Notes on Tone in Tibeto-Burman

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[Editor's note: This paper is a collection of excerpts of a much larger paper dealing with tone throughout the whole Tibeto-Burman family. Thus 'Notes...' is a collection of topics including development of tone on polysyllabic units, the tonogenetic effect of tone on finals, and tone in Tibetan.]

Development of tone on Polysyllabic units.

A very important question of Tibeto-Burman tonogenetics, which has received little attention so far, is the synchronic and diachronic relation of tone to polysyllabic units.

It has been assumed that all South-east Asian languages are monosyllabic or basically so. Ideally this should mean that each syllable corresponds to one word, or at least to one morpheme. This is certainly generally true for most South-east Asian languages, and for Tibeto-Burman among them. From the phonological point of view this should also imply that the syllable is the basic frame in which phonological relations are best described. We find statements to this effect in most studies on Tibeto-Burman languages. Burling (1969:19) states for Karen: "As in most Tibeto-Burman languages and in many others in Southeast Asia, the Karen syllable can be given a central place in a phonological description".

Tone is also considered to be an attribute of each syllable. And since this has been reported for most Tibeto-Burman languages, Matisoff (1973 CTT: 77) has been led to propose the generalization that a monosyllabic structure is a "fertile soil" for the development of tone. "It appears that to become truly tonal a language must have a basically monosyllabic structure(i.e., the morphemes must be only one syllable long). Polysyllabic languages like Japanese, Swedish, or Serbo-Croatian may develop "pitch-accent" systems, but these differ from true tone-systems in many important respects." And he further states (ibid.: 78): "The Tibeto-Burman languages have always been monosyllabic".

I admit this view as generally true. But I think that a large number of Tibeto-Burman languages do not fit well in such a pattern. To discover whether these languages are exceptional or not we would need a typological study of Tibeto-Burman languages. Henderson (Lingua 1965: 402) lists "among the features which have suggested themselves as typologically characteristic of a South East Asian linguistic area, or of smaller areas within it...", the presence or absence of tone, the presence or absence of register, initial consonant patterns and their distribution, "syllabification patterns, i.e. the comparative structures of 'tonic' and pre-tonic or post-tonic syllables, or 'major' and 'minor' syllables, and the permitted combinations of these," as well as vowel systems, and final consonant patterns and their distribution.

Unfortunately, although she recognized the importance of analysing and comparing syllabification patterns and their relations to the various other elements of phonological structure, she was not able to present a map of the geographical distribution of different types of syllabification and word structure in the area. Evidently the material at her disposal did not allow such comparative work. Even now the descriptions are rare which go into so much indispensible detail as her own description of Cambodian (Henderson, 1952).

This is in fact almost a vicious circle. Since the traditional view of tonal systems, as illustrated by Pike (1948: 3), states that a tone language has a tone on each syllable, there is a strong tendency to disregard sandhi phenomena, and consider them as sub-phonemic accidents. This suggests that many descriptions of languages fail to describe the behaviour of tones on units larger than the syllable, and this even when the author specifically mentions that there are indeed sandhi perturbations in the language he describes. Such incompleteness in other areas of the phonological description is much rarer. If authors consider sandhi phenomena secondary, and fail to describe them, then in a typological survey it looks as if sandhi phenomena were indeed exceptional, which reinforces the tendency to ignore them.

A survey of languages which show tonal alternations within the word, as opposed to languages where syllabic tone retains its identity in all contexts would be very instructive as would a map of the languages in which all the syllables have the same weight, and of those where "weak" or "minor" syllables carry no stress and no tone, and see the distinctive possibilities of their vowels reduced (or eliminated). I am not in a position to make such a survey, but I would like to suggest that not all Tibeto-Burman languages are equally monosyllabic.

Difficult sandhi problems have been reported in a number of Tibeto-Burman languages. Akha, according to Bradley (1971: 13-14), has been the object of conflicting reports on possible sequences of tones. Bradley himself states (ibid.: 25) that "Pitch-prosody seems to be very nearly syllabic, but the high-pitch and low-pitch words of more than two syllables make a purely syllabic prosody impossible." Bawm Chin, as reported by Löffler (1970, 1972, and 1973) and even more in Lehman's reinterpretation of it, baffles the imagination by the complexity of its tone sandhi rules. But, when all the rules have applied, only a tiny number of tonal patterns applicable to each type of word (monsyllabic or polysyllabic) is left. In fact, Löffler (1970: 1) mentions

that: "Bawm informants maintained that their language was not a tonal language like Marma (Burmese), but they admitted that pitch could serve as a distinguishing mark." Certainly it does not seem to have a tone per syllable. Is this then a "true" tone system?

Aside from languages where the tones supposed to exist on each syllable see their distinctive power drastically reduced when the syllables are built into words and phrases, we also find languages where some syllables never show a tone of their own. These syllables have been called unstressed, or weak syllables. Unstressed syllables are reported in Western Bwe Karen (Henderson, 1961: 60). These syllables do not have distinctive pitch and "are therefore not regarded as characterized by a tone". Their vowel is either "mid central unrounded ə" or "it may be pronounced with the 'colour' of the vowel of the following stressed syllable." The tone A stressed syllables also may change when they are welded into words, and this is more than a simple phonetic sandhi modification. Henderson considers that this characterizes the word as a phonological as well as a grammatical unit. "There is a suggestion here that tonal dissimilation is perhaps being used as a means of welding together separate grammatical items into one, much as the single strong stress of the English word "blackbird" distinguishes it from the two-word sequence "black bird". An example is ni^1 'to obtain', with $mɛ^1$ 'wife' compared to ni^2 $mɛ^1$ 'to marry'. The monosyllabicity of Burmese, too, requires many qualifications. As Bernot (1963: 164) states: "A l'audition ce monosyllabisme est à peine repérable", and "Entre les éléments d'un syntagme existent également des liens étroits qui se traduisent par un véritable sandhi". In a footnote she likens this sandhi to Sprigg's "Intraverbal junction" (ibid.: 1965). She also recognizes the existence of a fair number of "exceptions" which are truly polysyllabic words. Weak syllables have been described in all the grammars of Burmese. Cornyn and Roop (1968) do not say anything about the possible sequences of the different tonic syllables with unstressed ones. They do not so much as analyze their material into words. There seems nevertheless to exist such a unit in Burmese. Although the word in Burmese "cannot be delimited solely by appeal to phonetic criteria" (Sprigg, 1957: 109). Sprigg (1957 and 1964) shows that Burmese cannot be treated as a truly monosyllabic language, and cannot be shown to exhibit the complete array of tonal oppositions in all contexts. A large number of phonological features, including tonal harmony, extend over the whole word.

