

TIBETO-BURMAN TONOGENETICS*

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0. Introduction
1. Tonogenetic effect of initials
 - 1.1. Karen initial mutation
 - 1.2. Loloish initial mutation
 - Lahu tonal split
 - Lisu tonal split
 - Sani tonal split
 - Other Loloish languages
 - Conclusions on the Loloish tonal split
 - 1.3. Bodish initial mutation
 - Tibetan
 - Tamang
2. Tonogenetic effect of finals
 - 2.0. Parallels outside the TB family
 - 2.1. The role of the finals in relation to proto-tones
 - *A, *B, and *C
 - Development of Sino-Tibetan tones from syllable final laryngeal features
 - The explanatory power of the theory of syllable final laryngeal features for the evolution of initial stops in Sani
 - 2.2. Finals and tones in Tibetan
 - 2.3. Finals and tones in Khaling
 - 2.4. Finals and tones in Jingpho
3. Development of tone on polysyllabic units
 - 3.1. Modern word-tone systems
 - 3.2 What is the historical origin of word-tone

O. INTRODUCTION

The field of Tibeto-Burman tonogenetics is a very young one, and it might seem premature to attempt a survey of its achievements. It will appear very quickly that the present essay does not aim at drawing conclusions. Rather it is conceived as a portfolio of case histories which can be drawn upon as a source of new hypotheses to be applied to the many languages and language groups of the Tibeto-Burman family which have not yet been touched by linguists. Thus the arrangement will be typological. I will examine successively three types of diachronic processes through which tones are created or multiplied. In each section I will bring in a number of examples from Tibeto-Burman languages to illustrate the process considered. I will make no attempt at covering all the available material, but I will rather choose some typical and some rare cases in order to give an overview of the research which is currently undertaken in the field of Tibeto-Burman tonogenetics.

It is barely possible now to appreciate what is typical of the family. The field simply does not compare with Indo-European or Chinese. In this essay I will try to bring out similarities of evolutionary processes in different languages in an attempt to throw into relief characteristic features of the family as compared to other linguistic groups, and more particularly as compared to the other Southeast Asian languages. Thus I will systematically emphasize similarities over differences. In the present state of Tibeto-Burman studies, seemingly anomalous phenomena are difficult to appraise. Is the divergent evolution noted in a particular language a genuine exception? Or is it rather the mark of an inadequate description where a superior generalization has been missed? The time when we can fit all special cases into the broad lines of evolution of the family has not come. It should be clear that generalizations at this stage have to be tentative, and should be regarded mainly as hypotheses to be checked.

This essay is oriented toward the typology of language change, not toward reconstruction. Although a number of authors in the

past few years have concerned themselves with tonal problems in the Tibeto-Burman languages, the attention given to the historical process of the birth of tones itself has developed only quite recently. Even works dealing with historical reconstruction have often refrained from offering general explanations for the list of changes that they posit between the modern forms and the reconstructed ancestor.

There is some reason for such an attitude. The data on modern tonal systems has been very meager until recently. Uncertainty about the modern tonal systems precluded confidence in the reconstructed forms, and dissuaded writers from attempting to justify them by positing general principles of development, on the grounds that, in the present state of our knowledge, this would have been mere speculation.

Another type of difficulty stems from the very nature of these languages. Tibeto-Burman languages, unlike other Southeast Asian languages, show traces of a very complex morphology in the proto-language. The modern languages have all simplified this old morphology to such an extent that many of them presently have invariable lexical items, to which affixes of recent origin are attached. While a few processes of the proto morphology, such as the formation of causatives, are more or less understood, many more are impossible to discover. Prefixes and suffixes, which left their most visible trace in Written Tibetan, lost their independence from the root, and their meaning faded away. Many doublets must have resulted from this erosion: how can we know which ones a language kept or dropped? The extent of morphological variation of the root in verbal conjugation is evidenced by Written Tibetan, where it is already a barely productive remnant. In many modern languages the verb root is invariable: which stem was generalized to the whole conjugation?

In my view, these difficulties are obstacles to the reconstruction of individual lexical items as much as to the understanding of the broad lines of evolution. Generalizations are not only the last step of a careful reconstruction, they are also a test against which to check individual reconstructions during

the analysis. Fortunately, in spite of the uncertainties involved, a number of scholars have proposed hypotheses to explain the evolution of tonal systems in Tibeto-Burman. The general principles which have been proposed and the most frequently attested evolutionary processes will be the subject of the present essay.

1. TONOGENETIC EFFECT OF INITIALS

The tonogenetic process most often and most clearly attested in Southeast Asian languages is the birth or the multiplication of tonal contrasts due to a transphonologization of distinctive features previously attached to initial consonants. The most comprehensive exposition of this process is Haudricourt's 1961 article: "Bipartition et tripartition des systèmes de tons dans quelques langues d'Extrême-Orient."¹ The only Tibeto-Burman languages included in Haudricourt's article are Karen. I will first explain what is known of the Karen tonal developments. Then I will show that similar processes are found in Loloish and Bodish.

1.1. Karen² Initial Mutation

1.110 Haudricourt (1961) treats only open or nasal syllables. For a more complete exposé of his ideas on Karen one has to look back to his articles of 1946 and 1953. The most important contributions to the study of Karen tonogenetics in the following years have been: Luce (1959), used by Haudricourt (1961), Jones (1961), completed by Jones (1971), Henderson (1961 and 1973), Burling (1969), Jones (1975), and Haudricourt (1975).

Neither Jones (1961) nor Burling (1969) uses Haudricourt's reconstruction, or even discusses it. This is unfortunate since a number of problems raised by these authors had been solved in advance by Haudricourt's hypothesis. I will develop only two examples of it: the restrictions on cooccurrence of modern initials and tones, and the cases where tonal correspondences between

Taungthu and Pwo on the one hand, and Palaychi and Sgaw on the other hand are not one-to-one.

Common Karen

1.111 Haudricourt (1946:133) reconstructs three series of initial consonants for Common Karen: voiced, voiceless unaspirate, and aspirate; and three tones: two open tones, and one checked tone.³ The split of the three proto-tones into the modern six tones, four on *smooth syllables (open or nasal syllables), and two on *checked syllables, was caused by a mutation in the system of initial consonants.

Jones (1961) does not consider the idea that tones might have developed from an initial consonantal mutation occurring between Common Karen and the modern languages. Rather he reconstructs two proto-tones with three-syllable-final laryngeal features, which could be considered either as tonal features or as the historical source of modern tonal features. So if his views were followed, Karen would not exemplify the development of tones from initial consonants, but possibly their development from final laryngeals.

Burling (1969:26) reconstructs the individual six tone systems of the modern languages to a Common Karen six tone system, and claims that it is impossible to go any further in the internal reconstruction of Karen than the stage where the proto-language had six tones. We will see that Haudricourt's hypothesis on the origin of these six tones gives us a much more coherent picture of the family than the weaker hypothesis proposed by Burling.

The Evolution

1.112 Haudricourt explains that the three series of initials determined three series of tonal allophones of the proto-tones. The *aspirate determined a high series of allotones, the *voiced a low series. The *voiceless unaspirate were 'mid' in their tonal effect (Luce, 1959, says "mean"), with the result that the

tones on syllables beginning with these initials were sometimes likened to the high allotone, and sometimes to the low allotone of each proto-tone.

Table 1
Common Karen phonemic system of three tones
with allotonic variation conditioned
by the initial consonants

| *initials | *tones | *A (level) | *B (oblique) | *C (checked) |
|--------------------------------|--------|----------------------------------|----------------------------------|----------------------------------|
| *aspirate (high) | | A _{high} | B _{high} | C _{high} |
| *voiceless unaspirate (mid) | | A _{mid or variable} | B _{mid or variable} | C _{mid or variable} |
| *voiced (low) | | A _{low} | B _{low} | C _{low} |

The Common Karen three-tone system did not become in one step a six-tone system ancestor of all the modern six-tone systems, but rather went through a nine-category stage from which the different modern six-tone systems individually diverged. The divergent evolution of Pwo and Sgaw is represented by Haudricourt (1946:133) in a chart which can be translated in the following way:

Table 2
The divergent evolution of Pwo and Sgaw
from the Common Karen stage^a

| | <u>Sgaw</u> | | | | <u>Pwo</u> | | |
|----------|--------------------|--------------------|-----------------------------|----------|--------------------|--------------------|-----------------------------|
| | *A | *B | *C | | *A | *B | *C |
| *asp (H) | A _H (4) | B _H (2) | C _H (τ^2) | *asp (H) | A _H (4) | B _H (2) | C _H (τ^2) |
| *vl (M) | A _H (3) | B _H (2) | C _H (τ^2) | *vl (M) | A _L (3) | B _H (2) | C _H (τ^2) |
| *vd (L) | A _L (3) | B _L (1) | C _L (τ^1) | *vd (L) | A _L (3) | B _L (1) | C _L (τ^1) |

a. I have indicated the six tones reconstructed by Burling in parentheses.

