On tone in Tamang and neighbouring languages: synchrony and diachrony

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It would be easy to believe that "tone languages" constitute by now a well defined typological category. Numerous books and articles have endeavoured to provide us with a reliable definition, with a list of characteristics. But there are at least two classes of powerful contenders for the title of prototypical tone language. These classes can be exemplified by (1) a Nilo-Saharan African language like Kunama, with its three level tones, assignable to each mora, and four contour tones analysable as 'tone-clusters' of level tones (Yip M., 2002:141-2) on the one hand, or (2) an Asian language like Vietnamese, with six melodic tones, assignable to each syllable.

Languages with a lower concentration of lexically distinctive pitches in the spoken chain were not traditionally assigned to the "tone language" category (Pike K. L., 1948), unless the interplay of a tone system with an accent system could be invoked to explain away the absence of pitch contrasts on unstressed syllables by neutralization (Martinet A., 1967:90-91). Some of these less than fully tonal languages were categorized as "pitch-accent" systems, with either Swedish, Norwegian or Serbo-Croatian acting as the prototype (Lehiste I., 1970:85).

Beside the tone-bearing unit, and the possibility of analysing contours as "tone-clusters" (as in Kunuma) or not (as in Vietnamese), a third aspect of tone systems which can be debated is "the interaction between tone and non-tonal (typically laryngeal) features", which can sometimes be interpreted as "a phonological condition on tone" or "even be a part of the definition of a tone, e.g. the low creaky tone of Vietnamese" (Hyman L., 2001:1371).

For the Tamangish (or TGTM) branch of Tibeto-Burman, and for the tonal dialects of Tibetan, in the neighboring Bodish branch, we make two claims :

(1) The tone bearing unit is the morpheme, or the word.

(2) Cooccurring laryngeal features are best analyzed as features of the tones.

The historical origin of these tones in segmental material at the beginning and the end of words is consistent with these synchronic claims.

1. The tonal situation of languages of the Tamangish (TGTM) and Bodish (Tibetan) groups

Following Shafer's classification, the languages discussed here all belong to one division among six in Sino-Tibetan,[1] the Bodic division, a name formed on *bod*, the

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[1] Shafer's six divisions of Sino-Tibetan, all bearing names in *–ic,* are 1.Bodic, 2.Burmic, a very large group containing, among others, Burmese, the Yi languages in China, and

name of Tibet in Tibetan. The Bodic division contains four sections, one of which, the Bodish section, contains two main branches, the Bodish branch, consisting of all the Tibetan dialects, and the Gurung branch, which I have renamed "Tamang or Tamangish branch" to follow the speakers' autonym, or TGTM after the initials of its main languages, Tamang, Gurung, Thakali, and Manangke (Shafer R., 1955). No claim is made here concerning the higher level classification of the family, but Tibetan (in its many dialects) and Tamangish are definitely closely related.

Geographically, these two branches of the Tibeto-Burman (TB) family are located contiguously at the south-western edge of the Sino-Tibetan area, in contact with the non-tonal Indo-Aryan languages. If tonogenesis has spread from the east, it might be expected that this western edge would have been reached most recently, and that tone formation processes could still be observed, yielding typologically "less tonal" languages.

Languages of the Tamang branch are all tonal, and have very similar four-tone systems, in regular etymological correspondence. The bipartition of an earlier two-tone system is reconstructible, but the origin of these earlier two tones is obscure. I have shown that Benedict's attempt to correlate the two old Tamang tones to the two tones reconstructed for Lolo-Burmese and Sino-Tibetan is not conclusive. (Benedict P. K., 1972 ; Mazaudon M., 1985).

Tibetan dialects on the other hand go from toneless, as in Ngaba Amdo, to marginally tonal with almost no functional load, as in Balti (Pakistan), to fully tonal as in Lhasa, Shigatse, or Dzongkha (Bhutan), although some redundancy with associated segmental features remains (Huang B., 1995 ; Sun J. T.-S., 1997, 2003). For Tibetan we are lucky to have a written form dating from the 7th century, predating tonogenesis. Tibetan tones are more recent than the two proto-Tamang tones. They can easily be traced to segmental material at the beginning and the end of words as reflected in the conservative Tibetan orthography. Tamangish is close to Tibetan, but their separation dates from before the period of Written Tibetan (WT). The reconstruction of the older Tamangish two-tone system has to be done by internal and comparative reconstruction inside the group of Tamangish dialects. (Mazaudon M., 1978). This system is not shared by Old Tibetan which appears to have been toneless.

2. The domain of tone

In a recent encyclopedia article Hyman proposes the following definition: "A language with tone is one in which an indication of pitch enters into the lexical realization of at least some morphemes" (Hyman L., 2001:1368). But Hyman specifically avoids saying that all languages that have tone [in the sense of his definition] are "tone languages" (ibid. 1376). The problem with Hyman's definition, for the languages we are concerned with, is that it contains an unspoken part, which is listed

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the Kuki-Naga languages in India, 3. Baric, i.e. the group around the Bodo-Garo languages of Assam, 4. Karenic, the Karen languages in Burma and Thailand, 5. Sinitic, the Chinese so-called 'dialects', and 6. Daic, i.e. Thai Kadai and their group. The Daic division is not now generally considered to be a member of Sino-Tibetan. Tibeto-Burman is here used to designate divisions 1 to 4.

as a "property" of tone. The "tone bearing unit (TBU)" is said to be the mora, the vowel, or at most the syllable (ibid. 1368). Any assignment of a pitch pattern to a larger domain has to be worked out as an interplay of stress and tone. So Swedish type "pitch-accent" systems are considered as "hybrids" which mix properties of stress-systems and of tone-systems, while a system like Tokyo Japanese is considered as a "restricted tone-system" (ibid. 1376). Himalayan tones are not considered.