Luce (1954:30) rejected monosyllabicity for Chin: "I was brought up to regard Far Eastern languages generally as (i) Monosyllabic (consisting of words of one syllable; (ii) Invariable (not modified by any inflections); and (iii) Isolating (destitute of syntax). Chin is a language which disproves all three statements". Morse (1963:31), who also quotes the above statement, observed the same thing for Rawang. About the "weak" syllables he says: "Many of the daughter languages of the Tibeto-Burmic branches also exhibit the verbal prefixes [which occur in Written Tibetan], with the 'intervention of a colourless sound'. Such is the case in the Rawang language". Tiddim Chin is yet another example of a language where all syllables do not have equal status. "Syllables pronounced with markedly less stress than their neighbours in the texts are, unlike stressed syllables, never differentiated by vowel length or pitch, and are never closed by a consonant" (Henderson, 1965: 18).

The word structure of the above languages is reminiscent of that of two languages of the same area but of unrelated families, Cambodian (Henderson, 1952; Huffman, 1972) and Punjabi (Bahl, 1956). In both of these languages a word can begin with an unstressed, neutral syllable, which has no distinctive tone, and does not phonetically participate in the melodic pattern of the word. This last point is fundamentally different from the type of word-tone that appears in Bodish languages.

Bodish word-tone:

In languages of the Bodish section the tonal system for polysyllabic items is more straightforward, and at the same time more difficult to account for diachronically. In Tamang (Mazaudon, 1973:61-92) a word can be defined as a string of one lexical item, a noun or a verb, monosyllabic or polysyllabic, followed by a number of affixes. Each such word, whatever the number of its syllables, and the number of its compounding morphemes, has one of four possible melodies. There are no stress differences among the syllables, no unstressed or weak syllables, and no syllables with a neutral vowel. The phonological word as the domain of tonal oppositions is a feature common to most of the tonal languages of the Bodic division.

The descriptions of the Lhasa Tibetan tone system by Sprigg (1954, 1955) and by Shefts (1968a,b,c, and d) are in agreement even though these two scholars work with totally different theoretical assumptions on the relation of tones to words. Shefts (1968a:49-50) describes four tone patterns on monosyllables: high level, low level, high falling, low falling. Chang and Shefts (1968:3) say, "The tone possibilities

which can be realized in any one position in stressed morphological units of more than one syllable are limited. In the first syllable, there are only high level and low level tones; in the second syllable, there are only high level and high falling tones". For items of any length Shefts (1968c: 4) states a sandhi rule as follows: "falling→level/_____ stressed tone (either level or falling). The contrast between falling and level tones is thus neutralized in this position". Rule 10 in Chang and Shefts (1968:80) completes the description: "A low tone becomes high in a noninitial syllable". This can be summarized in the following chart:

monosyllable	disyllable	trisyllable	more than 3
ā	āpā	āpāpā	āpāpā..pā
a̲	a̲pā	a̲pāpā	a̲pāpā..pā
āà	āpà	āpāpà	āpāpā..pà
a̲à	a̲pà	a̲pāpà	a̲pāpā..pà

(The .. stands for "same tone pattern as the preceding syllable").

This is very clearly the same type of word-tone as we have seen in Tamang. Whatever the length of the word, four melodic patterns are available to distinguish meanings. A high or low feature characterizes the beginning of the word, and a level or falling feature characterizes its end. There is one difference between the two systems. Tibetan has a number of suffixes which are unstressed. When such a suffix occurs, it behaves like weak syllables in Lolo-Burmese or Punjabi; it simply does not count for anything and the tonal patterns on the syllable preceding it behave as if the word ended before the suffix. In short, the penultimate syllable, in this case, assumes the level/falling opposition. The suffix itself is pronounced with a central vowel, short, and without stress. Such suffixes are written without tone marks in Chang and Shefts transcription, and are marked low by Sprigg.

Sprigg's description is very similar, with one difference. The falling/level feature is not recognized by Sprigg. The falling contour is linked to the disappearence of final consonants. We have already said that the speech described by Sprigg transcribes more finals than that described by Shefts (in the fuller version). Sprigg's analysis thus retains only two tones, those defined by the low/high feature on the beginning of the word in terms of Sheft's description. Depending on the intonation, the pitch of medial syllables can vary, but the starting point of the first syllable and the ending point of the last one are fixed. From Sprigg's transcription we can see that some fallen final consonants lengthen the vowel, and others change its quality. No influence on the pitch is

claimed. Sprigg claims that phonetically all the tones fall at the end, but Shefts claims that there are different degrees of fall which allow her to distinguish level tones with a slight phonetic fall from falling tones with a marked phonetic fall. The difference between the two is mainly a matter of duration or of "quality" of the fall(for more phonetic details see Shefts, 1968b:passim).

Whether we recognize a falling/level opposition on the last syllable or not (which may be a matter of dialect), the main tonal contrast is the high/low correlation which starts at the very beginning of the first syllable and then develops its melody up to the end of the word. Whether there are two or four possible patterns, their domain is the word.

