by a hypothesis which assumes the original word bases to have contained three consonants each, each consonant representing either the high or the low register. Using the notation of this paper, the eight total combination possibilities which give the eight tones are as follows:

KVKVK	GVGVG
KVKVG	GVGVK
KVGVK	GVKVG
KVGVG	GVKVK.

The concept of register can usefully be applied to several Tibeto-Burman languages of Nepal. The Tamang evidence of the voicing of initial stops only in the breathy group of TGTh words, and the Chepang parallelism of voiced and voiceless final consonants with low and high pitch, add support to the hypothesis of consonants in a parent language as an historical source of present-day register systems (Li 1966:88, Phillips 1962:1). Further, intersection of the voicing distinction in both word-initial and word-final consonants can explain the four-way opposition found in Sherpa, Gurung, Tamang, and Thakali.

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ABBREVIATIONS:

BSOAS = *Bulletin of the School of Oriental and African Studies*, London.

SIL = Summer Institute of Linguistics.

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A GUIDE TO THAKALI TONE*

MARIA HARI

INTRODUCTION

One striking feature of the tone systems of Tibeto-Burman languages studied thus far by members of the Summer Institute of Linguistics in Nepal is that pitch contrasts are defined over morphologically defined domains, such as the word or the morpheme, rather than over phonologically defined domains such as the syllable. In Thakali the morpheme is the domain over which pitch contrasts are defined.

This paper gives a summary of the tone system of Thakali. All the theoretical statements are amply illustrated with data. This summary has grown out of extensive field work and also contains a few remarks on the methods of tone analysis. These are hoped to be stimulating for anyone who wants to analyse a similar tone language.

Thakali is spoken in Nepal in the northern part of the Dhaulagiri zone along the upper Kali-Gandaki River. This part of the valley is known as Thak Khola. Many Thakalis have migrated recently to other places, mainly south of the Thak Khola. This guide represents the language as spoken in Tukche, the business centre of the region.

The tone analysis was carried out with the help of Miss Nila Gauchan from Tukche, who proved to be an excellent informant.

A practical text orthography is used to represent the segmental material. This orthography is based on the phonemic analysis. For the suprasegmental features of tone phonetic and phonemic representations have been used. This variation reflects the successive stages of the tone analysis. In the Thakali text all the morpheme breaks are indicated with a dash: **so-wa**.

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T retroflexed alveolar stop;
Th retroflexed alveolar aspirated stop;
t dental stop;
th dental aspirated stop;
c alveolar affricate (ts);
ch alveolar aspirated affricate (tsh);
ng velar nasal.

The examples presented in this guide are intended only to illustrate the tone analysis of Thakali. They are not presented for use in the study of the grammar of the language. Though care has been taken to insure the grammaticality of the utterances used, many of them are fragmentary, and many are highly idiomatic. These idiomatic utterances are used especially in jokes, figurative speech and in slang expressions even though from a grammatical or semantic point of view they are far from transparent.

I. THE CONTRAST SYSTEM

1. *VOICE QUALITY CONTRAST*

Introduction

All the six vowels of Thakali (i, e, aa, u, o, a) occur with tense and with lax articulation. This modification of the articulation is contrastive and also modifies the pitch of the vowels. *Tense articulation* conditions *high pitch* while *lax articulation* conditions *low pitch*. (In the pronunciation of tense vowels the Adam's apple is raised slightly. This results in a smaller resonance chamber at the back of the mouth and the vowel sounds therefore tense, non-vibrant, and high. In the pronunciation of lax vowels the Adam's apple remains lowered. This results in a larger resonance chamber at the back of the mouth and the vowel therefore sounds lax, vibrant, and low.)

The voice quality contrast is very important in Thakali and not too difficult to hear. Without contrasting the voice qualities with each other one may easily fail to hear it, but in a frame where we have the contrast at the same point of the utterance, it is quite striking.

Voice Quality Contrast on Stems

List 1

The following list is a selection of monosyllabic tense and lax nouns in the same frame. In orthographic transcription laxness is symbolised with an h after the vowel, tenseness is not marked. Thus, vowels which

are not followed by h are tense. Observe how tense and lax vowels condition the pitch of the items.

ngā-cē ke mraang-ci.	*I saw a field.*
kaa	*blood*
ta	*horse*
pu	*earthern pot*
kaah	*blister*
Tih	*skin*
cah	*son*
ngā-cē me mraang-ci.	*I saw a fire.*
li	*face*
le	*tongue*
ru	*horn*
roh	*friend*
mih	*person*
meh	*ox*
tom	*bear*
cam	*bridge*
sin	*wood*
pay	*wool*
kehn	*bread*
kaahng	*hill*
pahr	*garden*
tihm	*house*
kyu	*water*
plaa	*vegetables*
pro	*snack*
cye	*meadow*
prih	*root*
praah	*flour*
ngyeh	*milk*

List 2: Some minimal pairs

ngā-cé kē mrāang-ci.	*I saw a field.*
keh	*work*
mē	*fire*
meh	*ox*
kyū	*water*
kyuh	*sheep*
prī	*yak cow*
prih	*root*
mī	*eye*
mih	*person*
yāa	*hand*
yaah	*yak*
pēn	*toad*
pehn	*young fellow*

List 3

The numbers from 1 to 10 sorted for voice quality.

TENSE:		LAX:	
cūri sōm 'mu-mu.	*Here are three.*	cūri Tih 'mu-mu.	*Here is one.*
ngīs	*seven*	ngih	*Here are two.*
kū	*nine*	plih	*four*
cyū	*ten*	ngaah	*five*
		Tuh	*six*
		preh	*eight*

List 4

Voice quality is contrastive only on the first syllable of a morpheme. Observe this in the following groups of tense and lax bisyllabic nouns.

cūri kōlaa 'mu-mu.	*Here is a child.*
karū	*wheat*
tāyaa	*potato*
pōlo	*nettle*
kohca	*khukuri*

curi tihngi 'mu-mu.	*Here is (a) sun.*
tuhli	*tailor*
pahle	*foot*
pucu	*thorn*
pulu	*cap*
caca	*salt*
naTi	*bone*
cahme	*daughter*
cahca	*baby*
Tihmca	*rug*
ngyahla	*mit friend (girl)*

The voice quality contrast occurs on all word classes. In the following list we have groups of tense and lax verb stems in alteration.