I started working on Nepalese Tibeto-Burman languages in 1969, at about the same time as Kenneth Pike and some members of his team. Pike was the author of the famous early definition of a tone language as "a language having lexically significant, contrastive but relative pitch on each syllable" (Pike K. L., 1948:3). After a few months of working with Tamang, Gurung and Thakali, Pike was led to admit that the "foot" or "phonological word" was the domain in which pitch and voice quality (breathiness) contrasts had to be stated (Pike K. L., 1970). At this point the analysis was still in progress, and Pike's statement was made in terms of "restrictions". By mid 1970, however, he co-signed with Maria Hari and Doreen Taylor a paper on Western Tamang which plainly states that "the domain for each of these contrasts [of breathiness and pitch contour] is the morpheme or the morpheme followed by non-tonal suffixes" (Hari M., D. Taylor & K. L. Pike, 1970:82).

At the same time, I worked out the tonal system of a dialect of Eastern Tamang, which, unsurprisingly, had similar characteristics. The demonstration was done in my dissertation in 1971 and was published in 1973. (Mazaudon M., 1973b:61-92). I must say that, without the moral support of Pike, the official proponent of the one-tone-per-syllable theory, I would never, as a PhD student at the time, have dared to believe that my inability to break down the tonal patterns into successions of syllabic tones with sandhi or accentual restrictions was not simply due to my own incompetence. Of course a "solution" is always possible inside a theory, provided enough fudging is allowed. I believe the theory should rather be revised to allow for some languages with a TBU larger than the syllable.

I will briefly summarize the evidence for TGTM languages, then compare the structure of their tonal domain to that of some Tibetan dialects.

2.2. *Word-tone in the languages of the Tamang group (TGTM)*

In TGTM languages the tone bearing unit in the lexicon is the morpheme; in the sentence, it is the word, formed of a tonal lexical item plus its atonal grammatical affixes. The tonal melody which characterizes the tone of the lexical item fully determines the pitch of the suffix or string of suffixes. In many cases, the melody simply extends, or rather deploys itself over the number of syllables available.

All languages of the Tamang branch described until now[2] exhibit a four-tone system (Mazaudon M., 1978). Pitch values on monosyllabic words for eight of these dialects are represented in figure 1[3], using Chao Yuen-ren's notation (Chao Y.-r., 1933).

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[2] There are two exceptions: Chantyal, which has borrowed 80% of its vocabulary from Indo-Aryan Nepali, and is reported to have lost its tone system (Noonan M., 2003) and an urban variety of Manangke spoken by young bilinguals in Kathmandu, which is

tone	TAMANG			THAKALI			GURUNG	MANANG
	Ris.	Sahu	Taglung	Tukche	Marpha	Syang	Ghachok	Ngawal
1.	54	44	55/44	54	43	43	33	33
2.	44	54	43	44/33	45	45	54	45
3.	33/22	11	33/22	11	33/22	11	11	54
4.	211	32	51	121	51	33/22	12	31

Fig. 1. Phonetic pitch of the 4 tones on monosyllables in 8 dialects of the TGTM group

2.2.1. *Excursus on tonogenesis in TGTM: a case of tonal bipartition*

Five of the eight dialects listed have a main split in their system between two high tones and two low tones. These are Risiangku and Sahugaon Tamang, Tukche and Syang Thakali, and Ghachok Gurung. Correlatively, the low tones are accompanied by a particular phonation type, which has been described as breathiness (shown by a grey background in the chart), while the two high tones are pronounced with modal voice.

Two more features are associated with low tone words in these five dialects, one phonological, one phonetic. First, and this is valid for all eight dialects, the obstruent initials, on which a contrast of aspiration exists under tone-1 and tone-2, do not contrast for aspiration under tone-3 and tone-4. In words of tones 3 and 4, only one laryngeal mode is found on word-initial consonants. In the five dialects with a main High/Low division, the resulting archiphoneme is unaspirated.

Secondly, phonetically, obstruent initials under the low tones in these five dialects can be optionally slightly voiced. Nowhere in the phonemic systems of the eight dialects is a voicing contrast pertinent[4]: initials on the high tones are either voiceless aspirated or voiceless unaspirated, phonetically and phonemically. In intervocalic position, unaspirated obstruents are voiced, and often spirantized. In dialects where the intervocalic aspiration contrast exists (Risiangku among them) the aspirated obstruents remain unchanged (no deaspiration, no voicing, no spirantization).

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reported to have reduced its tone system to a simple high-low opposition (Hildebrandt K., 2003).

[3] Language cum ethnic names are on the first line, village names on the second line. Ris. is Risiangku, Sahu is Sahugaon.

[4] Nepali loans in Gurung are an exception.