Tonal Typology

Neither the "schwa languages" nor the Bodish word-tone fits into the traditional classes of prosodic phenomena.

What is the historical origin of these systems?

If we admit the evidence of word-tone in languages of the family, whether such systems be regarded as "true" tone systems or not, we may ask whether they emerged by reduction from syllabic tone systems or if they never were more complete than they are now.

The most widely proposed explanation is the first one, as illustrated by Matisoff (1973:82-83). He explains that the process of tone-birth and decay is a cyclical one, "thus we may imagine a hypothetical language at stage A: it is monosyllabic, but the number of possible syllables is very large, since there is a rich system of syllable-initial and -final consonants. Grammatical information is carried by a number of non-syllabic affixes attached to both ends of the syllable". The language at this stage may have redundant pitch levels, but it does not have distinctive tone. "Time passes, and the language enters a new phase, stage B". Reduction of initial and final consonant clusters reduces the contrastive possibilities of the language, which reacts to it simultaneously in three ways: two syntactic processes and a phonological one. 1) "Although each morpheme is still monosyllabic, the language now creates bisyllabic or even trisyllabic compounds in order to disambiguate homophones or near-homophones, so that the word is no longer monosyllabic". 2) "At the same time, 'analytical' ways of signalling grammatical relationships are found". 3) "Meanwhile the number of vowels has increased and lexically contrastive tones have arisen". This seems to account for systems such as the Lahu system where most morphemes are monosyllabic, but where there exist

polysyllabic words, in which each syllable has its own tone, and where no cooccurence restrictions have to be stated for sequences of tones within a word.

To account for "less tonal" languages we have to consider stage C of the evolution. "Human laziness being what it is, some of the syllables in compounds are tending more and more to be prounced laxly, slurred over. Vowels are losing their stress all over the place, and being reduced to schwa. These unstressed syllables also lose their tone, and tend increasingly to hitch themselves onto the adjacent syllable in the compound."

This string of events is a possible explanation of the origin of the languages which have schwa syllables. It is not a satisfactory explanation for languages of the Bodish group, where all the syllables have the same stress, all their segments, vowels or consonants, have the full array of distinctive possibilities*, and still there is only one tone per word.

Pending more complete and accurate information on the typology of Tibeto-Burman tone on polysyllabic units, I will consider that there are two main types, the "schwa languages", and the "non-schwa languages". For both types I will propose that it is at least as likely that their tonal system was never any more complete than it is now, and that tone developed after the language had acquired the word structure which it shows nowadays, and not at a time when it was still monosyllabic.

"Schwa languages"

Some of the neutral syllables of Burmese can be shown to have come from full independent morphemes, which became reduced to their present state when they entered into composition. Others, though, seem to have arisen as epenthetic vowels between the elements of the initial consonant clusters of Proto-Tibeto-Burman. Schwa syllables in Burmese and Jingpho cannot occur word finally; they almost never can in Karen (Burling, 1969:23). The same thing is true in Mon-Khmer. Although Cambodian is not genetically related to Tibeto-Burman, its structure is typologically similar to that of the schwa type languages, and it is worth quoting Henderson's description of its word structure: "Note the gradual progression

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*Some restrictions of occurence or neutralizations occur in certain positions, but they differ from language to language and do not correlate with tone.

from simple monosyllable, through extended monosyllable and minor disyllable, to major disyllable. Between the stages there is only a relatively small structural difference. There is no sharp boundary between monosyllable and disyllable." (1952:170 note 1)

From a diachronic point of view, Morse observes of Rawang that "certainly it can be shown that the peripheral syllable with non-contrastive tone and vowel [ə] is a development from original consonant-cluster prefixes of Proto-Tibetan." (1963:33). In Rawang this vowel has acquired distinctive status, although not full phonemic status; its presence or absence is distinctive but the vowel does not carry a tone and does not commute with the vowels of full syllables.

The vowel [ə] which appears in five of the six Karen dialects examined in Jones (1961) is reconstructed by Burling (1969:47-48) as *ə?. Burling emphasizes that this vowel correspondence exists only under one tone of the system he reconstructs, namely *tone 2 glottalized. "It is also unique" he continues, "in that the great majority of its reflexes in all the modern languages occur in the non-final syllables of polysyllabic words". "*ə? appears to have many of the qualities of weak syllables of Burmese." "One possibility", he suggests (1969:22) is that these syllables, in the proto language, "were rather like the 'weak' or 'toneless' syllables of Burmese, Jinghpaw, and some other Tibeto-Burman languages." In the modern languages these syllables have normal stress, and "it is not necessary to treat these syllables differently from others" (Burling, 1969:48). If Burling's supposition is right, and it seems well supported to me, we have here a diachronic example of the "gradual progression from simple monosyllable...to disyllable" which is a synchronic feature of Cambodian.

Matisoff (1972, STConf.:6) reports Maran's claim that Jingpho prefixal syllables carry a two-way tonal opposition: "Prefixal Jingpho syllables whose vowel is unstressed schwa are deemed to have no tone at all for our purposes, though Maran claims that there is a high-low contrast even there." Matisoff does not consider this tonal contrast, if it is confirmed, to be ancient, and that is why he does not analyze it. Could it be an indication that Jingpho schwa syllables are now in the process of acquiring full phonemic status as they did in Karen?

How does the development of tone correlate with these word structures? For Austroasiatic languages, Haudricourt (personal communication) explains the phenomena in the following way. The languages should be considered as "quasi-

monosyllabic". Their first syllable, which is unstressed, plays no part in the development of tone. When the consonantal mutation occurs, only the initial of the second syllable, which is stressed, is involved. As a result, tone develops only on the second syllable, and there is only one tone for the disyllabic word. I think that this explanation could be extended to several Tibeto-Burman languages, and would be more satisfactory than the supposition that tone was born and lost without trace on these weak syllables.