List 5

thẽ -cẽ	koh-si 'mu-mu.	*He is understanding.*
	ngyoh-si	*looking*
	cuh-si	*cooking*
the	ko-si	*moving*
	chyu-si	*catching*
the	Tu-si	*sitting*
	pih-si	*saying*
	cih-si	*biting*
	keh-si	*cutting*
	ti-si	*spreading out*
	me-si	*asking*
	khe-si	*slinging over*
	paah-si	*bringing*
	Taah-si	*tearing*
the	mah-si	*losing*
	nah-si	*raising*
the	Taa-si	*weeping*
	naa-si	*carrying*

thé-cé sa-si 'mu-mu.	*He is completing.*
ca-si	*eating*
kohn-si	*measuring out*
nuhng-si	*spoiling*
caahng-si	*sending*

List 6

The following examples illustrate the voice quality contrast for verb stems with minimal pairs.

ko-wa	*to move*	cu-wa	*to bark*
koh-wa	*to understand*	cuh-wa	*to distribute*
so-wa	*to live*	taa-wa	*to hold out*
soh-wa	*to build*	taah-wa	*to hit*
te-wa	*to take out*	re-wa	*to get up*
teh-wa	*to boil*	reh-wa	*to grind*
kyu-wa	*to break*	to-wa	*to need*
kyuh-wa	*to buy*	toh-wa	*to meet*
pi-wa	*to leave*	kóm-pa	*to wear*
pih-wa	*to say*	kohm-pa	*to measure out*

List 7

Thakali has a whole series of aspirated consonants: ph, th, ch, Th, kh, rh, lh. After these only tense vowels may occur. Lax vowels in monosyllabic words pronounced in isolation sound quite breathy.

pe	*story*	ngi	*we (exclusive)*
peh	*wife*	ngih	*two*
kaa	*blood*	nga	*I*
kaah	*blister*	ngah	*drum*
na	*nose*	Ta	*hair, head*
nah	*ear*	Tah	*cooks comb*
maa	*down*	ngo	*hair parting*
maah	*son-in-law*	ngoh	*forehead*

Monosyllabic nouns with initial aspirated consonants manifest voiceless aspiration before the vowel and have all high pitch.

khe	*grandfather*	pho	*deer*
Tha	*buzzard*	lha	*idol*
tho	*roof*	rhe	*ribbon*

In bisyllabic morphemes aspirated consonants occur only in morpheme initial position. Note the parallel to lax vowels, which also are relevant only on the first syllable of a morpheme.

khotong	*hole*	phopTe	*gray, white person*
Thisin	*loom, weaving stick*	chame	*young girl*

Aspiration of consonants and laxness of vowels are mutually exclusive in the first syllable of a morpheme. However these features are phonetically distinct and semantically contrastive. Following are a few minimal contrasts between aspiration of consonant and laxness of vowel.

ngā-ce kaah mraang-ci.	*I saw a blister.*
khaa	*neck*
cahme	*daughter*
chame	*young girl*
poh	*dough*
phō	*deer*
'khayaang pihr-wa ih-me?	*When will (he) fly?*
phir-wa	*shake up*
teh-wa	*boil*
the-wa	*hear*
toh-wa	*sow*
tho-wa	*be big*
cuh-wa	*cook*
chu-wa	*be happy*

Suffixes

The suffixes we have used in the examples up to now have all been tense, or at least nondistinctive as to voice quality. The following examples show that laxness also occurs on suffixes. Thus we cannot say that voice quality is a feature of the word. It is rather a feature of the morpheme, and it is only relevant on the first syllable of the morpheme.

List 8

In the following lists observe the different tonal behaviour of tense and lax suffixes.

FIRST LIST - TENSE SUFFIX

cú ta-ce 'la-si 'mu-mu.	*This is made with an axe.*
ru-ce	*horn*
sIn-ce	*wood*
man-ce	*medicine*
Tih-ce	*skin*
roh-ce	*by a friend*
Tuhy-ce	*by a giant*
cú Tohm-ce 'la-si 'mu-mu.	*This is made by a shaman.*
aana-ce	*elder sister*
picyaang-ce	*younger sister*
cyohma-ce	*nun*
pahle-ce	*leg*

SECOND LIST - LAX SUFFIX

cúri ta-caah 'mu-mu.	*Here are axes.*
rù-caah	*horns*
sìn-caah	*woods*
màn-caah	*medicines*
roh-caah	*friends*
Tih-caah	*skins*
tuhy-caah	*giants*
Tohm-caah	*shamans*
aàna-caah	*elder sisters*
picyaàng-caah	*younger sisters*
cyohma-caah	*nuns*
pahle-caah	*legs*

Note the strange tonal behaviour of -ce after lax stems. If it has a tense vowel we would expect the pitch to rise for it. This incoherence should raise our suspicion, and we should be able to explain it. Later we will see that the tonal behaviour of some tense suffixes is conditioned by the nature of the stem to which they are suffixed. The conditioning however is not only linked with the voice quality but also

with the pitch characteristics of the stem. As we have not yet illustrated the tone contrasts, the full explanation of the tonal behaviour of these suffixes will be given later.

2. *PITCH CONTRAST*

Introduction

In the previous section we have been talking about the voice quality contrast and about pitch insofar as voice quality conditions high and low pitch. For a long time we did not know that there was contrastive pitch as well, probably because it does not carry nearly as heavy a semantic load as the voice quality contrast. That is, minimal pairs for voice quality are extremely numerous but for tone they are quite rare. We only discovered them when we were actually hunting for tone. For this we made up lists of nouns and verb stems sorted for voice quality and CV-patterns. One day we happened to listen to a list of lax verbs in the following frame:

List 9

'kyaahng-ce "cuh-wa ih-mu.	*You will cook.*
"koh-wa	*understand*
"toh-wa	*meet*
'neh-ˀwa	*massage*
"nah-wa	*raise*
'paah-ˀwa	*bring*
'kyuh-ˀwa	*buy*
"ngyoh-wa	*look*
"praah-wa	*grind flour*
"lehm-pa	*lick*
'mahm-ˀpa	*think*
'nahm-ˀpa	*cover*
'cohm-ˀpa	*cross*
'caahng-ˀpa	*send*

This proved to be a good frame in which we were able to hear that some verbs had a strangely different stress and tone pattern.[1] First we talked of contrastive stress, saying that some stems had primary stress and others secondary stress. After the stems with primary stress, the suffix would sound unstressed and after stems with secondary stress it

would naturally sound a bit stressed.

First we were not so sure that there were only two different patterns and as a means of checking we lined up together those which we thought were the same.

List 10

Here we have the verbs of list 9 again, sorted for stress patterns. This lining up helped us to check whether we heard correctly.

'kyaahng-ce "cuh-wa ih-mu?	'kyaahng-ce 'caahng-'pa ih-mu?
"koh-wa	'cohm-'pa
"toh-wa	'nahm-'pa
"nah-wa	'mahm-'pa
"ngyoh-wa	'kyuh-'wa
"praah-wa	'paah-'wa
"lehm-pa	'neh-'wa

List 11

A good frame can be extremely helpful in tone analysis. Following we have the verbs of list 9 in a different frame. With this frame we found it much more difficult to hear the stress contrast.

He is cooking. etc.

thē-cē cuh-si 'mu-mu.	thē-cē ngyoh-si 'mu-mu.
koh-si	praah-si
toh-si	lehm-si
neh-si	mahn-si
nah-si	nahn-si
paah-si	cohm-si
kyuh-si	caahng-si

With this kind of contrast existing in the lax group we expected to find a similar phenomenon in the tense group. We continued working with verb stems.