Tone	Voice quality	Phonemic contrast
tone-1	modal voice	ph *vs* p …
tone-2	modal voice	ph *vs* p …
tone-3	breathy voice	*no contrast* [b?~b~p]
tone-4	breathy voice	*no contrast* [b?~b~p]

Fig. 2. Relationship of tones and initials in Risiangku, Sahu, Tukche, Syang, Ghachok

The relationship between pitch and laryngeal features on the vowel and the initial is a giveaway for the origin of the tones. We can readily reconstruct the redundant occasional feature of voice as belonging to the ancestral stage, while a tonal opposition developed later from what used to be redundant pitch lowering after proto-voiced initials. As devoicing of the obstruent initials progressed, the voicing contrast on continuants and sibilants disappeared, and tones were phonemicized. We can thus reconstruct an old system for Proto-TGTM with two tones, a three-way contrast (aspirated, voiceless, voiced) on obstruent initials, and a two-way contrast (voiced and voiceless) on continuant initials. For a step by step demonstration see (Mazaudon M., 1973a, 1978). This is the absolutely standard scenario of tonal bipartition which took place repeatedly all over Asia, as demonstrated by Haudricourt for Vietnamese and Chinese in his 1954 articles (Haudricourt A.-G., 1954b, 1954a), and which we can represent in the format he used in his detailed survey *Bipartition et tripartition des systèmes de tons dans quelques langues d'Extrême-Orient* (Haudricourt A.-G., 1961).

Initials ?	Tones ?	*A	*B
k,ts,t,p..., kh,tsh,th,ph..., s, *hm>m, *hn>n ..., *hl>l, *hr>r ...		1	2
*g>k, *dz>ts, *d>t, *b>p ..., *z>s..., m, n, ..., l, r, w...		3	4

Fig. 3. Bipartition of tones in proto-TGTM

We will return to the other three dialects in section 4.1, after considering the domain of the tones.

2.2.2 The domain of tone in TGTM

In all the languages of the group, grammatical suffixes are reported to be devoid of distinctive tones, and to carry pitch patterns entirely conditioned by the tone of the root.

As an example, figure 4 presents the four tonal contours of Risiangku Tamang as pronounced by a male speaker on a verb root followed by the suffix /-ma/. The contours are averaged over 38 different verbs, in a carrier sentence. The carrier sentence — /X-ma X-ma [3]la:nan X-ci/ 'He X-ed a lot' (X-ing X-ing much X-ed) — provides three occurrences of the verb+suffix combination in three positions in the intonation curve. The second occurrence of /X-ma/ was chosen for the present calculation[5].

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[5] Thanks to Alexis Michaud for realizing this figure. The measures were done on open syllable verb roots with a long vowel exemplifying the different vocalic qualities. Data
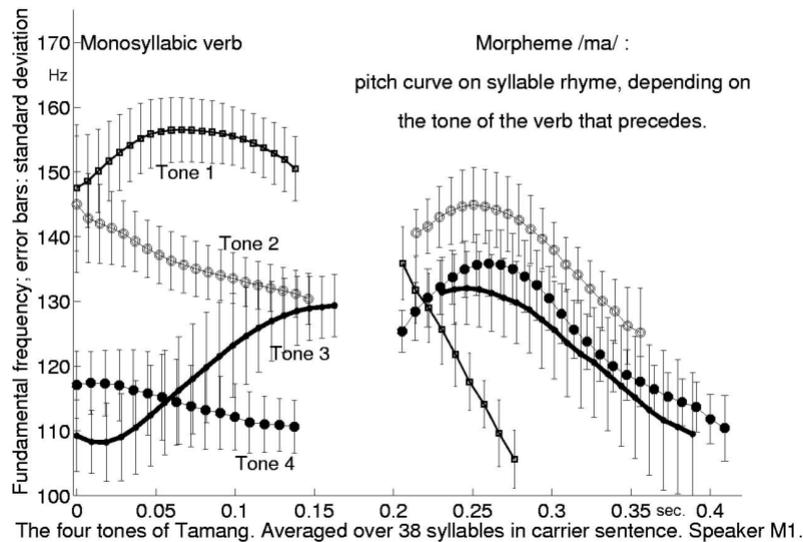
Fig. 4. *The four tones of Risiangku on disyllabic bimorphemic verbal words*

The same patterns occur on disyllabic monomorphemic nouns.

Except for some realignment in timing, and occasional loss of the extremities of the curve on short items, the se patterns are the same four patterns that are realized on monosyllabic monomorphemic words. Thus in a language like Risiangku Tamang, which has an independent opposition between long and short vowels, we observe the same four tones on a short CV word, a long CVV word, a monomorphemic CVCV disyllable, bimorphemic CV-CV or CVCV-CV words, ..., and so on up to trisyllabic morphemes, which are rare, or roots with strings of suffixes, which are frequent.

As an example, we can compare, in figure 5, the fall-rise on the word 'horse' (resulting in the acoustic impression of a level tone), to the tone-2 pattern on verbal words in figure 4, which falls on the first syllable and rises on the second syllable (before a phrase-final fall which is found with all tones). The sentence is : /²ta ³pi-pa/ 'he says horse'. Similarly on a tone-2 trisyllabic word, the first syllable falls gently, the second is higher, and the third slightly lower than the second. (fig. 6).