It must be kept in mind too that weak syllables can develop both from vowel epenthesis between members of an initial consonant cluster, and by reduction of full syllables in one and the same language, as Huffman pointed out for Cambodian (1972:54). For the understanding of the historical process of tonogenesis it would be essential to know whether tone developed before the reduction of full syllables to schwa or after it.

Bodish word-tone

To account for the origin of the tonal systems found in modern Bodish languages, neither the idea that the language developed a tone per syllable, and then reduced them to one tone per word through sandhi, nor the explanation just proposed for "schwa languages" is satisfactory. Both explanations require an accentual prominence of some syllables over others, which is not attested in modern Bodish languages. Of course it can be assumed to have existed in the past, but we would expect to find some traces of it in that case.

The development of tones on truly polysyllabic languages is exemplified by Punjabi, Camuhī (Haudricourt, 1968), and Balto-Slavic (Purcell, 1973). The process in Punjabi and Camuhī is very straightforward. Briefly, in Punjabi old voiced aspirates became unvoiced unaspirates or voiced unaspirated. When this mutation occurred, if the old voiced aspirate was initial, it left a low tone on the preceding vowel, if it was not initial it left a high tone on the preceding vowel (Gilland Gleason, 1972:14). If there was no voiced aspirate in the word, the word took the mid tone. As in the case of the Mon-Khmer languages, initial schwa syllables were ignored; the development of word tone happened as if the initial of the first full syllable was the initial of the word. In Camuhī, the process is the same except that the mutation here affects old unvoiced aspirated consonants which, upon becoming unaspirated, leave a high tone word if they were initial and a low tone word if they were not. If there was no such consonant in the word the tone is mid (Haudricourt, 1972). Note that if in the proto-language

a given correlation could be present in syllable final positio as well as in initial, this schema will account for the same number of pitch patterns on monosyllabic items as on polysyllabic ones. Purcell's explanation of the process in Balto-Slavic is a little more complicated. When breathy voiced initials merged with voiced ones, they left a falling tone on the word. When post vocalic laryngeals disappeared they left a rising tone. When postvocalic breathy voiced became simple voiced, they left divergent reflexes in Baltic and in Slavic. Slavic shows a rising tone parallel to the effect of an old laryngeal, but Baltic shows a falling tone. There seems to be some link too with the placement of the old stress

An explanation of this type was proposed by Glover (1971) after Pittman and Glover (1970), for Proto Tamang-Gurung-Thakali (TGT), Shafer's Gurung Branch. Pittman and Glover (1970:9) say: "TGT was a 'four-box' register language, which means that each word-base is interpreted as having had two syllables, each of which had back (tense) or front (lax) tongue-root articulation. Each word-base therefore had one of four possible combinations of the two prosodies: tense-tense, tense-lax, lax-tense, or lax-lax. Each word-base could also lose a vowel or an entire syllable without losing either prosody; the remaining syllable could easily carry both". Glover (1971) proposes to interpret the two pairs of prosodies mentioned by Pittman and Glover as due to the voiced or voicelessness of consonants in the parent language. This of course is an attractive hypotheses for this group of languages with their puzzling four way contrast on all types of syllables and on all word structures. The difficulty with it is that it makes us posit disyllabic word-bases for all lexical items in the proto-language, including words which are nowadays made up of a single open syllable. This is not supported by comparative evidence or by the reconstruction of Sino-Tibetan. Glover does not insist on the disyllabic character of the base put forward by Pittman, but he has to claim at least that the minimal word structure was CVC, with a voicing correlation in both initial and final positions. Even thus restricted the hypothesis is not supported by the reconstructions of Proto-Sino-Tibetan arrived at until now.

In spite of the difficulties involved, it seems to me necessary to posit that 1) tones in the Gurung Branch as well as in Tibetan developed on the polysyllabic words already formed, which means that the composition of earlier monosyllabi morphemes into the polysyllabic units which we find today occurred before the development of tone, and 2) that when tone developed it developed immediately as a word-tone, and not as a syllabic tone later reduced by sandhi. The Pittman-Glover hypothesis would imply such sandhi reduction in all morphemes for Tibetan, and in any morpheme longer than two syllables

in Tamang and Thakali.

The idea that Tibetan used to have, and still underlyingly has, a tone per syllable, leads to embarrassing situations, as when Miller (1956:347 note 3) decides that: "In the citations of Central Tibetan and Lhasa here this tone sandhi is, for the purpose of simplifying the comparisons, ignored, and the tone written on each syllable is that which would appear on that syllable when uttered in isolation". Then he cannot avoid writing WT dkar-po 'white' as Lhasa kár-pó and WT skar-ma 'star' as Lhasa kár-m[illegible] (ibid.:350), transcribing on pó a high tone and on mà a low tone, which are not presently pronounced, and most probably never were, since these suffixes are never uttered in isolation. Moreover the suffixes WT pa and ba, which will have to be transcribed as pá and bà for Lhasa speech according to Miller's practice, were not even contrastive in Old Tibetan, since they stood in complementary distribution, pa and po changing to ba and bo after ŋ, ?, r, l, and vowels (Hahn, 1971:27). It will be useful also to consider that the majority of modern Tibetan disyllables have an old suffix for their second syllable. As for the rest of them it can be observed that the second syllables of Tibetan words retain the prefixes which, by their disappearance, caused the development of tone on monosyllables and on first syllables of compounds. Sprigg (1972:555) says: "It seems to me probable that the initial-consonant clusters that can characterize the second syllable of nouns in the Lhasa dialect, and the resulting higher degree of consonantal differentiation for that syllable as compared with the first is connected with the non-distinctive high pitch of that syllable: the greater range of initial-consonant features renders the pitch-level distinction, highly functional for the first syllable, less necessary for the second." Sprigg's statement is meant as a synchronic observation, but I propose that it may be adopted as an historical one as well.