List 12: tense verbs

nāama 'nāa-'wa ih-mu.	*Tomorrow (he) will carry.*
'Tāa-'wa	*weep*
"To-wa	*burn*

naama 'to-'wa ih-mu.	*Tomorrow (he) will thresh.*
'ko-'wa	*move*
'the-'wa	*hear*
"khe-wa	*patch*
"phye-wa	*sort out*
'ngye-'wa	*chew*
"mra-wa	*light*
'sa-'wa	*complete*
"kha-wa	*come*
"ca-wa	*eat*
'kom-'pa	*wear*
'tham-'pa	*put away*

The same list sorted for the two patterns:

naama 'naa-'wa ih-mu.	naama "ca-wa ih-mu.
'Taa-'wa	"kha-wa
'to-'wa	"mra-wa
'ko-'wa	"to-wa
'the-'wa	"khe-wa
'ngye-'wa	"phye-wa
'sa-'wa	

The next step was to sort all the monosyllabic verb stems for primary and secondary stress. We pre-sorted them carefully for voice quality, CV-patterns and vowel quality in order to help our hearing and we ran them through the frames we had found most helpful. To start out we had the frame 'kyaahng-ce.....ih-mu. (see lists 9 and 10). The initial part of this frame proved to be cumbersome because intransitive verbs would require 'kyaahng. The informant could not always tell immediately what was required and so this would be the cause for many interruptions and discussions which were not desired at this stage of the analysis. We still found the tense stress patterns particularly difficult to distinguish and uninterrupted recording proved to be the best help. We were able to evade the issue by putting a time word in the place of the pronoun. The resulting utterances were not always very meaningful but this did not disturb our informant once she had discovered what we were after.

List 13

This list gives us the verb stems with CV and CCV-patterns and oh as vowel.

naama "koh-wa ih-mu.	*Tomorrow (you) will understand.*
"toh-wa	*meet*
"ngoh-wa	*fry*
"toh-wa	*sow*
"soh-wa	*build*
'toh-'wa	*exchange*
"yoh-wa	*sieve beer*
'loh-'wa	*shake the salt tea*
'kyoh-'wa	*plough*
"ngyoh-wa	*look*
'mloh-'wa	*pierce*
"ploh-wa	*boil*
"kyoh-wa	*be beautiful*
'ploh-'wa	*be rich*

List 14

Verb stems with tense vowels have to be classified in the same way.

naama 'Te-'wa ih-mu.	*Tomorrow (you) will climb.*
'te-'wa	*fall*
'pe-'wa	*become shy*
'che-'wa	*be exhausted*
're-'wa	*get up*
'rhe-'wa	*grate*
'ye-'wa	*return*
'sye-'wa	*dance*
"kye-wa	*itch*
'sye-'wa	*go (honorific)*
"ple-wa	*flatten*

In the course of the sorting process we finally also discovered some minimal pairs. Some of these pairs had been previously encountered but

our former informants had always assured us that they were homophonous. Without a frame it is indeed almost impossible to pick up the contrast, especially in the tense group.

List 15: some minimal pairs for stress contrast

In the lax group:

naama "cuh-wa ih-mu.	*Tomorrow (you) will cook.*
'cuh-'wa	*divide*
"kyoh-wa	*be beautiful*
'kyoh-'wa	*plough*
"ploh-wa	*boil*
'ploh-'wa	*be rich*
"rih-wa	*beg*
'rih-'wa	*scratch*

In the tense group:

naama 'so-'wa ih-mu.	*turn it round.*
"so-wa	*be hot (spicy)*
'khe-'wa	*sling it around*
"khe-wa	*patch*
'phye-'wa	*go out*
"phye-wa	*sort out*
'kye-'wa	*arrange*
"kye-wa	*itch*

Stress versus Tone

The next step was to find out how this stress contrast was manifested in different frames and with different suffixes. From each of the four patterns we selected a group of representative verb stems and listened to them with all the occurring suffixes. This involved a lot of careful listening in the process of which we came to the conclusion that it was more appropriate to talk of contrastive pitch than to talk of contrastive stress. It was only in our initial frame where a stress difference could be heard clearly. In the majority of the frames it was just impossible to decide on stress differences. The difference in pitch however was constant and coherent. If two categories of stress were set up they would always be defined most successfully in terms of

pitch contours. This was enough evidence for contrastive pitch in Thakali. This interpretation was also more compatible with the conviction gained much earlier that the basic word stress was always on the first syllable of the word.[2]

List 16

This list gives a small selection of the possible verb suffixes with four different verb stems. The four verbs represent the four pitch patterns. It documents the claim that in Thakali a classification based on pitch is more stable and satisfactory than one based on stress.

	FRAME: *GRANDMOTHER SAID:*	
I	mom-ce /the Tu-mu /pih-si pih-ci 'mu ro.	*He stays.*
	the Tu-si mu-mu	*He is staying.*
	the Tu-laase	*He may stay.*
	nga Tu-cyo	*Let me stay.*
	nga Tu-wa-ka	*I want to stay.*
	Tu-ko-le	*Please stay.*
	Tu-yaang-ce ta-ci	*It's all right to stay.*
II	mom-ce /the-ce me-mu /pih-si pih-ci 'mu ro.	*He asks.*
	the-ce me-si mu-mu	*etc.*
	the-ce me-laase	
	nga-ce me-cyo	
	nga-ce me-wa-ka	
	me-ko-le	
	me-yaang ta-ci	
III	mom-ce /the-ce paah-mu /pih-si pih-ci 'mu ro.	*He brings it.*
	the-ce paah-si mu-mu	*etc.*
	the-ce paah-laase	
	nga-ce paah-cyo	
	nga-ce paah-wa-ka	
	paah-ko-le	
	paah-yaang-ce ta-ci	

IV mom-ce /the-ce cuh-mu /pih-si pih-ci 'mu ro. *He cooks.*

the-ce cuh-si mu-mu *etc.*

the-ce cuh-laase

nga-ce cuh-cyo

nga-ce cuh-wa-ka

cuh-ko-le

cuh-yaang-ce ta-ci

(Note that the last suffix of a phonological phrase shows varying pitch contours. This variation is conditioned by higher level intonation factors. Compare page 47, 2. *PITCH VARIATIONS UNDER INTONATION*.)

The Four Box Contrast System

The preceding examples induce us to set up a four box contrast system. We have already seen that tense voice quality conditions high pitch and laxness low pitch. Within each group we have a further contrast between level and contour pitches. The two intersecting systems of tense versus lax voice quality and level versus gliding pitch result in a four way contrast.

	GLIDING	LEVEL
TENSE (relatively high)	extra high falling I ('v)	high, basically level II (v)
LAX (relatively low)	low rising falling III ('vh)	low, basically level IV (vh)

In orthographic transcription gliding contours will be marked with an apostrophe before the first syllable of the morpheme and laxness by an h after the first vowel of a morpheme.

Contrastive pitch is linked with contrastive voice quality and is likewise a feature of the morpheme. The contours are elastic and stretch or shrink according to the number of syllables of the morpheme.

List 17

Observe the four contrastive pitch patterns on monosyllabic and bisyllabic nouns.