1.113 When the evolution of the initial consonantal system had resulted in the merger of all (Sgaw) or part (Pwo) of the *voiced series of initials with the *aspirate series, the allo-tones occurring after these two series of initials were phonologized into tones. Thus the tonal system became a six tone system (plus an architonemic series) instead of a three tone system. For a while the tones of syllables belonging to the mid series behaved as three architonemes for which the features distinguishing *A, *B, and *C were pertinent but for which the features high and low, recently phonologized for the two other series, were not pertinent. Then in Sgaw all the syllables of the mid series merged with those of the high series, an evolution similar to that of the Tai languages except for Siamese, and of Chinese (Haudricourt, 1946:133). In Pwo they merged with those of the low series when the proto-tone was *A, and with those of the high series when the proto-tone was *B or *C, an evolution similar to that of Siamese. As is abundantly exemplified by Haudricourt (1961), a mid (or archiphonemic) series in a split shows reflexes which differ from language to language, and from proto-tone to proto-tone inside the same language. On the contrary the high and the low series behave more regularly.

1.114 Burling attempts to reconstruct a balanced system for the state of the language corresponding to the end of the evolution represented in the chart above. He posits a proto-system with six tones where all initials occur with all tones. Then he has to write rules to derive the 'modern' Sgaw and Palaychi systems from the 'ancient' system posited on the model of Pwo and Taungthu.

If Haudricourt's scheme is right, this is impossible. There never was a Common Karen stage with six tones occurring with all initials. The languages separated before completing the re-analysis of their tonal systems.

Divergent segmental correspondences according to tone

1.115 Burling (1969:23) says: "For the most part the three series of stops and affricates (aspirated, voiceless unaspirated,⁴ and voiced) appear uniformly in all the languages. In a considerable number of cases, however, Taungthu and the two Pho dialects have aspirated initials in apparent correspondence with unaspirated initials in Palaychi and Sgaw. It turns out that these occur only in syllables with tones 1, 3, and ɿ¹. Correspondences in which aspirated initials occur uniformly in all six languages are found only with tones 2, 4, and ɿ². It is therefore possible to group these together as being derived from a single proto-form, which can be symbolized as if it had aspiration. A rule can then state quite simply that aspiration is lost in Palaychi and the Sgaw dialects in syllables with tones 1, 3, ɿ¹."

The rule may be simple to write, but it is not clear why a phonetically unmotivated loss of aspiration in a series of tones should occur. We will see later that some cases where a tone is deemed to influence the development of a segment find their phonetic explanation in the presence of some laryngeal feature associated with the tone (cf. 2.111). No such laryngeal feature is reported for Karen tones 1, 3, and ɿ¹.

1.116 If we regard all six systems as equally 'evolved,' as we do with Haudricourt's hypothesis, the correspondences are perfectly regular. In some languages, like Pwo and Taungthu, the merger of the *voiced initials with the *aspirate is complete, in favor of the aspirate. Thus, in the modern language, the six tones all occur with an aspirate initial, the three 'high' tones after modern aspirates which derive from *aspirates, the three 'low' tones after modern aspirates which derive from *voiced. In Sgaw and Palaychi the merger of the two series of initials is incomplete: the *voiced nasals have merged with the *aspirate nasals, but *voiced stops did not become aspirate; they are only voiceless. In the resulting system there is a restriction of co-occurrence between initials and tones: the three tones which

Burling calls *1, *3, and *ʔ¹ do not occur with aspirate initials. This was to be expected since they derive from the low allotones conditioned by a proto *voiced initial. The aspiration was not "lost" as Burling says (1969:32); it was never there.

Restrictions of cooccurrence between initials and tones

1.117 Another problem which is solved by the same explanation is the complementary distribution of /r/ (or /ɣ/) and /h/ in Taungthu, Palaychi, and Bassein Sgaw. In these languages /r/ or /ɣ/ occurs under tones *1, *3, and *ʔ¹, /h/ occurs under tones *2, *4, and *ʔ². Both phonemes, /r/ and /h/ are reconstructed by Burling (1969:37) as *ɣ. The modern distribution is unexplained. If, on the contrary, the series of tones *1, *3, and *ʔ¹ is recognized as a low series deriving from *voiced initials, and the series of tones *2, *4, and *ʔ² as a high series deriving from *aspirate initials, we reconstruct only three proto tones. Each of these proto-tones (those noted by A, B, and C on the chart, section 1.112) could occur with two initials, *r and *hr. *r developed into modern /r/ or /ɣ/ with a low series of tones, *hr developed into modern /h/ and a high series of tones. The development of aspirated resonants into the glottal fricative is not exceptional in Tibeto-Burman (cf. for Lahu, Matisoff 1972a:25).

Cases where tone correspondences are not one to one

1.120 Burling reconstructs a proto system with the same tonal classes as modern Pwo and Taungthu. This decision leads him to posit mergers and splits to relate the 'ancient' Pwo system to the 'modern' Sgaw type systems. "For the most part each of these six tone correspondences is represented consistently in each language by a single tone, but in a few cases two originally distinct tones have fallen together in particular languages, and in two cases splits seem to have occurred in an originally single tone" (Burling 1969:21). Thus, in Burling's interpretation, *2 split in Palaychi, and *3 split both in Palaychi and in Sgaw. His tonal

correspondences are the following (ibid:53-55):

Table 3
Tonal correspondences in some modern Karen languages

| | <u>Taungthu</u> | <u>Moulmein</u> <u>Pwo</u> | <u>Bassein</u> <u>Pwo</u> | <u>Palaychi</u> | <u>Moulmein</u> <u>Sgaw</u> | <u>Bassein</u> <u>Sgaw</u> |
|-------------------|-----------------|-------------------------------|------------------------------|-----------------|--------------------------------|-------------------------------|
| *1: | ˆ | ˊ | ˊʔ | ˊ | ˊ | ˊ |
| *2: | ˊ | ˊʔ | ˊ | ˊq ˊq | ˊʔ | ˊ |
| *3: | - | - | ˊ | ˊq ˊ | ˊ - | ˊ - |
| *4: | ˊ | ˊ | ˊ | ˊq | ˊ | ˊ |
| *ʔ ¹ : | ˊʔ | -ʔ | ˊʔ | ˊ | ˊʔ | ˊʔ |
| *ʔ ² : | ˊʔ | ˊʔ | ˊʔ | ˊq | -ʔ | -ʔ |

It is clear that the choice of one set of modern tones rather than another for the reconstructed system is arbitrary. If the modern Moulmein Sgaw for instance had been taken as the basis of the reconstruction, we would have to posit a tonal split in Pwo to account for the fact that corresponding to Sgaw /ˊ/, Moulmein Pwo has both /-/ and /ˊ/.