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for individual syllables were interpolated linearly at 100 time points equally spaced between the beginning and end of the vowel, so that the results could be averaged over syllables. More technical detail on the method can be found in A. Michaud's article, Final consonants and glottalization: new perspectives from Hanoi Vietnamese, *Phonetica* 61:119-146 (2004).
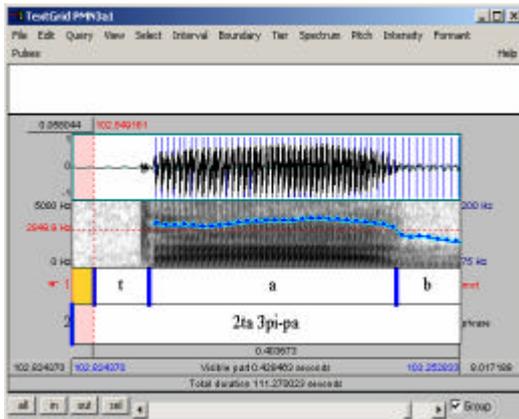
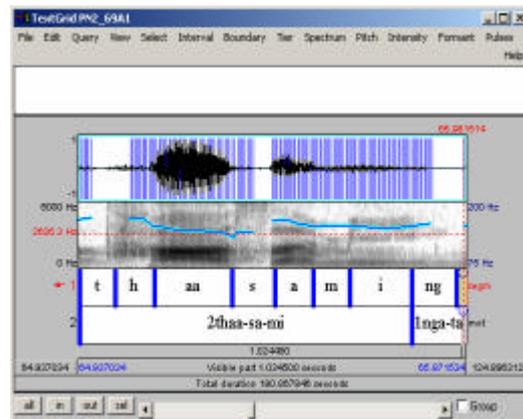*Fig.5. An example of tone-2 on a short CV word /²ta/ 'horse' in Risiangku*

Fig.6. A tone-2 trisyllabic word in Risiangku /²tha:-sa-mi/ 'if he cuts'

Tone-1, a high-falling tone in Risiangku, falls sharply, after an optional rise, on phrase-final monosyllables. In the tone-1 disyllabic words of figure 4 this is realized by the sharp increase in the slope of the Fall on the suffix. Note also that brevity was described as a correlative character of tone-1 on monosyllables (Mazaudon M., 1973b:63). In figure 4 we observe that the verb root is not significantly shorter for tone-1 than for the other tones, but the suffix is extremely short.

The same expansion-compression of the tonal melody can be observed in the other TGTM languages.

We will now take an example in Tukche Thakali, from a recording by Maria Hari (Hari M., 1971). Figure 7 compares two tone-4 monomorphemic words, /⁴me/ (spelled 'meh) 'cow' and /⁴came/ ('cahme) 'daughter' in the carrier sentence /cu nga-e -- ihmu/ 'this is my --' .

It appears that the full pattern Fall-Rise-Leveling-and-Fall that is realized on the disyllable /⁴came/ is simplified to almost only the Rise on the short vowel of the monosyllable /⁴me/. If we were to consider the first syllable as the sole carrier of the tone, /⁴me/ would be a rising tone, and /⁴came/ would be a falling tone. When a final nasal lengthens the rime, as in /⁴tim/ ('tihm)[6] the overall melody on the rime resembles closely that on the disyllable /⁴came/ (fig 7c).

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[6] the transcription ih + i, in figure 7c, is only meant to point out the breathy part of the vowel. There is no rearticulation, the vowel is short.
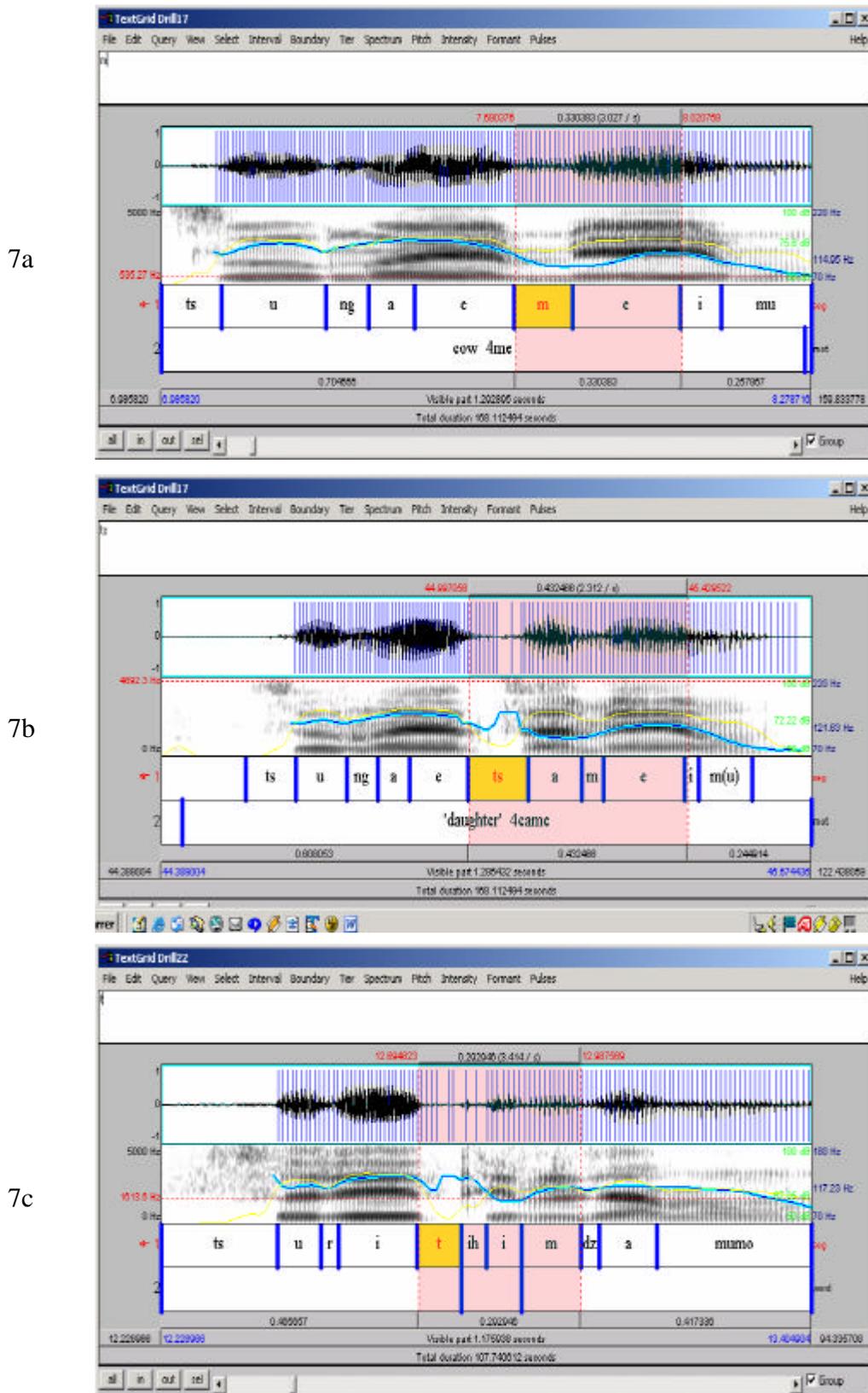
Fig.7. Tone-4 in Tukche Thakali on: a. short monosyllable b. disyllable c. CN rime