III	cū ngā-e meh ih-mu.	*This is my ox.*
	tuh	*manure*
	toh	*tunnel*
	kyuh	*sheep*
	kyahm	*path*
	nahngkyaa	*bed*
	tuhngkal	*worry*
	cahme	*daughter*
IV	cū ngā-e koh ih-mu.	*This is my back.*
	Tih	*skin*
	leh	*fate*
	kaahng	*hill*
	pyaahng	*voice*
	mehnto	*flower*
	rihkpa	*wisdom*
	luhmpu	*country*
I	nga-ce karu mraang-ci.	*I saw wheat.*
	tayaa	*potatoes*
	polo	*nettles*
	syutaa	*mill*
II	nga-ce naakaa mraang-ci.	*I saw a hen.*
	kolaa	*child*
	pucu	*thorn*
	pulu	*cap*

There is no contrast between patterns I and II in tense monosyllabic nouns.

nga-ce yaa mraang-ci.	*I saw a hand.*
lha	*god*
po	*popped grains*

nga-ce pay mraang-cí.	*I saw (a) wool.*
kon	*clothing*
phum	*egg*
cyen	*tiger*
sung	*mouth*

List 18

No minimal sets representing all the four different patterns have yet been discovered. The following sets each contain a minimal set of three. A nearly minimal item is inserted to represent the missing fourth pitch pattern.

naama 'khe-wa ih-mu.	*Tomorrow (he) will patch.*
te-wa	*take out*
'teh-wa	*boil, cook*
teh-wa	*drive away*
naama 'su-wa ih-mu.	*be dense*
cu-wa	*bark*
'cuh-wa	*divide*
cuh-wa	*cook*
naama 'so-wa ih-mu.	*Tomorrow (it) will be spicy hot.*
so-wa	*turn around*
'toh-wa	*exchange*
soh-wa	*build*
naama 'To-wa ih-mu.	*burn*
to-wa	*need*
'toh-wa	*exchange*
toh-wa	*meet*

Tonal Behaviour of Suffixes

As to their tonal behaviour there are two classes of suffixes: *neutral* and *distinctive*. The majority of suffixes are neutral, only a small minority is distinctive. The pitch pattern of neutral suffixes is determined by the stem to which they are suffixed. The contour of the stem spreads over the neutral suffixes.

List 19

Observe the four pitch patterns with various numbers of neutral suffixes.

	FRAME:	*GRANDMOTHER SAID:*	
I	nom-ce /the-ce 'khe /pih-si pih-ci 'mu ro.		*He patches it.* (definite)
	the-ce 'khe-wa		*He patches it.* (indefinite)
	the-ce 'khe-wa-ri 'yah-wa		*He goes to patch it.*
II	the-ce khe		*sling over*
	the-ce khe-wa		
	the-ce khe-wa-ri 'yah-wa		
III	the-ce 'rih		*scratch*
	the-ce 'rih-wa		
	the-ce 'rih-wa-ri 'yah-wa		
IV	the-ce rih		*beg*
	the-ce rih-wa		
	the-ce rih-wa-ri 'yah-wa		

Distinctive suffixes do not fall under the influence of the pitch contour of the stem but they manifest their own distinctive pitch pattern.

List 20

In this list we have a set of nouns first with the neutral suffix -ri and then the distinctive suffixes -'cyowa and -caah. Observe the pitch contours.

I	cu 'aale-ri 'paah-ko.	*Bring this to the brother.*
II	poso-ri	*young ox*
	kolaa-ri	*child*
	naakaa-ri	*hen*
III	'meh-ri	*ox*
	'tuhli-ri	*tailor*

IV	cu roh-ri	*friend*
	cyohma-ri	*nun*
I	naama 'aale-caah 'kha-wa ih-mu.	*Tomorrow the brothers will come.*
II	poso-caah	
	kolaa-caah	
	naakaa-caah	
III	'meh-caah	
	'tuhli-caah	
IV	roh-caah	
	cyohma-caah	
I	naama 'aale-'cyowa 'kha-wa ih-mu.	*As for the brother, he will come tomorrow.*
II	poso-'cyowa	
	kolaa-'cyowa	
	naakaa-'cyowa	
III	'meh-'cyowa	
	'tuhli-'cyowa	
IV	roh-'cyowa	
	cyohma-'cyowa	

The lax suffixes are all distinctive and if a tense suffix is distinctive it has a high falling contour (I) and will be marked accordingly. We can conclude that **pattern II suffix** is equal to **neutral suffix.**

Prefixes

There are only two prefixes in Thakali. They are both of tense voice quality and manifest a high pitch regardless to what stem they are affixed.

List 21

The negative prefixes **aa-** and **tha-** with different stems:

I	'tingi aa-'Tu-wa tih.	*So he doesn't stay today.*
	aa-'mra-wa	*light*
II	aa-naa-wa	*carry*
	aa-phaa-wa	*pay*
III	aa-'paah-wa	*bring*
	aa-'tuhm-pa	*become thick*
IV	aa-taah-wa	*hit*
	aa-toh-wa	*meet*
I	'tingi tha-'Tu-ko-li.	*Let him not stay today.*
	tha-'mra-ko-li	
II	tha-naa-ko-li	
	tha-phaa-ko-li	
III	tha-'paah-ko-li	
	tha-'tuhm-ko-li	
IV	tha-taah-ko-li	
	tha-toh-ko-li	

In the section on voice quality we did not distinguish between level and gliding pitches but only between the high pitch of tense and the low pitch of lax vowels. At this point we realise that they also must be classified as to their pitch.

Classifying Vocabulary

List 22

This list contains the lax items of lists 1, 2, and 3. The plural suffix -caah was found to be most helpful as frame for sorting lax nouns.

III	curi 'meh-caah 'mu-mu.	*Here are oxen.*
	'tihm-caah	*houses*
	'praah-caah	*flours*
	'keh-caah	*works*
	'kyuh-caah	*sheep*

III	curi 'yaah-caah 'mu-mu.	*Here are yaks.*
	'pehn-caah	*young fellows*
IV	curi kaah-caah 'mu-mu.	*blisters*
	Tih-caah	*skins*
	cah-caah	*sons*
	roh-caah	*friends*
	mih-caah	*people*
	kehn-caah	*bread*
	kaahng-caah	*hills*
	pahr-caah	*gardens*
	prih-caah	*roots*
	ngyeh-caah	*milk*
III	cu 'Tih-ih-mu.	*This is one.*
	'ngih	*two*
	'plih	*four*
	'ngaah	*five*
	'Tuh	*six*
	'preh	*eight*

List 23

The tense monosyllabic nouns proved to be quite a problem when we tried to sort them for pitch. They did not split up into two groups as we expected they would. We sorted them carefully for vowel quality and tried them in several frames, but could hear only one pattern. This drill contains tense items of lists one and two in two different frames.

I-agent.	*X-pl*	*saw*	*this*	*X-of*	*made*	*is*	
nga-ce	mi-caah	mraang-ci.	cu	mi-ce	'la-si	'mu-mu.	*eye*
	pri-caah			pri-ce			*yak cow*
	le-caah			le-ce			*tongue*
	me-caah			me-ce			*fire*
	ke-caah			ke-ce			*field*
	cye-caah			cye-ce			*meadow*

nga-ce kaa-caah mraang-ci.	cu kaa-ce 'la-si 'mu-mu.	*blood*
plaa-caah	plaa-ce	*vegetables*
yaa-caah	yaa-ce	*hand*
pu-caah	pu-ce	*pot*
ru-caah	ru-ce	*horn*
kyu-caah	kyu-ce	*water*
sin-caah	sin-ce	*wood*
pen-caah	pen-ce	*toad*
tom-caah	tom-ce	*bear*
cam-caah	cam-ce	*bridge*
pay-caah	pay-ce	*wool*

List 24

This list contains tense bisyllabic items sorted for pitch.