1.121 If we consider the evolution of the Pwo system to have been as shown on the chart in section 1,112:

Table 4
Pwo evolution

| Proto-tones: | *A | *B | *C |
|--------------|---------------------------------|----------------------------------|--|
| High series | (4)ˊ | (2)ˊʔ | (ʔ ²)ˊʔ |
| Mid series | (*A _M > 3)ˊ | (*B _M > 2)ˊʔ | (*C _M > ʔ ²)ˊʔ |
| Low series | (3)- | (1)ˊ | (ʔ ¹)-ʔ |

then, the Palaychi system does not represent a 'split' in tones "2" and "3", "2" and "3" never were unified categories in the

proto-language but resulted in Pwo from mergers which occurred at the time of the tonal split. Thus the Palaychi evolution is the following:

Table 5
Palaychi evolution

| Proto-tones: | *A | *B | *C |
|--------------|--------------|--------------|--------------|
| High series | `q |'q..... | `q |
| Mid series |`q..... |`q..... |`q..... |
| Low series | , | , | , |

Note the three different reflexes of *B in Palaychi. The phonologization of three tones corresponding to the three series of *initials requires the presence, at least in part of the phonological system of the proto-language, of three merging series rather than two. Haudricourt reconstructed three series of continuants in Common Karen, which merged in the modern languages, e.g. ?wa^A 'white,' hwa^B 'bamboo,' wa^B 'to paddle.'⁵ These three series survive in Bwe according to Luce (1959b: table II) and Henderson (1973:15).

In the same way, we need not posit any tonal split in Sgaw. There the mid series of tones conflated with the high series for all proto-tones. Thus syllables under tone *A with an initial of the mid series (*p, *t, *k, *ʔ, *b, and *d for Burling, or *p, *t, *k, *ʔb, and *ʔd, for Haudricourt 1961) joined the tone correspondence "4" in Sgaw, instead of joining "3," as they did in Pwo (cf. table 4).

Table 6
Sgaw evolution

| Proto-tones: | *A | *B | *C |
|--------------|---------------------------------------|--|---|
| High series | (4)' | (2)'? | (?²)-? |
| Mid series | (*A _M > 4)'M..... | (*B _M > 2)'?M..... | (*C _M > ?²)-?M..... |
| Low series | (3)- | (1)' | (?¹)'? |

Residue of unexplained tonal correspondences

1.122 As Jones (1971) pointed out, the system of 3 tones multiplied by 3 initial manners of articulation reconstructed by Haudricourt did not account for category V or Luce's eight sets of correspondences (1959b). (Jones correctly divides Luce's V into V and Va, and VI into VI and VIa to account for Palaychi.) Luce's category V includes fewer lexical items than the other categories and was neglected by Haudricourt in his earlier reconstructions. To accomodate it, Haudricourt (1975:341) reconstructs one additional oblique tone, which we may call *B'. The reflex of *B' with an initial of the high series (*aspirate) is now the Luce-Jones category Va, and the reflex of *B' with an initial of the mid series (*voiceless unaspirated) is V. Since no category corresponding to reflexes of tone *B' with initials of the low (*voiced) series could be traced, it is assumed that these underwent the same merger--presumably with *B-low (Luce's IV)--in all the languages. Luce's V (including Va) is defined as the class of words which merged with VI (including VIa) in Pwo, but with II (and III) in Sgaw. The reconstructions now proposed by Haudricourt for Luce's correspondences are as follows:

Table 7
Haudricourt's (1975) reconstructions
for Luce's correspondences

| | *A | *B | *B' | *C |
|------------|---------|-----------|----------|-----------|
| | [level] | [falling] | [rising] | [checked] |
| *aspirate | III | VI | Va | VIII |
| *voiceless | II | VIa | V | VIII |
| *voiced | I | IV | IV | VII |

Note that the division VI/VIa is needed to account for the Palaychi treatment of proto-tone *B discussed in section 1.121 above. Similarly V remains distinct from Va in Palaychi, since V merges with VIa and Va with VI. It is still true, however, that in Palaychi as in Pwo, Luce's larger categories V and VI have merged completely. But in Sgaw, the reflex of Luce's V is ['], which is distinct from the reflex of VI ['?], but represents a merger with the reflexes of Luce's categories II and III. (See Table 6.)

Emergence of modern three tone systems through splits and mergers

1.123 Modern three tone systems in Karen could be thought to be direct descendants of the Common Karen three tone system. (There is no need to consider *B' here since it has merged with *B in all the languages in question.) This is not the case. The Blimaw dialect of Bwe, according to Henderson (1973) shows the following evolution.

Table 8
Blimaw evolution

| Proto-tones: | *A | *B |
|--------------|------|-----|
| High series | high | mid |
| Mid series | high | mid |
| Low series | mid | low |

The three series of initial obstruents are kept distinct. *Aspirated and *voiced nasals have merged, phonologizing the tone system, a situation similar to the one in Sgaw. Henderson states that there are no closed syllables in Blimaw, but she does not trace the modern reflexes of the reconstructed *checked syllables. So it is impossible to restore the third column on the chart, the reflexes of *C.

In Geba, another Western Bwe dialect, the mutation of initial consonants is not completed yet for any part of the system. The tonal split between a high series (which, in Geba as in Sgaw, is not separate from the mid series) and a low series has taken place in spite of the conservation of the aspiration contrast in the initials.⁶ For Geba *smooth syllables Haudricourt (1961:301) draws the following evolutionary chart.

Table 9
Geba evolution

| Proto-tones: | *A | *B |
|--------------------------|----|----|
| hm, hn, th, ph, ʔd, t, k | 55 | 35 |
| m, n, l, b, d, g | 35 | 35 |

1.124 The difference between the Blimaw and Geba dialects seems to be the appearance of a third level of tone (low) with the merger of *aspirate and *voiced nasals. But this interpretation raises a problem. In the examples given by Henderson (1973: 27) for the combination of *voiced initial with tone *B of Haudricourt's Common Karen, all the words have the mid tone in modern Blimaw Bwe, not the low tone. Looking at Luce's (1959) first chart, we can see that Luce writes the modern tone "3" (which I interpret as identical to Henderson's tone "3," that is, the low tone) only on stopped syllables, and this for both Geba and "Bwe." I do not know whether Luce's Bwe is the same as Henderson's Blimaw Bwe, but the convergence of the two observations leads us to propose the following chart as a hypothesis to be

checked.

Table 10
Geba and Blimaw evolution

| Proto-tones: | *A | *B | *C |
|---------------------|------|-----|-----------|
| High and mid series | high | mid | low (mid) |
| Low series | mid | mid | low |

If the reflex of the ancient checked tone *C in the high series was low, we would expect to find a number of correspondences where a Geba word with an aspirate nasal initial has a Blimaw cognate on the low tone. In Geba itself we would expect some words with an aspirate initial to have the low tone. But if the tone *C, when occurring with an initial of the high series had a mid reflex, a hypothesis I indicated between brackets on the chart, then the correspondences between Geba aspirate and non-aspirate nasals and Blimaw tones would be the same as that posited by Henderson: the high tone words of Blimaw would have Geba cognates with aspirated nasal initials, words with the mid tone in Blimaw would have cognates with either aspirate or non-aspirate initials in Geba, and words with the low tone in Blimaw would have Geba cognates with unaspirated nasal initials only.

Checked syllables have been set aside by students of Karen languages, either for simplicity of exposition (Haudricourt 1961) or out of principle (Burling 1969:20): "syllables terminating in a stop can be expected to develop entirely differently from tones in smooth syllables," or "tone correspondences in stopped syllables are entirely different from those in non-stopped syllables" (*ibid*:11). This view is commonly held, and seems to me very misleading. The checked syllables have no reason to behave in a basically different way from the smooth ones in a tonal split conditioned by the initials. On the other hand, it is indispensable to establish their reflexes in order to understand the internal relations in the modern systems. It has now been abundantly shown

that *checked syllables can become unchecked, not only in a general depletion process, but in an evolution conditioned by particular contexts (cf. Matisoff 1970, and below, section 1.223). *Smooth syllables can become checked by a glottal stop as in Blimaw (Henderson 1973:4), or by a full consonant (Burling 1966). Checked and non-checked syllables are not impervious categories. We will show in what follows several examples where a unified view of the development of a tonal system is necessary to understand the processes involved.

1.2. LOLOISH INITIAL MUTATION

The Lolo-Burmese⁷ subfamily of Tibeto-Burman is the group of languages where most of the research in the past ten years has been concentrated, and this is the field where historical research has been most emphasized.