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Tibetan

We have seen a large number of cases where a reduction of the number of contrasts in the system of initial consonants has triggered a split in a previously existing tonal system. Cases where a transphonologization of features from the initials onto the rhyme creates a tonal system in a previously non-tonal language are much less frequent.*

*Haudricourt (1961:285) reports this phenomenon in two Austroasiatic languages of the Palaug-Wa group, Riang and Lamet, and in an Austronesian language, Cham of South Vietnam.

When a voicing correlation disappears in non-tonal languages of South-East Asia, it is more readily replaced by a phonation type opposition, often accompanied by a multiplication of vowel qualities, rather than byproperly tonal oppositions. Such systems are commonly referred to as "register" systems.* Usually the quality-phonation correlation is also accompanied by a pitch difference as in Khmer (Henderson, 1952), but this is not always the case: Shorto (1967:246) claims that in Mon "pitch difference as an exponent of register is lacking".

Both typologically and in their historical origin register systems and tone systems are very similar, although not entirely. Short (1967:245) says: "[register] in its structural functioning shows both considerable analogies with pitch distinctions in tonal languages and certain divergences from them". Haudricourt (1965:313) compares the consonantal mutation which is the origin of the Mon-Khmer registers to that which is the origin of tonal splits in South-East-Asian languages: "Il y a une parenté étroite, évidente, entre le type de mutation consonantique mon-khmer, où une confusion d'initiale fixe deux registres de voix qui influencent le timbre des voyelles, et la mutation des langues à ton d'Extrême-Orient dont il a été question (dans "Bipartition et tripartition des systèmes de tons..."). On peut se demander si ces deux registres ne sont interprétés comme registres de hauteur tonale que dans les langues qui ont déjà des tons..."

The Lhasa dialect of Tibetan provides an example of the birth of tonal, or should we say register, contrast on a previously non-tonal language, due to a consonantal mutation in the initials.

Whether or not tone is postulated for Proto Sino-Tibetan, or for Proto Tibeto-Burman, it is generally agreed that Proto-Tibetan did not have tone. Benedict (1972b: 91 & 195) states that the two tones he reconstructs for Sino-Tibetan had been lost by Written Tibetan times, and authors, who believe that no tones are to be reconstructed for Proto Tibeto-Burman, do not raise the question.

Native Tibetan grammarians as well as early scholars from the West, have noted the connection between the classes of Written Tibetan initial obstruents ("masculine", or voiceless; "neutral", or aspirate; "feminine", or voiced) and

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*Following Henderson (1952, 1965:402), I use "register" as a phonological term and "phonation-type" as a cover term for the laryngeal features usually present in the phonetic realization of the registers (breathiness, creakiness, ...).

the tones of modern Lhasa Tibetan. Jäschke, (1881:xiii) although he believes that the "system of Tones has been introduced under manifestly Chinese auspices," notes that "the Tone of the word is determined by the initial consonant of the word." He goes on to describe their relationship in these terms: "An inhabitant of Lhasa, for example, finds the distinction between s̀ and ż, or between s and z*, not in the consonant, but in the Tone, pronouncing s̀ and s with a high note (as my Tibetan authorities were wont to describe it "with a woman's voice", shrill and rapidly), ż and z, on the contrary with a low note, and, as it appeared to me, more breathed and floating. This latter distinction is still more apparent with regard to those low-toned aspirates, that in the course of time were introduced in Central Tibet instead of the mediae, in contraposition to which now the original aspirates are used as high-toned."

Most teaching grammars of Tibetan devote a few lines or a few pages to considerations of orthography and orthoepy, spelling rules and reading rules, but rarely do they say anything as detailed and insightful as Jäsche's remarks on the tones.

In the past twenty years detailed phonetic studies of the pronounciation of modern Central Tibetan have appeared. Some of them systematically correlate pronounciation and spelling, and are thus useful for diachronic analysis. Among those we can quote Sedlàček (1959) and Richter (1964). These studies have to be used with caution though since the authors' aims were in no way structural analyses of sound change. Sedlàček states his own interest very clearly at the beginning of his work. He wants to examine how Lhasa Tibetans pronounce all possible combinations of initial letters of Written Tibetan; thus for the combinations of which he could not find examples he says: "if such expressions do not occur in Lhasa Spoken Tibetan, they will be taken from the Literary Tibetan language, or from other Tibetan dialects [..]. Our results will thus be more valuable as they show how words of other dialects are pronounced in the present Lhasa p'al-skad." (1959:183-184). For the description of the total competence of a particular educated Lhasa speaker, this may be a valuable exercise, but for the purpose of diachronic analysis of Tibetan, it makes the material somewhat dangerous to use.

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*Jäschke uses here the Tibetan characters which I transliterate according to his own system.

Richter on the other hand did a strictily phonetic analysis with no attempt at phonologization of his material. Since he was working from a tape, and had no access to a native speaker, he could hardly have done otherwise. In this case the material is likely to suffer from over differentiation, some accidental phonetic realization being taken as the norm for the particular context where it occurred.

Betty Shefts Chang (1968, Feb.:49) deplores the "great diversity in statements on Tibetan tones". "This is not," she continues, "the healthy diversity of differing interpretation It is true, the studies in which these statements appear have different goals. [...] Even granting such differences in goals, there should be a common ground of phonetic observation. It is not there."