I	cu 'karu-ce 'la-si 'mu-mu.	*This is made of wheat.*
	'tayaa-ce	*potatoes*
	'tale-ce	*mud*
	'polo-ce	*nettles*
	'caca-ce	*salt*
	cu 'cyuku-ce 'la-si 'mu-mu.	*This is made of oil.*
	'cikaa-ce	*barley*
	'nimung-ce	*mouse*
	'liTi-ce	*ladder*
	'nemyaa-ce	*bird*
II	kolaa-ce	*child*
	pucu-ce	*thorn*
	pulu-ce	*cap*
	naTi-ce	*bones*
	thanca-ce	*lock*
	sorma-ce	*fog*
	naakaa-ce	*hen*

Compound Nouns

For compound nouns with monosyllabic components we get the following four possibilities of combinations of voice quality:

	FIRST COMPONENT	SECOND COMPONENT
1.	tense	tense
2.	lax	tense
3.	lax	lax
4.	tense	lax

With the first three cases we get no compound pitch patterns. The resulting compounds have the same patterns as other bisyllabic nouns. In the fourth case each component retains its inherent pitch pattern and we get compound pitch patterns. The following list illustrates the four cases.

List 25

1. If both components are tense the compound will have pitch pattern I or II.

COMPONENTS:

nam	*rain*	thin	*floor*	cham	*hair*
kyu	*water*	sin	*wood*	ki-	*easy*
yaa	*hand*	rhe	*lace*	'pa-	*thin*
chap-	*sharp*	Ta	*head*	'To-	*burn*
me	*fire*	taang	*pot*		

cu nam-kyu ih-mu.	*This is rain water.*
yaa-thin	*palm of the hand*
yaa-rhe	*finger*
yaa-sin	*finger nail*
chap-kyu	*sweat*
Ta-cham	*head hair*
ki-yaa	*right hand*
'pa-yaa	*left hand*
'me-To	*embers*
'me-taang	*torch*

2. If the first component is lax and the second tense, the compound will have pitch pattern III or IV. In most cases the tense component will behave like a neutral suffix, but not always as the last example shows.

'tihm	*house*	'puh	*?*	nam	*?*
'teh	*load*	kohr	*plough*	pyaang	*paathi*
'meh	*ox*	cham	*hair*	ki	*excrement*
taah-	*hit*	kum	*yoke*	pin-	*give*
cyah	*tea*	sin	*wood*		

cu 'tihm-nam ih-mu.	*These are household goods.*
'teh-pyaang	*basket*
'meh-ki	*cow-dung*
taah-sin	*stick*
cyoh-pin	*teapot*
'puh-cham	*body hair*
'kohr-kum	*plough yoke*

3. If both components are lax we get pattern III or IV. There are very few examples in this group. Further data might show compound pitch patterns.

'tihm	*house*	'Tehn	*eldest*	'nahn-	*cover*
yuhl	*village*	mih	*people*	kyaah	*place*

cu 'tihm-Ten ih-mu.	*This is the main room.*
'nahng-kyaa	*bed*
yuhl-mi	*villager*

4. With a tense and a lax component we get compound pitch patterns, the lax component retaining its inherent pitch pattern.

kam	*cloth*	naahng	*inside*	lha	*god*
pyung	*man*	cah	*son*	paah	*leaf*

cu kam-naahng ih-mu.	*This is an attic.*
pyung-cah	*fellow*
lha-paah	*leaf*

II. VARIATIONS

1. *THE RELATIVE NATURE OF PITCH*

It is understood that all statements about high and low pitch are relative to the point of the phonological utterance at which the pitch in question occurs. A high pitch has to be higher than a low pitch only at the same point of the utterance but not necessarily at another point. This is due to the up- and downdrifts which characterise the various utterance types. Up to now we have concentrated on listening to the contrasts as they are manifested within the peak of the utterance. We must be aware of the fact that at that point the interval between high and low takes on its maximum dimensions while in the onset and coda we have reduced intervals between contrasting pitch heights.

List 26

In the following utterances pay special attention to the intervals between contrasting pitches at various points in the utterance.

tita the-ce 'polo-caah 'ca-ci 'mɑ ro.	*Yesterday he ate nettles, they said.*
tita the-ce Tahw-caah 'ca-ci 'mɑ ro.	*Yesterday he ate spinach, they said.*
cyuhri the-ce naakaa-caah 'ca-ci 'mɑ ro.	*At last he ate the chickens, they said.*
cyuhri the-ce naakaa-caah cuh-ci 'mɑ ro.	*At last he cooked the chickens, they said.*
cyuhri 'kyaahng-ce naakaa-caah 'paah-ci 'mɑ ro.	*At last you brought the chickens, they said.*

2. *PITCH VARIATIONS UNDER INTONATION*

According to the linguistic literature in some tone languages there seems to be a minimum of higher level intonation. The lexical pitch patterns govern the sentence intonation almost entirely. This is not the case in Thakali. Lexical pitch contrasts and higher level intonation factors can cause quite drastic changes in the pitch patterns. We have noted above the general cresting pitch which manifests intonational drift over the utterance. Different utterance types can modify the course of the drift. In general, however, it is the final syllable of the phonological phrase or utterance which manifests the heaviest intonational pressure. Modifications of this syllable include intonational stress, up-step in pitch, rising or falling pitch contours,

crescendos and decrescendos. The pitch of neutral suffixes in this position is heavily modified by these higher level intonation factors. Distinctive suffixes and stems are also influenced and although the contours are modified, the underlying contrasts are not neutralised. The following lists give some illustrations of various overriding intonational patterns.

List 27

In list 26 the past tense suffix -ci is under the influence of the stems. Observe its behaviour in that position and compare it with the following utterances, where it is under the influence of sentence final intonation.

the-ce 'To-ci-wa 'ca-ci.	*He ate burnt (food).*
the ye-si 'kha-si cuh-ci.	*When he had returned he cooked.*

-wa, the present indefinite suffix is neutral. In the first utterance it is under the influence of the stem, in the second under the influence of question intonation.

'tingi nga-ce cuh-wa ih-mu.	*I will cook today.*
'tingi 'kyaahng-ce cuh-wa ?	*Are you cooking today?*

These pitch variations are irrelevant on the level of lexical pitch but not on the level of intonational patterns.

Stem Morphemes before Junctures

The morphemes occurring most frequently before major junctures are suffixes. Stems, however, may also occur in this position. The following list shows how the lexical pitch contrasts are preserved in spite of added higher level intonation features. (In the data below the pitch contours of the following verb stems should be observed and compared with each other: I 'khe- *'to patch'* III 'rih- *'to scratch'* II khe- *'to sling over'* IV rih- *'to beg'*.)

List 28

1. Verb stems:

I	'tingi aa-'khe-wa?	*Will you not patch it today?*
	aa-'khe, 'tingi aa-'khe.	*No. I won't patch it today.*
II	'tingi aa-khe-wa?	*sling over*
	aa-khe, 'tingi aa-khe.	
III	'tingi aa-'rih-wa ?	*scratch*
	aa-'rih, 'tingi aa-'rih.	

IV 'tingi aa-rih-wa? *beg*

aa-rih, 'tingi aa-rih.

2. Bisyllabic nouns:

I	su 'kha-la?	nga-e 'nimung.	*Who came?*	*My mouse.*
II		nga-e picyaang.		*My sister.*
III		nga-e 'cahmé.		*My daughter.*
IV		nga-e taahwa.		*My master.*

3. Monosyllabic nouns:

tense:	su 'kha-la?	nga-e khe.	*My grandfather.*
III		nga-e 'meh	*My ox.*
IV		nga-e peh.	*My wife.*

Much more would have to be said about pitch variations under intonation. This section does not give a complete treatment of the subject. It only exhibits some features and indicates along what lines the investigation should probably proceed.

3. *SHORT TEXTS*

In the following short story observe how the different pitch patterns are manifested in a coherent text.