From Proto-Tibeto-Burman (PTB)
to Proto-Lolo-Burmese (PLB)

1.210 It is generally admitted that the Proto-Tibeto-Burman syllable had the same structure as that displayed in Written Tibetan, a structure which can be symbolized in the following formula: $(P_1)(P_2)C_i(G)V(:)(C_f)(S)$, where P is a prefix, C_i is the initial consonant, G is a glide, V the vowel, ':' stands for vocalic length, C_f for final consonant, and S for suffix (Matisoff 1973a:78).

The fillers of these slots as reconstructed for Proto-Tibeto-Burman are also very similar to the phonemes of Old Tibetan as attested by Written Tibetan, with one important difference, and a few secondary ones.

Proto-Tibeto-Burman initials

1.211 It has long been understood that the three manners of articulation of initial stops spelled as aspirate, voiceless un-

aspirate and voiced in Written Tibetan, go back to only two proto-series: voiced and non-voiced. In Written Tibetan itself, aspirate and voiceless unaspirate stops are still in almost perfect complementary distribution: the aspirates occurring in absolute word initial position, and after the prefixes *m-* and *a-* (alias *h*, *ʔ*, or *ʔä*, WT *'a-chung*), and the voiceless unaspirates occurring after any prefix other than those two (Li 1933). For Li Fang-kuei the basic original form is the aspirate, and the unvoiced unaspirate is derived from it through the influence of the prefix (Li 1933:138). Shafer (1937:1) says the same thing: "original aspiration...has been lost in Old Bhotish due to the prefixes occurring there--prefixes causing the dropping of aspiration."

1.212 Benedict (1972a:17,20) prefers to retain the unaspirated stop for his PTB reconstructions and considers the aspirate stops as secondary. Matisoff (1973a:80) holds the same view. As far as Tibetan is concerned, I find Li's argumentation persuasive; but, to my knowledge, Li does not claim to go back to the Proto-Tibeto-Burman level, but only to Proto-Tibetan itself. Whether aspirate or non-aspirate, there was only one voiceless series in PTB, so that, from a functional point of view, it can be defined simply as non-voiced in opposition to the only other series of initial obstruents, which was voiced. For Chang Kun, however, the number of series is an open question (1973:337). Chang suggests that, at the Sino-Tibetan level in all cases, and possibly at the Proto-Tibeto-Burman level too, a three-way contrast may have to be reconstructed: voiced, voiceless unaspirated, and aspirate.

At the Proto-Tibeto-Burman level, the nasals and liquids are reconstructed in only one series (Benedict 1972a:18), which makes it a plausible guess that they were phonetically voiced. The sibilants are reconstructed with a voicing opposition (*s/z*), and initial *h-*, which is rare (*ibid*:33), can be presumed to be plain, that is unvoiced.

Prefixes

1.213 Most of the initial consonants could be preceded by prefixes, some of which have long been known to have a morphological origin (Wolfenden 1929b), but many of which are of uncertain meaning. The strictly phonological restrictions on their occurrence with the different types of initials are not completely clear. The prefixes reconstructed for Proto-Tibeto-Burman are very similar to those attested from Written Tibetan: b, d, g, m, ʔ, r, l, s.⁸ At the PLB level, two extra prefixes, both secondary, have been called upon by Matisoff to explain some tonal developments in Loloish (1972a:15,25). They are a vocalic prefix V-, not to be confused with the glottal prefix 'a-chung' attested in Tibetan, and a voiceless consonantal prefix, transcribed as k-, which may have occurred only before resonant initials. A p- prefix is also occasionally reconstructed for PLB. All three derive from whole syllables which became reduced, and are not reconstructed as prefixes at the Proto-Tibeto-Burman level.

1.214 The prefixes interacted with the root initials to form new series of initials, which in turn underwent the evolution which led to the modern tonal systems. In some cases the prefixes are deemed to influence the tone directly across the initial consonant, without having any effect on the consonant itself. This type of explanation was put forward by Matisoff (1972a:15) to explain somewhat exceptional forms in Lahu, and again by Thurgood for similar cases in Lisu. Such a remote control mode of action of the prefixes is difficult to understand from the phonetic point of view.⁹ Since the words which fall into these categories are a much smaller class than those where the tone can be shown to reflect directly the manner of articulation of the proto initial consonant, we will center this review on those tonal developments which can be traced to manners of articulation of the proto-Lolo-Burmese initials.

The manners of articulation of Proto-Lolo-Burmese initials

1.215 Burling (1967:35,69) showed that, in addition to a *voiced and an *aspirate (or non-voiced) series, a *glottalized series was needed in his reconstruction of Proto-Lolo-Burmese to account for the correspondences of initial stops in Burmese, Atsi, Maru,¹⁰ Lisu, Lahu, and Akha. Its existence also explains the tonal reflexes of PLB tone *1 in Lisu and Lahu¹¹ (Burling 1967:61,69). Matisoff (1970) strengthens the probability of a proto-glottalized series by showing it to be at the origin of the Lahu high rising tone. In fact he reconstructs two *glottalized series rather than one at the Proto-Lolo-Burmese level. One is *voiced and the other *voiceless, and they derive respectively from PTB *voiced and *voiceless initials prefixed by a or by 'a-chung (1972a:18). These two *glottalized series are supposed to have merged in all the languages of the family, sometimes leaving divergent tonal reflexes. The existence of a third series of initial stops besides *voiced and *voiceless seems well established. Its phonetic value is less evident. Matisoff (1972a) has chosen a voiced glottalized transcription for the most frequent series, the one which is reflected in the Lahu high rising tone. (In 1970 he had reconstructed most Lahu words in this tone with a voiceless glottalized initial.) Burling uses a voiceless ancestor for his unique series of *glottalized. The question of whether one or two series should be reconstructed remains open. The members of one of them (Matisoff's voiceless one) are treated more like clusters than like united phonemes in the tonal evolution (cf. below section 1.235 sqq.). If two classes of initial elements with glottalization are to be established, an opposition between a *voiceless glottalized series (> Lahu high rising tone) and a series of clusters formed of a plain initial with a 'loosely bound' glottal prefix (*ʔəC), whose tonal reflex is the same as that of plain initials, would be an alternative to the *voiced glottalized/*voiceless glottalized opposition proposed above. The series of simple glottalized phonemes could also be considered as simply 'fortis' at the Proto-

Lolo-Burmese level: PTB prefixed C > geminate > PLB fortis > Lahu voiceless, Burmese aspirate, Maru glottalized, a hypothesis suggested by Haudricourt (personal communication, 1974).

Matisoff (1972a:15-16) completes the picture of the PLB initial stop system by adding two prenasalized series, a voiced one and a voiceless one. While the *voiced prenasalized behaved regularly, as would be expected of simple phonemes, the voiceless ones sometimes demonstrated an independence in their behavior which seems more proper to a nasal + stop cluster than to a united prenasalized phoneme (cf. the Lisu example below, section 1.249).

1.216 For nasals, Burling reconstructed only two manners of articulation: plain, i.e. voiced, and glottalized. Matisoff (1972:24) adds an *aspirated or voiceless series. We will see later the fundamental importance of the three nasal series in the Loloish tonal split.

Resonants were reconstructed in three series, parallel to the three nasal series, by Matisoff (1970). He then came back to only two series, voiced and glottalized (1972a), the series once reconstructed as aspirated being now considered as a cluster of a plain voiced resonant with a 'loosely bound' *kə prefix.

1.217 For sibilants, three series are reconstructed at the Proto-Lolo-Burmese stage: voiced *z, voiceless *s, and "prefixed" *C s (Matisoff 1972a:22). No 'glottalizing' prefix (*s, and *a chung) is supposed to have occurred before sibilant initials, but only *b, *g, and *m-. Since "a prefixed spirant served to trigger the Lahu glottal dissimilation rule: *Cnak > in ʒa¹ (ibid:24), which is otherwise triggered by *glottalized stops or nasals or resonants, and since the slot for *glottalized sibilants is free, I propose to consider these prefixed sibilants as the functional equivalent of the *glottalized. This whole series from stops to sibilants, through nasals and resonants, could be defined for the Proto-Lolo-Burmese stage by the cover term of 'fortis.' The important point for us here is that this

series is consistent in its tonal behavior.

1.18 To summarize, the Proto-Lolo-Burmese system of initial simple phonemes can be reconstructed with a four-way contrast in manner of articulation for initial stops:

- fortis, or glottalized
- voiceless, possibly redundantly aspirated
- voiced
- prenasalized.