In Manangke, a recent paper by Kristine Hildebrandt presents tracings of tone contrasts on quasi-minimal sets, showing the spreading of tone patterns on monosyllables, disyllabic roots, and disyllabic words formed of verb stems + nominalizer suffix (Hildebrandt K., 2005:26-31). This could be shown for all languages of the group.

I have dwelt at length on the issue of the tone-bearing unit and presented some phonetic illustrations because this type of system is uncommon. It is likely connected to emergent tone systems (provided that emergence is understood as a process which can last a few centuries), rather than to long established systems. Nonetheless it should be emphasized that it can be ascribed to the same consonant-based laryngeal origin which is at the source of so many Asian tones and not to "prosodic features such as length, stress, and intonational tones", as is postulated for pitch-accent languages (Ove L., 2004).

As a final remark, note that, in Risiangku Tamang, breathiness, which we will consider in section 3, also extends over the whole morpheme[7] (maybe the word), unless it is stopped by a phonetically voiceless segment, that is, an aspirated stop or /s/.

2.3. *The domain of tone in Tibetan languages*

The tonal dialects of Tibetan also have word-tone systems. They differ from the TGTM type in that part of the word may fall out of the domain of the tone. These extrametrical syllables, short and unstressed, disappear in Dzongkha, leaving a compensatory fall in pitch.

2.3.1. *Lhasa*

In Lhasa Tibetan as described by Sprigg (Sprigg R. K., 1954, 1955), Chang and Shefts (Shefts B. C., 1968b, 1968a) , Hu (Hu Tan, 1982), and many others, we can distinguish four prosodic entities on monosyllables: high, high falling-glottalized, low, low-rising-falling-glottalized. A length distinction exists additionally on non-glottalized syllables. Depending on the features that each analyst chooses to include as "tonal", this makes from 2 (only HIGH and LOW) to 6 "tones" (if length is considered an attribute of tone)[8]. Length can occur on initial or non-initial syllables, and I believe it best treated as separate from the tone pattern. On longer items, whether etymologically compounds or formed of a root plus a derivational suffix, the same four patterns are encountered: the beginning of the word is high or low, the end is falling-glottalized or level-smooth. The intervening syllables are high.

The segmental origin of these pitch patterns has been understood for over a century because the older form of a non-tonal Tibetan is faithfully reflected in the orthography. As in TGTM, and possibly at roughly the same time, the loss of the voicing contrast on the initials (complicated by the simplification of initial clusters) gave rise to the high/low register contrast which all authors recognize. Note that this emergence of a tonal contrast occurred in a toneless language, whereas the TGTM

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[7] In Tukche Thakali and Gurung it is reported to be limited to the first syllable.

[8] CV [54] and [12], CVV or CVN [55] and [113], CVc or CVNc or CVC [52] and [132] after (Hu Tan, 1982:18-20).

languages were already tonal. The two "falling-glottalized tones" are reported to have alternative pronunciations, without a noticeable fall when a final oral or glottal stop is actually pronounced (Sprigg R. K., 1955). Some other authors consider such pronunciations as bookish. Whatever the case may be, the transphonologization of the closure due to the presence of an obstruent final into a falling pitch pattern is a later development, still in progress.

From the point of view of the domain of tone, it should be noted that word-internally, whether syllable final consonants are present or not, there is no falling pitch, and whether syllable initials are spelled with voiced initials or not, there is no low tone[9]. It all works as if only the word-initial and word-final consonants had seen their features transferred to a tonal contrast. And I would like to suggest that this may indeed have been the case.

There is a typological difference, however, between Lhasa Tibetan and languages of the Tamang group. Tamang syllables appear to be all about equally stressed. In Lhasa Tibetan, inflectional (as opposed to derivational) suffixes, like case-markers and verbal suffixes, are de-stressed. Correlatively, they are "extrametrical" from the tonal point of view, "in that the host syllable they are attached to is characterized by domain-final contours, as if the enclitics do not count as part of the tonal domain" to quote J. Sun's formulation (Sun J. T.-S., 1997:503) (see also Mazaudon, 1977:82-83). These suffixes are written without tone marks in Chang and Shefts' transcription and marked low by Sprigg. They do not carry the distinctive features of the root tone, and play no role in its identification.