Abbreviations:
aux = auxiliary
s = suffix
pst = past suffix

syomo syomo mih 'Tih-soto-we yuhl-ri tohnge-ci 'mu.
formerly formerly man one other-of village-in arrive-pst aux

'tihm-ri ye-we kaahng-ri cam 'Tih thaa-la myaang-pa 'mu ih-mu.
house-in return-s *time-in bridge one cut*-s *must*-s aux aux-s

cam-ye kuhng-ri tohnge-we kaahng-ri cam Thop kyu-si
bridge-of middle-in reach-s *time-in bridge suddenly break*-si

pohp te-ci 'mu. kyu-ri kyal-si 'yah-maa 'yah-maa coh
(at once) fall-pst aux *water-in swim*-s *go-while go-while lake*

'tho-wa 'Tih-ri tohnge-ci 'mu. ca-e resaang yuhl 'tho-wa 'Tih
big-s one-in reach-pst aux that-of near village big-s one

'mu ih-mu. kyu naahng-ce phe-we kaahng-ri tarnga 'Tih
is aux-s water inside-from (come out)-s time-in fish one

chyu-si 'paah-ci 'mu. tarnga-e pho Taah-wa-ce 'mahre 'cura 'Tih
catch-s bring-pst aux fish-of stomach cut-s-s gold bangle one

phe-ci 'mu. ca tarnga-'cyowa ca resaang-pe yuhl-ri
(come out)-s aux that fish-specification that nearness-of village-in

cung-si, 'mahr-e 'cura 'pohr-si 'tihm-ri ye-si 'yah-ci 'mu.
sell-s gold-of bangle (take with)-s house-in return-s aux

cu pe sye-wa narentra gawcan ih-mu.
this story tell-s is-s

FREE TRANSLATION:

1. *Once upon a time a man went to another village.* 2. *On his way back he had to cross a bridge.* 3. *When he was in the middle of the bridge, it suddenly broke and he fell down.* 4. *He kept swimming in the water for a long time until he reached a big lake.* 5. *Nearby there was a big village.* 6. *As he came out of the water he caught a fish and took it with him.* 7. *When he cut the fish up a golden bangle came out.* 8. *He sold the fish in the village nearby, took the golden bangle and returned home.*

By Narendra Gauchen

NOTES

1. It was Dr K.L. Pike, Professor of Linguistics at Ann Arbor University of Michigan, who drew my attention to this subtle difference in stress patterns for the first time.

2. Word stress in Thakali is manifested by some extra length and intenser lung pulses on the stressed syllable, but it is not correlated with high pitch. An ear however, which is used to correlate high pitch with stress, may hear unstressed high syllables as stressed.

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PROBLEMS OF PHONE ASSIGNMENT IN THE DESCRIPTION OF THAILAND LISU PHONOLOGY

E.R. HOPE

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 post-positions, 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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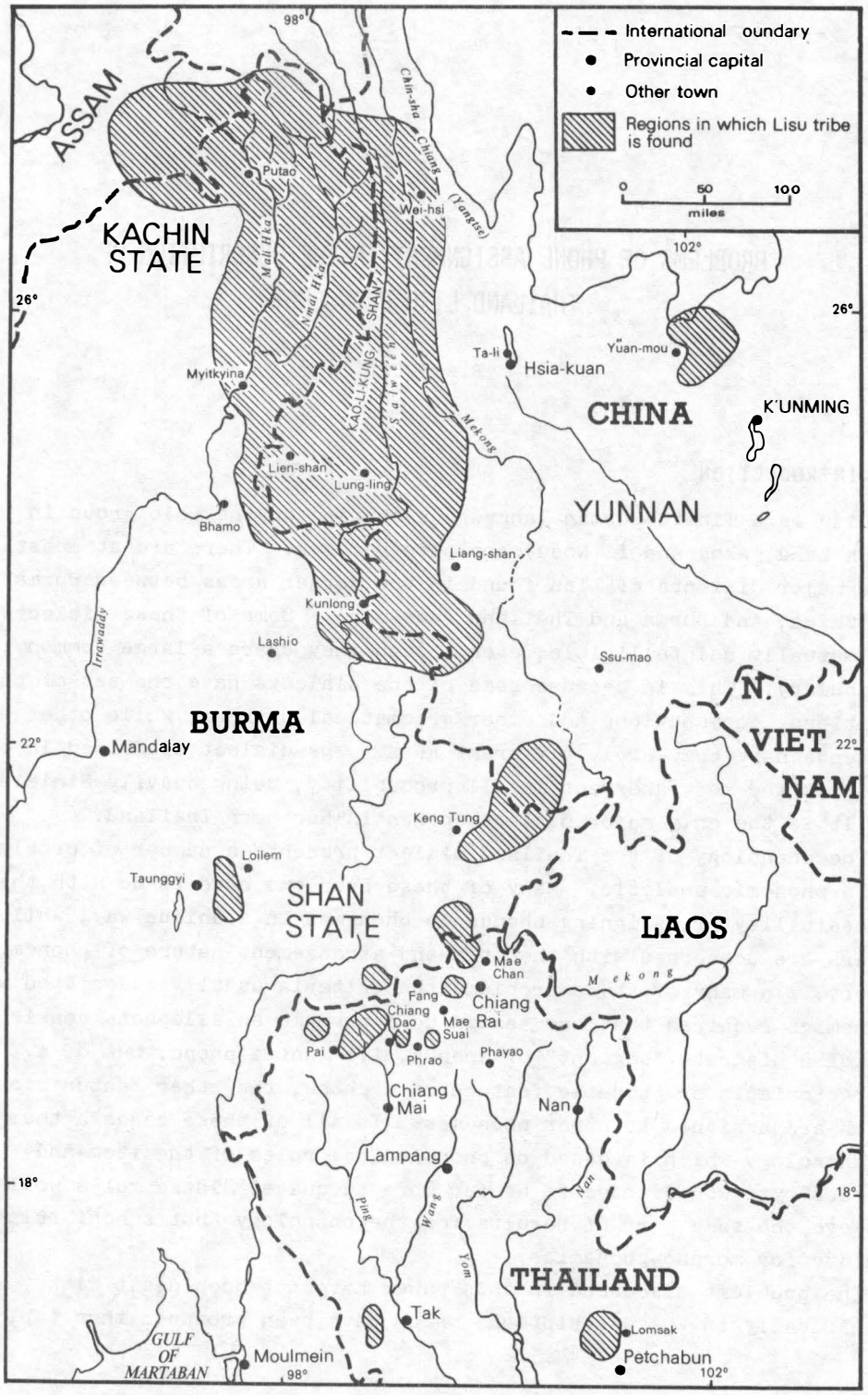

THE DISTRIBUTION OF THE LISU LANGUAGE

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		ɣ*	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
exchange	*deposit*	*vine*	*cook*	*stab*	*waft*
pha	tha	tsha	chà	kha	
glide	*here*	*hot*	*rob*	*copulate*	
ba	da	dza	ja̱	gàgà	
in milk	*clever*	*rice*	*cold*	*dawdling*	
fa̱	sa		ʃa	xa̱	ha
infected	*easy*		*clean*	*good*	*send*
vǎ	zà		ɣa̱	ɣa̱	
love-charm	*son*		*homespun*	*weave*	

ma	na	ɲá	ŋá
ripen	*sore*	*satiated*	*overturn*
la		ʌá	
come		*bright*	

Unassigned phone: [u̯], e.g. [u̯a] *'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: [ø] [ɣ̟ˈ] [ɣ̠ˈ]