A three-way contrast is reconstructed in nasals:

- fortis, or glottalized
- voiceless, or aspirated
- voiced.

The same three-way contrast can be posited for sibilants:

- fortis, alias "prefixed," or 'glottalized'
- voiceless (the functional equivalent of 'aspirated' in stops and nasals)
- voiced.

1.19 There also remained, by FLB times, initial clusters of prefix and root initial which had not coalesced into united phonemes. This is important to remember in order to explain seemingly aberrant tonal developments in a large number of lexical items (cf. Matisoff, 1973c:6-7).

Proto-Lolo-Burmese tones

Three tones are reconstructed on Proto-Lolo-Burmese smooth syllables (i.e., syllables ending in a vowel, a nasal, or a resonant). They are referred to as tone *1, tone *2, and tone and are respectively the ancestors of Modern Burmese low level tone, high falling breathy tone (heavy tone), and creaky tone. No tonal opposition is assumed to have existed on checked syllables,¹³ syllables closed by an obstruent. This architoneme of the proto language is referred to as *checked tone. PTB final is supposed to have disappeared long before FLB times. It is

perhaps represented in PLB by smooth syllables under tone *3. PTB final -l and -r are not supposed to have had any influence on tonal developments.¹⁴

The Loloish Tonal Split

1.220 Burling (1967) and Matisoff (1968, 1970, 1972a, and 1973c) have worked out the correspondences between PLB initials and modern tones, and the development of initial manner oppositions into tonal oppositions separately for smooth syllables and for checked syllables. I will present here a hypothesis to consolidate both into a single process.

1/The checked syllables split:

1.221 Checked syllables have been studied in much greater detail than smooth ones. "Loloish checked syllables fall basically into two great tonal classes", "high-checked" and "low-checked" (Matisoff 1972a:3). The two tone classes have been named "high-checked" and "low-checked" because their modern phonetic realization is respectively high-pitched and low-pitched in eleven of the thirteen Loloish languages analysed in Matisoff (1972a). In the two other Loloish languages, Nasu and Lu ch'lan, the phonetic pitch of the two classes is inverted. Thus the designations 'HIGH' class and 'LOW' class are statistically appropriate for the modern forms of these tones, and in the historical discussion they should be taken as abstract terms. The HIGH class derives from PLB *voiceless initials, and the LOW class from PLB *voiced ones.

1.222 In a number of languages, Lahu (Matisoff 1970), Lisu, Sani, and Ahi (Burling 1967:69, Matisoff 1972a:11), the LOW class has to be further subdivided into two subclasses: reflexes of syllables which had a *plain voiced initial at the PLB level, and reflexes of those which had a *glottalized initial. Hani (as described by Kao Hua-nien) and Nasu may show the same sub

classes, but this is impossible to ascertain in the present state of our knowledge.

1.223 The data as I have just presented it suggests that there occurred in these languages two successive mergers of initial consonants, each resulting in a tonal split. This is not in my opinion what happened; and I wish to restate the data in the languages where those three modern classes appear, by relating the PLB initials directly to the modern tonal classes, without considering the dichotomy of HIGH and LOW as anterior. I will consider only the three best documented languages among them, Lahu, Lisu, and Sani.

In these languages, *checked syllables fall into three tonal classes:

1. syllables whose initial was a *voiced or *prenasalized obstruent have a low glottalized tone in all three languages. Final glottalization in Lahu is a glottal stop; in Lisu and Sani it is only final glottal constriction. The modern values of this tone are very close: Lahu 212, Lisu 212, Sani 212.

2. syllables whose initial was a *voiceless, or 'aspirated' obstruent have a mid (Lisu 352, Sani 44), or a high tone (Lahu 542). The loss of all traces of glottalization in Sani is not explained.

3. syllables whose initial was *glottalized, or 'fortis', have a high tone in all three languages, and have lost all trace of the final glottalization: Lahu 45, Lisu 55, Sani 55. The loss of final glottalization is explained for Lahu in Matisoff (1970) as a dissimilation of the final laryngeal feature by the initial one. The explanation is equally applicable to Lisu and Sani.

What comes out here is a division of the initials in three classes rather than two. Our LOW class (1) corresponds to half of Matisoff's LOW, our HIGH class (3) to the other half of Matisoff's LOW, and our MID (2) to his HIGH.

7/The smooth syllables split

1.224 The tonal split of *smooth syllables has been analysed in detail only for Lahu (Matisoff 1973b:22,24) and for Lisu (Burling 1967, Thurgood 1973). Sani and LU-ch'uan (Matisoff 1973c, after Ma, 1948 and 1951) show a tonal split in *unchecked or 'smooth' syllables which is probably very similar to the Lahu and Lisu developments.

Lahu is the most revealing language of the four. At first sight, it seems that two separate tonal splits occurred in Lahu *smooth syllables, along different lines according as the PLB tone was *1 or *2. Syllables which were under PLB tone *1 have the mid tone [33] in modern Lahu if their initial was *voiceless (*aspirated)¹⁵ or *glottalized. If the initial was *voiced or *prenasalized, the tonal reflex of PLB tone *1 is low falling [21]. Syllables which were under PLB tone *2 have the high falling tone [54] in Lahu if their initial was *voiced, *prenasalized, or *aspirated. If the initial was *glottalized, the tonal reflex of PLB tone *2 is very-low [11].

1.225 The point to be noted here is the behavior of the *aspirates (which, in checked syllables, formed the MID class): under PLB tone *1 they side, in the tonal split, with the *glottalized (which, in checked syllables, formed the HIGH class), under PLB tone *2, they side with the *voiced and *prenasalized (which, in checked syllables, formed the LOW class). This type of behavior is typical of a series of initials which were only marginally involved in a tonal split--as a simple witness of a process of merger and compensatory split which involved the other series of the system. This is what Haudricourt calls a série moyenne:

"Une série tonale moyenne se caractérise par le fait que certains de ses tons se confondent avec ceux de la série basse et les autres avec ceux de la série haute; elle apparaît au cours de la mutation des initiales qui fait apparaître les séries haute et basse et son apparition dépend du système des initiales de la langue considérée." (1954a:157)

1.226 I want to examine here the hypothesis that there occurred in Lahu a two-way split where the *voiced and the *glottalized were the merging series which triggered the compensatory tonal split, and where the *aspirates behaved as a "mid" series (une série moyenne) in the context of which the tonal split did not occur. I will later show that the same process was at work in Lisu, Sari, and possibly LU-ch'üan.

The Lahu tonal split

1.227 If we admit the hypothesis that the *aspirates of Proto-Lolo-Burmese behaved, at the time of the Lahu tonal split, as an uninvolved series, we can present a unified theory for the tonal split on all syllable types, under all proto-tones. The *aspirate obstruents in Lahu remain aspirate to this day, while the *glottalized and the *voiced obstruents merged into a voiceless unaspirate series in modern Lahu. This shows that the *aspirates, as far as the obstruents are concerned at least, did not take part in the merger which affected the rest of the system.

Using the same chart format as Haudricourt (1961), we can schematize the evolution from Proto-Lolo-Burmese to Lahu in the following way.

Table 11
Lahu obstruent initials and tones

| PLB initials and their Lahu reflexes | PLB tones | | *3 | *1 | *2 | *-C |
|--|-----------|--|----|----|----|-----|
| | | | | | | |
| *ʔb (or *bb) > p, *ʔd (or *dd) > t, *ʔg (or *gg) > q | | | 33 | 33 | 11 | 45 |
| *p(h) > ph, *t(h) > th, *k(h) > qh | | | 33 | 33 | 54 | 54ʔ |
| *b > p, *d > t, *g > q | | | 33 | 21 | 54 | 21ʔ |
| *mb > b, *nd > d, *ng > g | | | | | | |

What evolutionary processes link the Proto-Lolo-Burmese forms to

the modern Lahu forms?