In spite of the very real divergencies in description, there is some agreement at least among those descriptions where the material is phonologically analysed, as Sprigg* (1954a,b,and c; 1955; 1972), P. M. Miller, R. A. Miller (1955), Chang and Shefts (1964), and Betty Shefts Chang (1968a,b,...). In all these works Lhasa Tibetan is described as having either two tones, or two series of tones, high and low. The origin of this correlation is shown to be reflected in Written Tibetan initial manners of articulation and prefixes. The divergencies come up when the authors consider the modern reflexes of old final consonants. For Shefts the disappearing finals left behind laryngealization and when this laryngealizatic is itself deleted, a falling tone, which combined with the high/low contrast, makes four tones. For Sprigg the influence of the final consonant is reflected in a vowel quality correlation, and more of the final consonants are kept. Several Lhasa Tibetans for whom I played the tape recorded by Nawang L. Nornang, Chang and Shefts' informant, mentioned that his speech was very elegant, and that they themselves pronounced more final consonants, which I could also observe for myself. A part of the divergence between Sprigg's and Shefts' analyses may be due to differences in the level of speech used by their informants. I will later come back to the possible tonal features linked with the finals, after examining the link between the high and low tones, or series of tones, and the old manners of articulation of the initial consonants.

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*It may not be useless to remind readers who lack familiarity with the works of the London school, that the rejection by its members of phonemic analysis does not mean the rejection of phonology in favour of phonetics. What is heavily criticized by Sprigg in particular is the "monosystemic Phoneme Theory" (Sprigg 1957: 106 note 3).

The distributional relations of tones and word-initials in modern Central Tibetan are the following: According to Chang and Shefts (1964:1) there are two series of initial stops in Lhasa Tibetan, voiceless unaspirated and voiceless aspirated. There is no voiced series. The aspiration contrast is found both under the high tone and under the low tone. No phonetic description is provided so that these statements are to be taken as phonological; they do not dismiss the possibility of redundant voicing for some phonemes. Sprigg's (1955) system can be interpreted in the same terms: high toned words can have a voiceless aspirated or a voiceless unaspirated stop as their initial; low toned words can have a voiceless aspirated or a voiced unaspirated initial. The voicing of the unaspirated stop on the low tone can be considered as a redundant feature of the "unaspirate", and the two systems are equivalent. R. A. Miller's material (1955 a and b) needs some reworking before it can be compared to Sprigg's and Shefts'. Miller reports for Central Tibetan two series of initial stops on the low tone, voiceless and voiced, both unaspirated (1955a:52 & b:46). These two can be easily correlated to the two series reported on the low tone by Sprigg and Shefts. For clarity I will give also their correspondences to the Written Tibetan spelling.

Written Tibetan	Shefts	Sprigg	Miller (Central)
voiced without prefix	voiceless aspirated	voiceless aspirated	voiceless
prefix plus prefix	voiceless unaspirated	voiced	voiced

On the high tone Miller's analysis diverges (1955b:45). He reports three series: voiceless unaspirated, voiceless aspirated, and voiced. He is the only author to report voiced on the high tone, so that it is worth examining his claim. Note that until now we have been talking only of the correlation of word initials to tone. In Miller's examples (1955b:49-50) there is not a single example of a voiced word-initial on high tone, but only syllable initial word-internally. We will comment on the significance of that fact later on; let it be sufficient for us at the moment to have eliminated voiced initials from the high tone in word initial position.

Aspiration is a redundant feature of non-prefixed stops and non-aspiration of prefixed ones in Written Tibetan. The correlation of Written Tibetan spelling to modern initial manners of articulation under modern hight one can be shown as:

Written Tibetan	Central or Lhasa (all authors)
voiceless unaspirated plus prefix other than m- or ?-.	voiceless unaspirated
voiceless aspirated without prefix (or with m- or ?-).	voiceless aspirated

The comparative study of several Tibetan dialects shows that those dialects which have developed phonemic tone have reduced their initial clusters of prefix plus root initial to simple consonants (Sprigg 1972:553-557). In light of the two charts above, this is a surprising connection, since the presence or absence of a prefix is reflected in Central Tibetan by th aspiration or non-aspiration of the initial, and not by a tone difference.

On the other hand it is difficult to claim that the disappearance of the voicing contrast on initial stops was the trigger of the split, since in a number of dialects the proto-voiced prefixed is still voiced. The change of the proto-unprefixed voiced to an aspirate and its consequent merger with the proto-unvoiced aspirates, does not seem to be the trigger either, since in the dialect reported by R. A. Miller, it is not aspirate. It would be counter intuitive to claim that in such closely related dialects as Lhasa and Central Tibetan the tonal split occurred separately, and one time through the merger of proto-unprefixed voiced with proto-unprefixed voiceless, and another time through their merger with the proto-prefixed voiceless.

There is yet another counter argument to considering the merger of proto-unprefixed voiced with proto-unprefixed voiceless into voiceless aspirates as the trigger of the split. The modern aspirates are reported to show phonetically a mid version of the high tone. This would be a very strange result for a series which actively participated in a split, and it rather points to the aspirates as a mid series where the tone remained mid as it was before the split occurred.

We must look for the trigger of the split among initial continuants. Modern Central Tibetan shows nasal initials on the high and the low tone. The rare modern aspirated nasals are clearly secondary, and the difference between them is is not reflected in Written Tibetan*. Written Tibetan prefixed

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*An example of this is Chang and Shefts minimal pair (1964:2) *ñēè 'to tan'/ñhēè 'to be tanned'*, *both spelled as* mñes in Goldstein (1970:268), and spelled as mñel and mñed, respectively in Chang and Shefts, in all cases, with the same initial.

nasals occur in Central Tibetan under the high tone, and Written Tibetan unprefixed nasals under the low tone. The liquids behave in a similar way. The sibilants show a voicing opposition in Written Tibetan, s/z and š/ž. In modern Central Tibetan they are all pronounced unvoiced, and the opposition is transferred onto the tonal opposition high, reflecting the old unvoiced, and low reflecting the old voiced. While stop initials carry some redundant features which help identify the tone, continuants do not, and the tone is the sole carrier of the previous voicing opposition.