EXAMPLES supporting vowel analysis:

phi	tɨ	phù
seedless	*stretched*	*picture*
phe	phə	phɔ phɔ
divorce	*loosen*	*flabby*
phǽ		pha
brush past		*glide*

EXAMPLES of unassigned phones: [pʰø³] *'bladder'*

[pʰᶠɣ̟ˈ³] *'drift'*

[pʰᶠɣ̠ˈ³] *'silver'*

1.22 Syllabic Nasals

/n̩/, e.g. /n̩khə̀ tsɬ/ *'night-time'*

1.3 *SEMI-VOWELS (PRE-NUCLEAR)*

/ʸ/ /ʷ/

EXAMPLES: /phʸa/ *'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 /ˇ/ [3-5]

High fall /^/ [5-2]

EXAMPLES: /má/ *'teach'*; /ma/ *'ripen'*; /mà/ *'plough'*; /mǎm̀pé/ *'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: /th̀ nyi/ *'one day'*; /thi nyi̲/ *'one finger's span'*; /mà mù/ *'not old'*; /mà mu̲/ *'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	/mʸà/ *'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 [ʎ] the palatal continuant phones can be ascribed to either the alveolars or the velars. Rather than having one palatalised alveolar phoneme /lʸ/ 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.

/nĺme/~/nyĺme/ *'today'*; /nl̀ts̀/~/nyl̀ts̀/ *'button'*.

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

/sʸ/ [ʃ] **Voiceless blade-alveopalatal deeply grooved fricative.** Occurs with front and central vowels[3], and with [ø]: /sʸĺ/ [ʃi^{5}] *'to cement together'*; /sʸl̀/ [ʃʒ̀$^{\dagger 1}$] *'blood'*; [ʃø^{1}] *'walk'*.

[ç] **Voiceless blade-palatal slit fricative.** Occurs with back vowels. /sʸa/ [ça^{3}] *'clean'*.

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

/zʸ/ [j] **Voiced blade-palatal slit fricative.** Occurs with non-laryngealised high and mid vowels, and with [ø]. /zʸè/ [je^{1}] *'to flash'*; [jø^{1}] *'use'*.

[ʸ] **High front on-glide.** Occurs before /a/ and laryngealised vowels. /zʸátsʲ/ [ʸa^{5}tsʲ^{3}] *'appearance'*; /zʸa̰/ [ʸa̰^{3}] *'do'*. In all unstressed syllables the latter allophone only occurs.

/hʸ/ [j̃ʰ] **Nasalised voiceless high front breathy vowel.** Occurs with /a/. /hʸà/ [j̃ʰa^{1}] *'Serow goat'*.

/mʸ/ [mʸ] **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. /mʸà/ [mʸa^{1}] *'many'*.

/nʸ/ [ɲ] **Voiced blade-palatal nasal.** Occurs before back vowels, [ø] and all laryngealised vowels. /nʸá/ [ɲa^{5}] *'surfeited'*; [ɲø^{5}] *'short'*; /nʸi̱/ [ɲi̱^{3}] *'a finger's length'*.

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

/nʸi/ [nʸi³] *'classifier for days'.*

/lʸ/ [ʎ] **Voiced blade-palatal lateral.** Occurs only with /a/. /lʸá/ [ʎa⁵] *'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 /Cʸ/) 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 [ɣ̥ᵘ] there is free fluctuation between the palatal affricate phones and the complex alveolar affricate phonemes:[4]

[ˊtʃʷa³⁻⁵]~[tsʷa³⁻⁵] *'to scratch'*

[ˊtʃʰʷa⁵]~[tsʰʷa⁵] *'to visit'*

[ˊdʒʷa³]~[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:

/tʸ/ [ˊcç] [c] [ˊkʸ] 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]. /tʸɨ/ [ˊcçi⁵]~[ci⁵]~[ˊkʸi⁵] *'to clear jungle'*; /tʸá/ [ˊcça⁵]~[ca⁵]~[ˊkʸa⁵] *'to cook'*; [ˊcçø⁵]~[cø⁵]~[ˊkʸø⁵] *'to breed'*.

[ˊtʃ] Voiceless unaspirated blade-alveopalatal affricate with grooved fricative release. Occurs before /ɨ/ /u/ /ʷa/ and [ɣ̥ᵘ]. /tʸɨ/ [ˊtʃʐ̩⁵] *'to cough'*; /tʸù/ [ˊtʃo¹] *'clan'*; /tʸʷáphù/ [ˊtʃʷa⁵pʰo¹] *'mosquito net'*; [ˊtʃɣ̥ᵘ⁵] *'to hollow out'*. Some people have [ˊtʃ] before /a/ in some words which the majority of Thailand Lisu pronounce with an initial /ts/. As mentioned above, there is free fluctuation between /tʸ/ and /ts/ before /u/ /ʷa/ and [ɣ̥ᵘ].

/thʸ/ [ˊcçʰ]~[cʰ]~[ˊkʰʸ] Aspirated equivalents of analogous allophones of /tʸ/ above.

[ˈtʃʰ] Aspirated equivalent of analogous allophone of /tʸ/ above. Distribution of allophones is as for allophones of /tʸ/. A few speakers have [ˈtʃʰ] before /a/ where the majority of speakers have initial /tsh/. In the speech of some speakers too [ˈtʃʰ] occurs before front vowels, in free fluctuation with the other allophones. /thʸɛ̀/ [ˈcɕʰe¹] ~[cʰe¹]~[ˈkʰʸe¹] *'gamble'*; /thʸà/ [ˈcɕʰa¹]~[cʰa¹]~[ˈkʰʸa¹] *'rob'*; [ˈcɕʰø¹]~[cʰø¹]~[ˈkʰʸø¹] *'speak'*; /thʸɨ̀/ [ˈtʃʰʐ̩̀³] *'barking deer'*; /thʸɯ̀/ [ˈtʃʰo¹] *'six'*; /thʸʷá/ [ˈtʃʰʷa⁵] *'a bunch'*; [ˈtʃʰvᵘ¹] *'thorn'*. There is free fluctuation between /thʸ/ and /tsʰ/ before /u/, /ʷa/ and [ʏ̩ᵘ].

/dʸ/ [ɟj]~[ɟ]~[ˈgʸ] 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]. /dʸì/ [ɟjɪ¹]~[ɟɪ¹]~[ˈgʸɪ¹] *'rub against'*; /dʸàlæ̀/ [ɟjaˈlæ¹]~[ɟaˈlæ¹]~[ˈgʸaˈlæ¹] *'naked'*; /dʸɯ̲/ [ɟjɯ̲³]~[ɟɯ̲³]~[ˈgʸɯ̲³] *'afraid'*; [ɟjø¹]~[ɟø¹]~[ˈgʸø¹] *'domestic animals'*.

[dʒ] Voiced blade-alveopalatal affricate with grooved fricative release. Occurs with /ɨ/, non-laryngealised /u/, [ʏ̩ᵘ] and /ʷa/. /dʸɨ/ [dʒɨ³] *'tusks'*; /dʸu/ [dʒo³] *'have'*; [dʒʏ̩ᵘ³] *'herds'*; /dʸʷa/ [dʒʷa³] *'down there'*. There is free fluctuation between /dʸ/ and /dz/ before non-laryngealised /u/, before /ʷa/ and [vᵘ].