1/The split

1.228 Let us suppose that the *glottalized (or fortis) stops determined a series of HIGH allotones of the PLB tones *1, *2, and *checked (*-C, on the chart),¹⁶ and that the *voiced stops determined a series of LOW allotones of these same PLB tones.¹⁷ At some point, the *glottalized and the *voiced series of initial obstruents (first and third lines on table 11) merged into a voiceless unaspirated series (*ʔb > p, and *b > p).¹⁸ This merger brought about the phonologization of the two series of allotones of PLB tones *1, *2, and *checked into full tonemes. The features 'HIGH' and 'LOW', which used to be redundant with the feature 'glottalization/non-glottalization' of the initial, became the pertinent features which kept apart the two series of syllables: two series of tones were phonologized. By then, the distinctive features of the tonal system were arranged along two axes: the features which used to distinguish the PLB tones are along one axis, and the new feature HIGH/LOW along the other.

Table 12
Correlations of initials and tones in Pre-Lahu

| <u>Initials</u> | | <u>Tones</u> | | | |
|-----------------|---------------|--------------|-----|-----|-------|
| p, t, q | < *ʔb, ʔd, ʔg | *3 | *1H | *2H | *-C.H |
| | < *b, d, g | | *1L | *2L | *-C.L |
| ph, th, qh | | *3 | *1 | *2 | *-C |

Meanwhile, the PLB syllables which had aspirated initials did not suffer any loss of distinctive features of their initial segment. The *aspirate stops are still aspirate in modern Lahu (second line on table 11).¹⁹ The tones which were pronounced on these syllables had no reason to be modified, and they prob-

ably remained close to the original value of the PLB tones for some time. In syllables beginning with an *aspirated obstruent the PLB tones did not split.

1.229 When the merger of the *glottalized and *voiced initials had resulted in the phonologization of two series of tones, there was, in the synchronic system of that period, a seven-fold tonal opposition in syllables beginning with a voiceless unaspirated initial (p, t, k, q²⁰): *3 unsplit, *1 HIGH, *1 LOW, *2 HIGH, *2 LOW, *checked HIGH, *checked LOW. In syllables beginning with an aspirate (ph, th, kh, qh), there was only a four-fold tonal opposition: *1 unsplit, *2 unsplit, *3 unsplit, *checked unsplit.

In this system, the old unmerged series, the aspirate, acted as a context in which the new born tonal correlation (HIGH/LOW) was neutralized into an architonemic series.²¹ This does not mean that any tonal oppositions available at an earlier period were lost in the context of aspirate stops, it simply means that the distinctions which were created after unaspirate initials to compensate the loss of distinctive features suffered by these consonants were not created after aspirate initials.

2/The simplification of the system

1.230 At this point the question is: were the three architonemes occurring after aspirate initials going to be phonologized into a third series of tones contrasting with the HIGH and the LOW series, or were they going to merge with members of these two series?

In *checked syllables there had been no tonal opposition in the proto-language, so that the number of tones born from the merger and split was small. In this type of syllables the original value of the architoneme was kept and phonologized into a third toneme standing in contrast with the two tonemes born from the split. Thus we have in the modern language three separate reflexes of PLB *checked tone, which are, in origin, two tones

and their architoneme.

In non-checked syllables, the number of tones after the split was much larger. If the architonemes had been phonologized jointly with the tonemes, the system would have had seven open tones. In this case, the architonemes did not keep their original values, but each merged with one of the two tonemes which shared all its distinctive features but for the feature HIGH/LOW --that is, each one merged with one of the two tonemes deriving from the same PLB tone as itself. No loss of pertinent feature was involved in this merger: since the architoneme never possessed the feature HIGH or LOW, it could add either to the list of its distinctive features. Whether the architoneme became confused with its HIGH toneme or with its LOW toneme had no importance whatsoever from the functional point of view. Thus inside each series of tones defined by a common PLB ancestor, the architoneme merged with the toneme which was phonetically most similar to itself. In the series of tones deriving from PLB tone *1, the architoneme merged with the HIGH toneme, in the series deriving from PLB tone *2 with the LOW toneme.²²

1.231 To understand the phonologization of the architoneme into a third toneme in syllables deriving from *checked syllables, it is necessary to study the system as a whole. With the system of simple initial obstruents which we have posited so far, this phonologization is not justified by any distinctive need. It can only be explained as due to a restructuring of the system such that *checked HIGH became an open tone, *checked LOW (21^o) was reinterpreted as the checked partner of *1 LOW (21), and the *checked architoneme (54^o) was reinterpreted as the checked partner of *2 LOW (54) (see Table 11, section 1.227). The mergers which occurred in nasal initials, and those which were caused by the reduction, between Proto-Lolo-Burmese and Lahu, of some initial clusters to simple consonants, can explain the phonologization of the architoneme by distinctive needs.

Lahu nasal initials

1.232 In Proto-Lolo-Burmese three series of initial nasals are reconstructed. Evidence for the reconstruction of *plain voiced and *glottalized nasals survives in segmental form in the Burmish branch. The *plain voiced nasals are voiced in Atsi, Maru, and Burmese; the *glottalized ones are glottalized in Atsi and Maru, aspirated in modern Burmese (Burling 1967:40-41). In Loloish their opposition is attested by tonal reflexes at least in Lahu and Lisu. In Akha, Nasu, and Lü-ch'üan the contrast of the two series was lost (Matisoff 1972a:24).

In Loloish *checked syllables, the tonal reflexes of syllables which reconstruct to Proto-Tibeto-Burman nasal initials prefixed by a sibilant (*s-m...) and prefixed by a glottal (*ʔ m...) are not the same. This observation led Matisoff (1972a:24-25, 1973c:26) to suppose that PTB *s- and *ʔ- prefixes, which had merged before initial stops²³ by the Proto-Lolo-Burmese stage, had not merged when they preceded a nasal initial, but were reflected, in Proto-Lolo-Burmese, by the opposition of a *glottalized nasal series (< *ʔ-m...) to a *voiceless nasal series (< *s-m...).

1.233 In Lahu *checked syllables, the three series of PLB nasal initials have respectively the same tonal reflexes as the three stop series: *ʔm- > m- + tone 45, *hm- > m- + tone 54?, *m- > m- + tone 21?. For *smooth syllables correspondences and reconstructions remain to be substantiated. Pending more comparative evidence, we can assume that the tonal split followed the same lines in syllables with nasal initials and in those with stop initials. Thus we expect to find three tonal classes in *smooth syllables as we did in *checked ones, and we expect them to be defined by the same three features of the proto-initial--glottalization, aspiration, voice.

In modern Loloish languages, and in Lahu among them, the number of tonal contrasts on smooth syllables is the same with a nasal initial and with a stop initial. Thus the same type of

mergers of the MID series with either the HIGH or the LOW series must have reduced the number of tonal contrasts. Whether these mergers followed the same lines as when the initial was an obstruent is a matter of conjecture.

Table 13
Probable evolution of Lahu nasals

| PLB initials and their Lahu reflexes \ PLB tones | *3 | *1 | *2 | *-C |
|---|----|------|------|-----|
| *ʔ _m > m | 33 | 33 | 11 | 45 |
| *hm > m | 33 | (33) | (54) | 54ʔ |
| m | 33 | 21 | 54 | 21ʔ |

The labials symbolize the series to which they belong.

1.234 We can suppose that the architonemes deriving from the MID series of nasals(*hm, *hn, *hŋ) merged with the tonemes born from the split according to the same pattern as in syllables deriving from *aspirate stop initials, a hypothesis which I have indicated between parentheses on the chart. This is impossible to ascertain from internal evidence. Confirmation or disproof has to come from comparative evidence drawn from languages where no loss of distinctive feature occurred in the evolution of the nasal series.²⁴

Already, the evidence of the complete merger of the three series of initial nasals into a plain voiced series, resulting in a three-fold tonal contrast in the modern reflexes of *checked syllables, is enough to raise an interpretation problem. Since the tonal system in modern Lahu appears to be largely redundant with features of the initial when the initial is a stop, should we suppose that the merger of the three series of nasals was the cause of the tonal split? If so, should we believe that there occurred a three-way split triggered by the simultaneous merger of the three series of nasals rather than the two-way split with

an architonemic series which I have proposed? I will come back to this question after examining the rest of the PLB initial system in relation to the development of tone.