An interesting difference with Loloish can be noted here. Loloish proto prefixed nasals behaved tonally like proto prefixed voiced, both of them becoming glottalized and thus behaving as a high series, the tone of which is now in opposition to the tone of proto non-prefixed voiced. In Tibetan we see the prefixed nasals are in the high tone while the prefixed voiced stops are in the low tone. It seems that the Tibetan proto prefixed nasal series did not turn into a glottalized series, but rather into a voiceless series, which then behaved like the unvoiced sibilants and the unvoiced stops. In Loloish the contrast which was trans-phonologized into tone was glottalized/non-glottalized; in Tibetan it was voiced/voiceless.

Tamang

Tamang, a language of the Gurung Branch of the Bodish Section of Bodic, in Schafer's classification, presents an evolution similar to Tibetan. However, the behaviour of the different series at the time of the split appears more clearly because some later developments of Central Tibetan did not occur in Tamang (Mazaudon, 1972).

The Tamang dialect of the village of Risiangku (Central Nepal) has a system of four tones. The language has kept a large number of final consonants, including the stops -p, -t, and -k. There is no final glottal stop. The four tones of the system occur with all types of syllables including those ending in -p, -t, -k. These tones are not to be equated with those of Tibetan. One of the axes of the tonal system of Tamang, namely high/low, has the same origin has the high/low opposition in Tibetan, as I will show presently. The other axis, namely contour/level, does not have the same origin as the falling/level contrast which Chang and Shefts posit for Lhasa Tibetan. As we will show in section IV, the Tibetan contrast is easily related to the deletion of final stops*. A glance at the modern

*Section IV will appear in the fuller version of this paper.

Tamang system shows that this cannot be the origin of the Tamang contour/level opposition since the finals including the obstruents are still fully pronounced and are not even "unreleased" (Mazaudon, 1973).

In my 1972 paper, I proposed to name the the level/contour opposition, which predated the division high/low, by the letters A and B, without implying anything about the origin of A and B or about their phonetic realization at proto-Tamang times. Recently Benedict (1973:135) has proposed the identification of this correlation with the A/B correlation which he reconstructs for Proto-Sino-Tibetan. This hypothesis is far from being demonstrated, one of its major difficulties being that Benedict wishes to reconstruct A and B only for smooth syllables, while the Tamang data stubbornly shows an identical behaviour of checked and non-checked syllables. I will come back to this question below. Meanwhile I will describe the Tamang tonal split as if I knew for sure which modern tone is the reflex of which ancient tone. The process in all events will be the same, but the categories A and B might have to be identified with something other than Sino-Tibetan Proto A and B tones.

Modern Tamang displays a system of four tones after initial liquids, nasals, sibilants, and unaspirated obstruent initials. When the initial is aspirated only the two high tones can appear. And, on the two low tones the opposition between aspirated stops and unaspirated stops is neutralized, and the archiphoneme is realized as unaspirated. The sibilant, s, is unvoiced on all tones; the nasals and liquids are voiced on all tones. The aspirate stops are unvoiced, as are the unaspirated stops when they occur with the two high tones. The unaspirated obstruent archiphoneme which occurs on the low tones is usually unvoiced, but is often lenis, or slightly voiced, or murmured. The vowel with all initials on low tone is breathy.

We can represent the system in the following chart:

HIGH, with clear voice quality	tone 1	kha	ka	ŋa	sa
	tone 2	kha	ka	ŋa	sa
LOW, with breathy voice quality	tone 3	g̊a̤		ŋa̤	sa̤
	tone 4	ǧa̤		ŋa̤	sa̤

The modern obstruents still bear witness to the old manner correlation which was replaced by the high/low

correlation. The fact that there is no aspiration opposition on the two low tones already points to a value of the unaspirated stops on low tones which is different from either the aspirated or the unaspirated on the high tones. The traces of voicing, now an occasionnal redundant feature, which appears on those stops gives away their voiced origin. Thus we can reconstruct the proto-Tamang system as a system with three manners of articulation of initial stops, and two tones *A and *B.

*tone A: kh, th, ph, k, t, p, g, d, b

*tone B: kh, th, ph, k, t, p, g, d, b

Vocabulary correspondences with Written Tibetan show low tone syllables with an s- initial deriving from a voiced z- initial, while the high tone ones come from an unvoiced s-. High tone syllables with nasal initials correspond to Written Tibetan prefixed nasals, and low ones to Written Tibetan plain nasals.

It is now very easy to understand the evolution of the old three-manners/two-tones system into the modern two-manners/ four-tone system.

	*tone A	*tone B
kh, k, *hŋ > ŋ, s...	tone 2	tone 1
*g > k, ŋ, *z > s...	tone 4	tone 3

From the above chart it appears that the merger of the proto-voiced and proto-voiceless series into a plain series, unvoiced for the stops and sibilants, voiced for the nasals, triggered the phonologization of the high and low allotones of proto tone A and proto tone B into a system of four tones. The aspirates did not merge with anything, so there was no tone split of the tones *A and *B on the syllables with aspirate initials. Functionally speaking, the tones which occur after the modern aspirates are not tone 1 and tone 2, but proto tone A and B themselves, unsplit, which in terms of the modern system can be called the architonemes of tones 2 and 4 for *A, and 1 and 3 for *B.

Historically, the unsplit tones *A and *B which remained on syllables beginning with aspirates may well have been kept phonetically distinct from both series of tones issuing from them by the split. In a later stage the archiphonemes A and B each merged with one of the tonemes derived from them; *A merged with its high toneme, modern tone 2, and *B merged with its high toneme, modern tone 1.

The hypothesis that the unsplit tones A and B remained for awhile distinct from the tonemes derived from them, as we have seen they did in Loloish*, is only a logical possibility for Tamang. If we go back to the Tibetan case though, where the creation of tones from a voicing correlation is exactly parallel to the splitting of the Tamang tone system, we find that the phonetically mid pitch of the syllables with an old aspirate initial, is explained by the behaviour of this series at the time of the split. The Tibetan tones were born from a merger of voiced and voiceless series which left the aspirated series out of the process. The pitch of the vowel following these consonants had no reason to budge from the mid value which it had in the previously toneless language. The other syllables on the contrary had to move towards either high pitch or low pitch to replace their disappearing voicing correlation.