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

pʸ	tʸ	ʔʸ
phʸ	thʸ	
bʸ	dʸ	
	sʸ	hʸ
	zʸ	
mʸ	nʸ	
	lʸ	

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 /tʸ/, 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 /ʸ/? And which part of the phone [c] is to be ascribed to /t/ and which to /ʸ/? 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 /ʸ/ 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 [u̯] have a distribution which is very nearly complementary:

	/e/	/æ/	/ə/	/u/	/a/	[ʸ̥]	[ʸ̊ᵘ]
[v]	x	x	x		(x)	x	x
[w]	(x)			x	x		

The contrast between [va] and [u̯a] occurs on only two words I know of, both of them borrowings. One of these contrasting forms [va$^{3-5}$] *'aphrodisiac'* is fully assimilated, and the other [va^{3} thi^{3}] *'calendar'* is fast becoming so.

The contrast between [ve] and [u̯e] is not very well established. Words of the form [u̯e] usually have an alternative form [u̯oʸ], 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 [u̯o] fluctuate freely with [ɣʷo] and even [ɣo]. Similarly [u̯e] fluctuates freely with [ɣʷe]. A possible interpretation of this data is that /ɣ/ has a zero allophone which occurs before /ʷa/ and which fluctuates freely with [ɣ] 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]	[æ̃]	[ə̃]	[õ]	[ɔ̃]	[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 concommitant 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:

/pɪ́/ *'to cover'*, /pé/ *'to turn into a were-tiger'*;

/phɪ̀/ *'slow'*, /phè/ *'level'*;

/bi/ *'beautiful'*, /be/ *'pendulous'*;

/mi/ *'tasty'*, /me/ *'late'*;

/di le/ *'full-grown'*, /de le/ *'recovered'*;

/tɪ́mə̌/ *'graveyard'*, /témə/ *'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
/tʸ/	Comp	FF	Comp	Comp	Comp	C
/thʸ/	Comp	C	C	Comp	-	C
/dʸ/	-	C	Comp	-	Comp	Comp
/sʸ/	Comp	Comp	Comp	FF	Ex.FF	C
/zʸ/	C	Ex.FF	Ex.FF	Comp	C	Comp
/n/	Comp	C	Ex.FF	C	-	C
/nʸ/	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 /?/ there is no full contrast between /i/ and /e/ when the syllable tones are taken into consideration. In non-laryngealised syllables, /i/ occurs after /?/ 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] [kʸi ~ kʸe] [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.

Roop[7] has made an interesting attempt at a solution to this problem by treating [i] as /ʸi/, 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: [yi^{5}] *'he'* : [ye^{5}] *'unconscious'*

[ʃ̊i^{21}] *'thirst'* : [ʃ̊e^{21}] *'kill'*

[cʰi^{1}] *'defecate'* : [cʰe^{1}] *'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 /sʸ/ and /nʸ/ (palatalised alveolar continuant initials) where /i, e, u, a, ø/ (Roop's phonemes) all co-occur.[8]

3.2 /i/:/ɨ/

The validity of this contrast hinges on the assignment of the phones [z̩ʲ] which occurs after alveolar fricatives and affricates, and [ʒ̩ʲ] which follows the palatalised alveolar fricatives and stops. These phones have complex articulation which is not adequately represented in my notation. With [z̩ʲ] 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 [z̩ʲ] and [ɨ] have complementary distribution:

	t	th	d	ts	tsh	dz	s	z	n	l
[ɨ]	x	x	x						x	x
[z̩ʲ]				x	x	x	x	x		

Turning now to the articulation of the phone [ʒ̩ʲ], the tongue tip remains in the retracted alveolar position adopted for the fricative [ʃ] or the fricative release of the affricate phones [tʃ] [tʃʰ] 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 concommitant forward central high vowel is taken as the focus of attention.

When the distribution of [ʒ̟̈] 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
[ʒ̟̈]	x	x	x	x		

A fact not reflected in the phonetic notation at this point is that [ʒ̟̈] 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]

	[sz̟̈]	[ʃi~çi]	[ʃʒ̟̈]
Solution 1	/si/	/syi/	/sywi/
Solution 2	/si/	/syi/	/sy̟/
Solution 3	/s̟/	/syi/	/sy̟/

In **Solution 1** the fact that [i] and [z̟̈] 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 [ʃʒ̟̈] 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^{y}i/ and /s^{y}ʷi/ respectively. The motivation for this analysis is economy, for it enables one to dispense with the /̟/ phoneme altogether. Syllables such as [kɯ$^{3-5}$] *'creak'* would be phonemicised as /ki/ since [ɯ] 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 [ʒ̟̈] 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 /i̱/ and associates it with [ʒ̱ʲ] but not with [ẕʲ]. 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 [ẕʲ] bears more resemblance to [i] than it does to [ʒ̱ʲ] which is an unwarranted assertion. /s/ and /z/ are still the only fricatives to co-occur with /i/ in this solution too.

Solution 3 maintains a regular non-occurrence of /i/ with fricatives, and does away with the phonetic anomalies mentioned above, but does so at the cost of adding the phoneme /i̱/ 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] [ʏ̱ʲ] *AND* [ʏ̱ᵘ]

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:

Unrounded		*Rounded*	
i	(i̱)	y	u
e	ə	ø	o
æ	a		ɔ

In this solution the phoneme (i̱) 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. [ʏ̱ʲ] is assigned to the new phoneme /y/, [ø] to the new phoneme /ø/ and [ʏ̱ᵘ] 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	?	f	v	s	z	x	ɣ	h	m	n	l
/ø/	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 [ɣ̬ʲ] to /y/ as a rounded vowel is questionable, since [ɣ̬ʲ] is not phonetically rounded. As represented on the chart of phonemes, the only significant difference between /y/ 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.

(ii) 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. [ɣ̬ʲ] can be assigned to /ʷi/, [ø] to /ʷe/ and [ɣ̬ᵘ] 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 /ɨ/. 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 [ø] : [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/ [i], [z̬ʲ] and the vowel components of [ʒ̬ʲ] and [ɣ̬ʲ] which are syllabic voiced fricatives with simultaneous high central vowel quality.

/ʷ/ [u̯], the lip-rounding component of [ø], and the labio-dental fricative component of [ɣ̬ʲ] and [ɣ̬ᵘ].

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 /ʏ̈/ is treated as /ʷɨ/ rather than as /ʷi/, yielding the somewhat asymmetrical chart of /ʷ/-plus-vowel sequences:

	ʷɨ	ʷu
ʷe		ʷɔ
		ʷa

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 /-a̲/ 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 /-a̲/, 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 alternative[11], 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 /ˊ/ : /ˇ/

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 /ˊ/ tone has high level pitch and normal vowel quality, while a syllable with /ˇ/ 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 /ˊ/ and /ˇ/ 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-phonic 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:

(i) 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 [˧] gliding to pitch allophone [˦] (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-diphthongs[13] 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/ ~ /C̆VV/ ~ /CV̆V/

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 [z̩†] be analysed as /wɨ/ 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 [sz̩†] 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 [xʷe] is then attributed to contrasting vowels rather than to contrasting initials, and [ø] and [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	ə	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 (Lienshan) dialect has concommitant 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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