2.3.2. Dzongkha

A last type of tonal development I would like to touch upon occurred in Dzongkha, the national language of Bhutan. The languages of the Bodish section, and to a large extent TB languages in general, are poor in accentual contrasts. They do not generally give prominence, either by way of F0 or intensity, to one syllable per unit. Either all syllables have roughly equal prominence, as in the TGTM group, or one syllable per unit is weak. This last is the case of Burmese schwa syllables at the beginning of the word, a structure which Matisoff has named "sesquisyllable" (Matisoff J. A., 1999:11).

What we just mentioned about extrametrical suffixes in Lhasa points to the opposite pattern: a weak syllable at the end of the word. Dzongkha has pushed this characteristic one step further, and reduced disyllables to monosyllables. (Mazaudon M. & B. Michailovsky, 1988). In so doing it gave rise to a bipartition of its High/Low basic system (of the same origin as in Tibetan or TGTM) into a four-tone system. Monosyllables derived from old disyllables have falling pitch, while historical monosyllables have level pitch, except for old vowel + *r* and *l* rimes which also have

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[9] The reported "spreading", in the Lhasa dialect, of an initial low tone into a second syllable if it is long (whence a phonetic rise) does not constitute counter evidence, since the low pitch realized in that context is non distinctive (Sun J. T.-S., 1997:501sqq ; 2003:40). This non coincidence of pitch patterns with syllabic boundaries actually makes Lhasa more similar to Tamang.

falling pitch. Ex. WT *thag-pa* > thap [42] 'rope' , WT *thap* > thap [44] 'stove'. The synchronic result is a four-tone system on all syllable types, except short open CV syllables.

2.4. The origin of word-tone in Bodish

The basic question in this domain is whether richer systems of syllabic tones existed before and were reduced through sandhi phenomena in polysyllabic words, or whether word-tone systems emerged as such. In recent compounds, across Bodish languages, both in the TGTM and in the Tibetan group, we find that two behaviours are possible depending on the degree of integration of the compound. Some compounds retain the tones of each component. This is often accompanied by other signs of the independance of the components, for instance, in Risiangku Tamang, retaining a long vowel in the second component, and failing to voice the initial of the second component. Composition in this case is only syntactic (no possible separation of the components without a change in meaning). Other compounds acquire a single tone. Some can oscillate between the two structures.

For those words which always have a single tone, the date of compounding cannot be ascertained for unwritten languages, but certainly a number at least of modern Tibetan compounds and words derived through suffixation are attested as such from the beginning of Written Tibetan. In such old polysyllabic items, I have heard from classical Tibetan scholars that many "spelling mistakes" occur in old texts between all three series of initials: voiced, voiceless and aspirated. This indicates that the three-way manner contrast which gave rise to tone in word-initial position was not present in intervocalic position at the time when tone started to develop, and explains why tone did not develop in non-initial syllables.

The other source of initial-based tonal contrasts in Tibetan was the reduction of initial clusters: this did not occur in word internal position, where the clusters are still found [10]. Thus a second potential source of tonal opposition was unavailable in internal position.

3. The non-F0 cues of tone, concomitant, successive, or alternative

3.1. Breathiness and Tamang tones

3.1.1 Phonation and melody: concomitant or successive

As we have already mentioned, breathiness on the initial consonant and the rime coocurs with low tone in most Tibetan dialects and in all TGTM dialects. This is not to say that the degree of breathiness or the implementation of breathiness is the same everywhere. According to Silverman, Tamang is an exception to a general rule he was able to establish according to which, in languages where a tonal system and a phonation contrast coexist, the implementation of features of tone and features of phonation (creak or breathiness) are sequential, not simultaneous. Typically, in a system which has tone, breathy phonation would occur at the beginning of the vowel, or on the end of an initial

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[10] A more detailed argument is given in (Mazaudon M., 1974:36-38, and 1977:87-90).

sonorant and the beginning of the vowel, leaving the end of the vowel free for tonal contrasts, as in Mazatec, an Otomanguean language of Mexico (Silverman D., 1997:152-4), or alternatively it could occur later, after tonal contrasts, and be heard as post-vocalic aspiration, as in Jeh, a Mon-Khmer language of Vietnam (ibid. 144-6). Breathiness blurs tonal information, and thus the simultaneity of tone information and phonation information is less than optimal from an efficiency point of view.

Sequencing or "phasing", to use Silverman's term, is not the way TGTM languages treat this potential conflict. All sources report the presence of breathiness all through the vowel, often starting during a sonorant initial, and the occasional perception of a post-vocalic *h*-like sound. In Risiangku Tamang I have even observed that breathiness may extend to the following syllable if not arrested by an intervening phonetically voiceless consonant (an aspirate or /s/).

Silverman surmises (ibid. 194) that since Tamang uses tone and breathiness in a non-sequential manner, Tamang breathiness must be weak. This is indeed the case. There is much less noise in a Tamang breathy word than in a Nepali word starting with a so-called voiced aspirate.