Lahu reflexes of PLB initial clusters

1.235 Instead of considering only supposedly single initial consonants of the Proto-Lolo-Burmese level, as we did above in section 1.227, let us now take into account the complete obstruent system of Proto-Lolo-Burmese. Following Matisoff (1972a: 23),²⁵ and grouping the initials according to their tonal class in Lahu (and in Loloish as a whole), we can draw the following evolutionary chart:

Table 14
The development of PTB prefixed and unprefixed
initial obstruents into PLB and Lahu

| | PTB | PLB | Lahu initial | Tonal class |
|-----|--------------------|-----------------------|-----------------|-------------|
| (1) | *C ^S -b | *ʔb | p | HIGH |
| (2) | *p | *p(h) | ph | |
| (3) | *C ^S -p | *ʔp | p | MID |
| (4) | *N-p | *mp(h) | b | |
| (5) | *b | *b | p | |
| (6) | *C _V -b | *C _V -b } | | |
| (7) | *C _V -p | *C _V -p(h) | ph | LOW |
| (8) | *N-b | *mb | b | |

The labials stand here for the whole series to which they belong. N- stands for 'nasal prefix', C- for 'oral prefix', C^S- (from C^{surd}) stands for 'voiceless oral prefix', PTB *s- and *ʔ-, C_V- (from C_{voiced}) for 'voiced oral prefix', C_V^S- will be used when all oral prefixes are supposed to have had the same effect on the initial and the tone.

Lines (1), (2), (5), and (8) have been dealt with above (section 1.227 sqq.), as being simple initials at the Proto-Lolo-Burmese level.

1.236 Line (7) is a rare evolution. The lexical items of this small category include 'goat' Lahu á-chèʔ, 'six' Lahu khòʔ, 'leaf' Lahu á-phàʔ. To explain the anomalous occurrence of tone 21ʔ (belonging to the LOW series of tones) with an aspirate initial (belonging to the MID---Matisoff's HIGH---series of initials), Matisoff (1972a:15) supposed the presence of either of two prefixes, a vocalic one V, or a voiced consonantal one C_v-, whose effect was that of a pitch depressor: they caused the tone of a syllable of the MID class (Matisoff's HIGH) to join the LOW class, without affecting the manner of articulation of the initial. The three items quoted above reconstruct as: 'six' *C_v-krok (set 35), 'goat' *V-cit (set 27), 'leaf' *V-pak (set 29).

1.237 Matisoff would now prefer a different reconstruction of the word 'six.' He would favor the idea of a 'loosely bound' prefix, so that 'six' would be: PLB *kə-rok > *kə-ròʔ > Lahu khòʔ. He also observed that, in such a tiny group, a very rare prefix, á-, occurs twice (personal communication, 1974). This might point to a totally different type of explanation. Both the 'loosely bound' and the vowel prefix are syllabic. If we admitted that the proto-language was polysyllabic the evolution would be straightforward. In modern Lahu, when the prefixed syllable is a vowel, it has the high rising tone á- (my HIGH class); the reconstructed 'loosely bound' prefix is voiceless kə- (my MID class, Matisoff's HIGH) in both cases the prefixed syllable is non-LOW.

If the second syllable is reconstructed with a *voiceless (aspirated) initial, as Matisoff proposed, its tone is of the MID series, i.e., it is an architoneme (cf. section 1.229). This means that the feature HIGH/LOW had no value on the second syllable, so that in contrast to the first syllable, which was high,²⁶ the second syllable was relatively low, and was eventually phono-

logized as low. This development could only occur on a disyllabic word.

1.238 If the proto-language is supposed to have been quite monosyllabic, I would prefer a different reconstruction. Some lexical items of this class correspond in Jingpho to high-stopped tone syllables,²⁷ a category which usually corresponds to Lahu words which reconstruct in the *glottalized, *voiced or *pre-nasalized series of initials, e.g. 'goat' Jg tšít-sà (properly 'deer'), 'six' Jg krúʔ²⁸ (Matisoff 1972c:48). Suppose that instead of reconstructing an *aspirated (alias *voiceless) initial, we reconstruct a *voiced. That would account for the tonal development without requiring the intervention of any other broad evolutionary trend than the one we have already seen at work, and by which the manner of articulation of the proto-initial determines the tonal class of the reflex. Then we can treat the aspiration of the modern initial as a secondary development, possibly due to some prefix. Only comparative evidence could decide what that prefix should be, and whether it is to be reconstructed as a recent prefixation, or whether it should be put back to the proto-Lolo-Burmese or the Proto-Tibeto-Burman level, or even further back in time. So line (7) in the chart in section 1.235 will be written:

(7) PLB *X-b > Lahu ph + LOW tone class.

1.239 In fact the presence of a *X- prefix before the reconstructed *voiced initial is necessary only to differentiate line (7) from line (5): PLB *b > Lahu p + LOW. Matisoff's reconstruction provides two sources for Lahu plain voiceless initials on low tone:

(5) PTB *b > PLB *b > Lahu p + low

(6) PTB *C_v-b > PLB *C_v-b > Lahu p + low.

If all modern Lahu voiceless unaspirate initials on low tone were derived from prefixed *voiced initials (line 6), we could derive Lahu modern aspirate initials on low tone from plain unprefixed *voiced initials, an evolution attested in Tibetan.

Line (7) could then be written:

(7) PTB *b > PLB *bh > Lahu ph + low.

There is one strong objection to this hypothesis. We said that the words of this class are few: is it likely that a plain voiced initial would be much rarer than a prefixed one?

1.240 Whether we retain the pair:

(5 6) *C_v-b > Lh. p + LOW

(7) *b > Lh. ph + LOW

which I tend to prefer, or the triplet:

(5) *b } > Lh. p + LOW

(6) *C_v-b }

(7) *X-b > Lh. ph + LOW,

we now have a chart where the manner of articulation consistently determines the modern tone, while the old prefix determines the modern manner of articulation, an observation which Matisoff (1972a:20) has already made in spite of the exception represented by his derivation of ph + LOW from a *voiceless initial.

Table 15

A tentative revision of Table 14

(The modified lines are marked with an arrow.)

| | PTB | PLB | Lahu initial | Tonal class |
|--------|---------------------------------|--------------------|-----------------|-------------|
| (1) | *C ^S -b | *ʔb | p | HIGH |
| (2) | *p | *p(h) | ph | |
| →(3) | *C ^S _v -p | *ʔp | p | MID |
| (4) | *N-p | *mp(h) | b | |
| →(7) | *b | *bh | ph | |
| →(5-6) | *C _v -b | *C _v -b | p | LOW |
| (8) | *N b | *mb | b | |

1.241 The interpretation of Lahu initial p with LOW tone as deriving from PTB *C_v-b (line 5-6) is parallel to that of initial

p with HIGH tone as deriving from PTB *C^S-b (line 1). These are the two series the merger of which is held responsible for the tonal split (cf. section 1.228). Should we posit two very different PLB forms (*ʔb versus *C_V-b) for phonemes whose origin in Proto-Tibeto-Burman and modern form in Lahu are very similar? Haudricourt (personal communication) criticized the idea of a *voiced preglottalized stage at the Proto-Lolo-Burmese level on the grounds that the devoicing of a voiced preglottalized series is a rare phenomenon.²⁹ We could rather suppose that an initial cluster turned into a geminate, and into a fortis, e.g.:

(1) *C^S-b > *pp > *p HIGH > Lh. p + HIGH

(5-6) *C_V-b > *bb > *p LOW > Lh. p + LOW.

It is impossible to say at which stage the tonal split might have occurred.

