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

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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the Summer Institute of Linguistics in Nepal, and Ken Gregerson and Richard Phillips in Viet Nam, for access to their unpublished materials.

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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 /ɐ̀/ 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	miq	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	mi	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'*
			ɦ̥——	
e:	kwẽ [kwẽ̥?]	*'clothes'*	ˋkwe [gwɛ:]	*'honey'*
			ɦ———	
a:	khamu [khamɷ]	*'he comes'*	ˋyamu [jɑ:mɷˑ]	*'he goes'*
			ɦ—	
o:	khlyõ [kl̥yõ̥?]	*'place'*	ˋso [z̥o̥:]	*'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/	[s̆ɪp.rʊ]	*'a snake'*
/nek.ma/	[nɛk.ma]	*'this year also'*
/kim.ləm/	[kɪm.lə$^{\vee}$m]	*'house'*
/baŋ.ləm/	[baŋ.lə$^{\vee}$m]	*'stones'*

II. FINAL SYLLABLE

/lyum.phuk/	[lyʊm.p^{h}ʊk]	*'cave'*
/yam.rok/	[yæm.rɔk]	*'husk'*
/baŋ.taŋ/	[baŋ.taŋ]	*'stone place'*
/baŋ.ləm/	[baŋ.lə$^{\vee}$m]	*'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 " *'tooth'*	sa ' *'floor,ground'*	cahq *'hen'*	dzah + *'rainbow'*
	naa ' *'day after tomorrow'*	naahq *'a wheat'*	saah ++ *'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 " indicates very fortis and ' 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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