But there is another consideration which will resolve Tamang's exceptionality. Maddieson (Maddieson I., 1984:132) reinterprets the Tamang four-tone system as the combination of two tones and two phonation types. This can be done mechanically from the charts in figures 1 and 2, by analysing tone-3 as "tone-1 + breathy", and tone-4 as "tone-2 + breathy" (tone-1 being "tone-1 + clear", and tone-2 now being "tone-2 + clear"). However Mazaudon (1973: 79-84) had demonstrated at some length that any analysis of the four tones as combinations of binary features resulted in arbitrary choices, and concluded that the best interpretation was a scalar system of four tones from highest to lowest, each tone having idiosyncratic secondary cues. Breathiness is one of those secondary cues. In this interpretation Tamang is no longer an example of a "laryngeally complex language", defined as a language making independent phonological use of F0 and voice quality. Pitch and phonation cues to tonal oppositions in Tamang can be realized concomitantly because they are cues to a single tone rather than distinct entities.

Silverman observes that laryngeal features usually are formed with a "primary gesture", e.g. "lower vocal fold tension" for low tone and "higher glottal aperture" for breathiness. Each feature also has concomitant "enhancing gestures", which contribute to its audibility (ibid.:141-3). As it happens, breathy voice and low tone share some "enhancing gestures", like "lower larynx". The primary gesture for each of them also happens to be a member of the set of enhancing gestures of the other. So, if low tone and breathiness cooccur they reinforce each other. This actually is rather consistent with the details of Tamang phonetics. In Risiangku, tone-4, the lowest tone, is also the more breathy of the two low tones. Tone-3, which is less low and less breathy than tone-4, conversely retains more often and to a greater degree the etymological voiced (or lenis) character of the initial stop.

So if Silverman would revert to my analysis of Tamang tones, tones 3 and 4 would be, like Mandarin third tone, cases of tonal melody with secondary phonation cues, and he would be left with only one exception to his generalization, the Mpi language of Thailand, whose use of creakiness is unresolved.

3.1.2. The alternative use of tonal cues

The alternative use of cues to a given phonemic entity constitutes the synchronic variation which allows historical change. During the evolution of TGTM languages, after a period when low pitch and breathy phonation increased together while the initial was becoming more and more voiceless, these two features started going their separate ways in some dialects, as we will see in section 4. Thus when tone-4 in Taglung Tamang had become high falling (instead of very low[11]) the breathy phonation stopped being an "enhancer" and was dropped.

Synchronically, I noted in Risiangku that among variant realizations of tone-4, when the pitch fell to the bottom of the range, the initial was totally voiceless, and breathiness too was absent. When the tone is low enough, the additional clue of breathiness can be dispensed with.

Allophony, or allotony between pitch and non-pitch features is found in languages other than Tamang. In Latvian, for example, Lehiste says, "laryngealization is the one consistant phonetic feature associated with the so-called third tone" (Lehiste I., 1970:90) and again "laryngealization [...] may also function [...] as an allotone of low pitch." In a similar manner, allophony between a final consonant and a melodic pattern is often claimed for Tibetan.

3.2 Breathiness and Tibetan tones

3.2.1 The high pitch of non-initial syllables

Yip (Yip M., 2002:196-9), following Duanmu (Duanmu S., 1992), proposes a synchronic analysis of Lhasa Tibetan which explains the High pitch on internal syllables as the spreading of a postulated High component which is postulated to be present in all initial tones. Thus high initial would be H, and a low initial would be LH. This is postulated to explain the high pitch of word internal syllables in Lhasa.

Sun convincingly refutates this argument by demonstrating that High in Lhasa (and in all other Tibetan dialects) is the neutral tone, and need not be posited underlyingly (Sun J. T.-S., 1997). He points out that his analysis is also consistent with history. The default tone is High synchronically because it was always high; it is unchanged from the non-tonal stage of old Tibetan. I would like to phrase this a little differently, following the same line of argument. Instead of saying that in old Tibetan "all syllables were normally produced in the high register" (Sun, 1997:508), I would prefer to say they were all produced with a modal voice (and no pitch register). The important point is that, as Sun rightly emphasizes, when pitch differences started to be phonologized, some syllables migrated to Low, and not the reverse. Thus the internal syllables, with their high pitch, represent the unchanged state historically, which is also the synchronic default tone (in a syllabic analysis) in modern Tibetan

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[11] This kind of evolution with melodic tones is nothing miraculous. It is definitely not a one step process, as shown by dialect comparison (Mazaudon, 1978). When a Low cannot become any lower, it turns rising or falling (in a very similar way to *i > ai in the Great English vowel shift), after which any portion of the curve can become the prominent cue.

Sun draws an argument for his analysis of "High" as the default across all Tibetan dialects from two Khams dialects, Derge and Batang, where a proto-voiced initial, when unprefixed, yielded a voiceless initial with low tone (WT go > Derge ko (L) 'hear'), but where those proto-voiced initials which were originally prefixed remained voiced, and are on the High tone (WT dgu > gu (H) 'nine'). So, says Sun, since voice phonetically lowers the pitch, if a High occurs after a voiced initial it has to be original. This case constitutes a good example, in my view, of how alternative cues which are used in a period of change get settled or not: in forms where voicing was retained, low pitch, even if it developed phonetically at a time, did not become established as a main cue, and it was eventually dropped in later evolution.

"Furthermore, Sun remarks, register on syllables with **synchronically** [Sun's emphasis] voiced obstruent initials show variation in register which is apparently random in some dialects, e.g. Derge (Huang B., 1995), Chamdo (Liu F.-H., 1984)". This Khams data is a textbook case for a structuralist analysis: if there is no difference, there is no object. If Low does not exist after modern voiced initials, then High does not "exist" either. The observed random variation reflects the absence of a phonological contrast, in my terms an archiphoneme, in Sun's terms a neutral tone.