The subsequent evolution of the system has obscured this pattern. In modern Lhasa Tibetan the old unprefixed voiced initials have evolved to aspirated voiceless. Thus they seem to be the low tone partners of the aspirates on the high tone. And if this correlation had some antiquity, we would have expected the high syllables with aspirate initials to move all the way to the same high pitch as the proto voiceless unaspirated, or the proto prefixed nasals. If we understand that the aspiration of the proto voiced on the low tone is a late development, which occurred after the tone split, then the mid realization of the syllables with aspirated initials becomes clear: this used to be an architoneme. The late origin of aspiration on the low tone is shown by their absence in Written Tibetan spelling, and also by the dialectal variability of their occurrence. In the Lhasa dialect described by R. A. Miller, all proto voiced initials, whether prefixed or not, became voiceless aspirated (Miller, 1955a:52). Goldstein (1970:xiv) mentions free variation between aspirated and non-aspirated on the low tone. On the contrary, in the Central Tibetan dialect described by Miller, none become aspirated; the proto prefixed ones remained voiced, while the unprefixed ones became voiceless unaspirated. It seems to me that the aspiration is a late reinterpretation of the breathiness which developed on the low tone. Why it affected the proto unprefixed voiced rather than the prefixed one is not yet clear.

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*The expanded version of this paper contains a large section on Lolo-Burmese tones.

Tonogenetic Effect of Finals

The transphonologization of syllable final features on the preceding vowel is not as well attested as that of syllable initial features on the following vowel. This statement about general phonetics by Ohala (1973:3) applies to Tibeto-Burman in particular. Two types of influence of the final on tone have to be distinguished. The tonal effect of the presence of a final glottal occlusion or friction as opposed to their absence is well attested in South-East Asian languages. An example of it is the Vietnamese tonal split, transforming a three-way final opposition between -?, -h, and open syllable into the three tones of VIth century Vietnamese (Haudricourt, 1954:159). Another way the final element of the syllable can influence the tonal development of the preceding vowel is exemplified by Punjabi, among Indo-European languages, and by Camuhĩ, among Austronesian languages. In these two languages the manner of articulation of some consonant influences the tone of the vowel which follows it when it occurs in word initial position, but it influences the tone of the vowel which precedes it, when it occurs in non-initial position. This last development requires a polysyllabic language for its occurrence, and will be examined in another section. The direct influence of the manner of articulation of a consonant on the preceding vowel in a largely monosyllabic language is a controversial hypothesis, which in Tibeto-Burman is exemplified by Jingpho. The influence of a final glottal stop is exemplified by Tibetan.

Tibetan

Richter (1964:33-36) says that the -g final of Written Tibetan, when it is pronounced in modern Lhasa Tibetan does not have any effect on tone. When it is unpronounced or pronounced as a glottal stop, it causes a fall in pitch. The -d final causes an optional fall in pitch, and the -s final generally causes a fall in pitch. The -s post-final, which can follow a nasal or obstruent final, has the same effect.

Sprigg on the other hand considers that: "Syllable-final features have not, in Tibetan, the relevance for tonal analysis that they have in Burmese and Lolo" (1972:547 note 4). From the examples quoted in Sprigg (1955) it appears that the final -g of Written Tibetan is replaced by vocalic length in Sprigg's informant usage. In his analysis Sprigg recognizes two distinctive pitch levels (1955:123), and considers the falling pitch which occurs at the end of words as a redundant phonetic feature without phonemic value.

Shefts specifically applied herself to the question of the final falling tone in a series of articles (1968a, b, c, and d). She says: "This treatment of Tibetan tones differs from others in its assertion of a relationship between the glottal stop and a falling tone" (1968a:51). She agrees that all the tones have a final fall phonetically, but she argues that there is a "difference in the quality of the fall". The high level tone falls steadily, whereas the high falling tone shows a gentle fall followed by a precipitous fall and a slight rise before the final fall (1968: March:8)*. "Even if the 'high' tone falls, it differs from the 'falling' tone in the absence of glottalization" (1968: February:49) Between the 'low level' tone and the 'low falling' tone, the difference is in the rise which precedes the fall in both of them, "the relatively sharp rise of the falling tone over half or less of the pitch record as opposed to the long, gentle rise of the low tone" (March:8).

The description of the contextual variants of the falling tone points to the historical evolution which led from final occlusion to modern falling tone. Shefts says: "In the 'falling' tone we subsumed glottalization. In isolation or final position this takes the form of a glottal stop. In other positions there is a fall, accompanied by some degree of glottal stricture". (1968, Februrary:49). "Geminate-vowel sequences of level or falling tone also alternate with vowel-consonant sequences. For example: falling tone alternates with -p, -t, -q, level tone alternates with -l, -r." (Chang and Shefts 1968:78).

It seems that a falling tone is in the process of replacing final occlusion in modern Tibetan through the following steps: the final obstruents become final glottal stops. This glottal occlusion itself becomes glottal stricture and is redundantly accompanied by a falling pitch. It should be noted that the expected effect of a final glottal stop is a rising pitch, as in Vietnamese or Archaic Chinese. On the contrary the effect of an imperfect glottal closure appears to be a falling pitch. This occurs also in Burmese where the creaky tone is described as slightly falling by Richter (1967:221), whereas the tone spelled with a final glottal occlusion, is described as level. Historically this means that two phonetically identical segments could have two opposite reflexes in the same language, at two different periods of its history.

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*The articulatory correlate of this medial precipitous fall is probably "a degree of glottal stricture less than a full stop" (ibid.:9).

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[Editor's note: This bibliography has been compiled by the editors and is not fully complete. Several minor discrepancies between citations in the text, and the sources do exist. The full bibliography will appear with the full version of this paper.]

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