3.2.2 The role of breathiness

Historically I would recast the story, introducing breathy voice as a main actor, in the following terms. Unprefixed voiced initials started devoicing and became breathy, along with the following rime, at the same time as the pitch of the syllable became lower. We have already seen that breathiness and Low pitch are mutually reinforcing. Prefixed voiced initials had their voicing protected by the prevoicing due to the prefix. They may have had a slight depressing effect on pitch, as is reported universally for voiced initials, but that depression was not developed nor phonologized. So, eventually, depending on the dialect, when tone was phonemicized on breathy syllables[12], voiced initial syllables, which were phonologically toneless[13], either retained that 'neutral' status, whence the random variation in Derge and Chamdo, or lined up as a group with one of the two newly created tones. Or again, as in the example of Batang, quoted by Sun from Gesang (Gesang J., 1985), they split between High and Low according to some other small phonetic difference created by the point of articulation of their initial, as in Batang ndzee (H) 'rice' < WT *'bras vs* ndzee (L) 'to resent' < WT *'gras.*

The intermediate presence of breathiness seems certain. It exists synchronically in many if not most Tibetan dialects, probably in more dialects than has been reported. Mainland Chinese scholars, who are doing a thorough job of describing these dialects, are not in the habit of transcribing phonation differences which are analyzed as a redundant feature. Tone-as-pitch is considered the element to be noted. But for history you need those redundant features: they are the stuff that past and future are made of.

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[12] that is, cognitively when tone became the preeminent clue, and phonologically when at least one initial merged totally with another. The first candidate to look for in Bodish is always *z > s, and next the sonorants.

[13] As an unrepentent Prague school structuralist, I would say a neutralization context was created there.

Tibetan and TGTM display in their synchronic state, with their multi-clue tonal systems, an embodiment of the diachronic process. They demonstrate something which is not new but is sometimes forgotten, that phonetically "Voice" may give rise to low(ering) but phonemically it is "Voice merges with Voiceless" which gives rise to Low.

4. The evolution of tones in TGTM after the bipartition

As Haudricourt pointed out, "once it is constituted, the tonal system evolves without remembering its origins"[14]. Thus, for example, the old *B-LOW and *B-HIGH tones, in the Popei dialect of Chinese, acquired a high and a low value, respectively, in the modern language.

4.1. The evolution after the bipartition of the three TGTM dialects which we have not yet examined in detail demonstrates this point. In figure 1 we can see that tone-4 in Taglung and Marpha has evolved from being a very low tone to being the highest tone in the system and sharply falling [51]. It has lost its breathy component at the same time. As an heir to the LOW tonal series, it has kept the neutralisation[15] of aspiration on initial stops, and only voiceless unaspirate stops occur.

In Manang, tone-4 has remained rather low [31], but tone-3 has soared to the top of the scale [54]. Both lost their breathy component, but both keep the trace of their LOW origin in the neutralization of aspiration on their initial stops. Interestingly, the archiphoneme is realized voiceless unaspirated under tone-3, as in Taglung and Marpha, but voiceless aspirated under tone-4. I believe this reflects the difference in the degree of breathiness that we noted in Risiangku Tamang. In Manangke, when devoicing of the initial was complete, the heavy breathiness of tone-4 was reinterpreted as aspiration on segments which allowed it (occlusive stops), and was lost on segments which did not allow aspiration (sonorants and /s/). The breathiness on tone-3, being lighter, was dropped whatever the initial. I noted an occasional extreme tenseness verging on a creak on very high realizations of tone-3. This is a phonetic reinforcement of the tense character of high tones (see Silverman) and not etymological[16].

4.2. The latest evolution of the Manangke tonal system in the speech of young urban bilinguals also displays an individual evolution of each tone: tones merge according to their phonetic proximity, not their etymological closeness. Hildebrandt shows that, across speakers, tone-1 (old *A-High series but modern *low* level) and tone-4 (old *B-Low series, modern *low* falling) get closer and closer, and eventually merge for the most advanced speakers. (Hildebrandt K., 2003:177-182). Actually a very slight difference on the coda is still noted on monosyllabic nouns, and Hildebrandt

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[14] "Une fois constitué, le système tonal évolue sans souci de sa valeur ancienne étymologique" (Haudricourt A.-G., 1961) (p.286 in the 1972 reprinting)

[15] Remember that a "neutralization" is not a "merger". "Neutralisation" in its original meaning in the Prague school, is a synchronic relation, not a diachronic process. Diachronically, neutralisation can result from the loss of an opposition, but just as frequently, from the failure to create an opposition.

[16] This might have been a "teaching" pronunciation used by my informants in the context of elicitation. Hildebrandt did not note it.

remarks that verb roots followed by a suffix merge totally, but the suffixes following a tone-1 root and following a tone-4 root remain different. Thus the distinction seems to me to be temporarily maintained, although threatened, the timing of the modulation becoming more and more delayed, and being now totally realized on the suffix.

5. Conclusion

The Bodish languages are at the south-western edge of the vast tone-prone area of East and South-East Asia. Their neighbours to the west and south are non-tonal Indo-Aryan languages. It may thus be believed that they constitute the western frontier of the expansion of tone which started somewhere farther east. As such they are newly tonal languages, and they evidence features that may be attributed to that status. As a testimony of the areal spreading of tonality we should remember the presence of word-tone on Punjabi (Bahl K. C., 1956, 1957), a neighbouring Indo-Aryan language.

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