1.242 From the observation that the manner of articulation of the root initial consistently determined the modern tone yet another hypothesis arises. The relation between Proto-Tibeto-Burman initials and modern tones is evident for the MID and LOW class. But the HIGH class looks like an offshoot of the LOW class, a special case of PTB *voiced initial, which is Matisoff's interpretation of it. I think that this class must have acquired the status of an independent series before the tonal split. Its distinctive feature could be *glottalization or a fortis character, as we have supposed until now. Considering though that redundant aspiration is claimed for the ancestors of the MID series, it would not be impossible to reconstruct the ancestors of the HIGH class as *plain voiceless at the time when the split occurred. The reconstruction in this hypothesis would be the following:

Table 16

Another view of the development of PTB initial stops
(with and without prefixes) into modern Lahu

| | | | | | |
|-------|---------------------------------|--------|------------------------|----|------|
| (1) | *C ^S -b | *(C)-p | *(C)-P _{high} | p | HIGH |
| (2) | *p | *ph | *P _{mid} | ph | |
| (3) | *C _v ^S -p | *C-ph | *C-P _{mid} | p | MID |
| (4) | *N-p | *N-ph | *N-P _{mid} | b | |
| (7) | *b | *b | *P _{low} | ph | |
| (5-6) | *C _v -b | *C-b | *C-P _{low} | p | LOW |
| (4) | *N-b | *N-b | *N-P _{low} | b | |

Capital P symbolizes the archiphonemic stage, when the old manners of articulation had been replaced by tonal contrast, and when the new ones had not emerged yet from the coalescence of the prefixes with the root initial. This reconstruction implies that the prefixes had not coalesced with the initials before the tonal split. It might even imply that the prefixes were syllabic.

Matisoff (1972a:31) mentioned the existence of a few "Lahu syllables under the high rising tone // with aspirated initials [which] are late developments that are poorly understood." He also pointed out to me some syllables under the high rising tone with voiced initials (e.g. ~~ʃ~~?-bá 'plank'). These forms fill the empty slots of the HIGH class. Did they develop into what they now are in a recent restructuring of the system, tending to liken the 'exceptional' HIGH class to the two others? Do they on the contrary reflect an older stage where the three tonal classes were on a par? This would imply a complete revision of the reconstructions proposed until now.

1.243 Many other questions are open. If we compare lines (1), (5-6), and (3), we find a merger of three series of initials, where an old segmental opposition is now replaced by tonal contrast. The nasals (section 1.234) show the same end result: the

three proto-series of initials are now reflected by three different tones in *checked syllables. Are we justified in speaking of the merger of two series of initials only, and to consider the third one as tonally neutral? Should we rather believe that the simultaneous merger of three series led to a three-way tonal split where subsequent conflations reduced the number of tones in *smooth syllables?

Whatever the details of the phonetic reconstructions, I think that we can answer negatively to this question. It seems clear that one of the classes of initials acted as systemically neutral, rather than only as phonetically mid. The fact that the conflations which followed the split always involved a member of the MID series cannot be mere chance. As we will see presently, this pattern is not found only in Lahu but also in Lisu and Sani.

Sibilant and resonant initials

1.244 Sibilants have to be mentioned because they are the only series of initials where irregularities occur. In syllables derived from PLB *checked syllables, the three tonal classes are evident. The part of the *glottalized is played by prefixed sibilants. For liquids, a series of *glottalized is reconstructed.

The sibilant equivalent of the PLB *aspirate stops reconstructs to a simple non-prefixed *s- at the Proto-Tibeto-Burman level. Its tonal reflex in *checked syllables is 54?, as expected. With resonants, the series which developed a MID tonal reflex, 54?, for *checked syllables does not reconstruct to an aspirated series in Proto-Lolo-Burmese, but to a 'loosely bound voiceless prefix', which is symbolized by kə- (Matisoff 1972a:24-25). The modern segmental reflexes of these clusters are not homogeneous, but their tonal reflex is always 54?.

The LOW series of sibilants and resonants was *voiced like the stops.

Table 17
Lahu reflexes of syllables
with *sibilant or *resonant initials

| PLB initials and their Lahu reflexes | PLB tones | *3 | *1 | *2 | *-C |
|---|--------------|----|----|------|-----|
| *C-s > s, *ʔy *ʔr *ʔl > h, *ʔw > f | | 33 | 33 | 11 | 45 |
| *s > s, *kə-l > h, *kə-r > r | | 33 | 33 | (11) | 54? |
| *z > y, y, r, l | | 33 | 21 | 54 | 21? |

1.245 The reflexes of the series of MID syllables are difficult to explain. Matisoff (1973b:24) presents a chart of combinations of initials and tones, from which it appears that s-, h-, and f-, do not occur with the high falling (open) tone, 54. For f-, the chart above provides an historical explanation: this initial comes from *ʔw, a member of the HIGH series, which never developed this tone (cf. charts in sections 1.227 and 1.233). With an s- initial, though, we would expect tone 54 to occur, as a reflex of PLB syllables under tone *2 with an *unprefixed voiceless sibilant initial (the intersection of the third column and the second line on the chart). What is then the modern reflex of this combination? It seems that these forms are now under tone 11.³⁰ If this is confirmed, it shows that the architoneme derived from *2 merged with its toneme of the LOW class when the initial was a stop, but with its toneme of the HIGH class (phonetically low in modern Lahu by a secondary evolution) when the initial was a sibilant. This is unexpected, since this merger is both an exception, as compared to the general evolution represented by the stop-initialled syllables, and uneconomical. The 'regular' merger, MID with LOW when the proto tone was *2, would have involved no loss of pertinent features, due to the shift of *z to y. This one does. I have no explanation to offer.

1.246 Some elements towards a solution may be contributed by the lexical item 'three.' This word has in Lahu two doublet forms:

šē (11), and šēʔ (54ʔ), which is the most common form. These two forms are phonetically remote. In the system of the time of the split (as symbolized on the chart) they are both neighbors of the slot *2-MID. Comparative evidence shows that 'three' reconstructs to tone *2 (Matisoff 1972c:28). If we reconstruct its initial as non-prefixed *s-,³¹ it belongs to the MID series, and its tonal reflex should occupy this central problematic slot in the chart. With this reconstruction both members of the doublet would derive from a single proto-form.³²

The Lisu tonal split

1.247 The same correspondences between Proto-Lolo-Burmese series of initials and modern tones are found in Lisu. According to Matisoff (1973c:27) and Thurgood (1973:31 and charts 1 and 2) the reflexes of Proto-Lolo-Burmese simple initial stops are the following:

Table 18
Lisu initial stops and tones

| PLB initials and their Lisu reflexes | PLB tones: | | | |
|---|------------|-----|----|----|
| | *3 | *1 | *2 | *- |
| *ʔb (or *bb) > p | 33ʔ | 33ʔ | 55 | 55 |
| *p(h) > ph | 33ʔ | 33 | 21 | 33 |
| *b > b | 33ʔ | 33 | 21 | 21 |

The value of final -ʔ in Lisu is simply laryngealization of the vowel; there is no glottal stop.

Some similarities and differences with the Lahu evolution come out immediately. Three tonal classes appear in *checked syllables. These classes are defined by the same features as in Lahu: the initial is *glottalized, or fortis in the HIGH class, *voiceless (aspirated) in the MID class, and *voiced in the LOW class. The

modern values of the Lisu tones are more faithful to the three classes as we supposed they emerged from the tonal split: the tones of the HIGH class are consistently higher pitched than those of the two other classes.

The mergers which occurred in smooth syllables after, or more likely during, the split follow slightly different lines than in Lahu. The architoneme of the series of tones deriving from PLB tone *1 merged with its LOW partner, as did the architoneme deriving from PLB tone *2. This might suggest that the *glottalized series was more marked in Lisu than in Lahu.

1.248 The most important peculiarity of Lisu is that there was no merger of the initial *glottalized and *voiced stops. The *glottalized are now plain voiceless stops, as in Lahu, but the *voiced did not lose their voicing. Thus after obstruent initials, the Lisu tonal system would still be entirely redundant if only simple initials were involved.

The Lisu tones carry their full distinctive load after nasal initials since the three series of nasals have merged into a single series of plain voiced nasals. The three series of nasals determine three classes of tonal reflexes, along the same lines as the stop initials. But Matisoff's chart (1972a:24) gives the normal tonal reflex of a *voiceless nasal initial in *checked syllable as [33?], while the tonal reflex of *aspirated stop initials in *checked syllables is [35?]. It can be observed that the PLB voiceless nasals *hm, *hn, and *hŋ are supposed to derive from PTB *s-m, *s-n, *s-ŋ clusters. On the other hand, the tonal reflex [33?] is observed on syllables which reconstruct to the PLB clusters: *s-b, *s-d, *s-g. The divergent reflexes of the Proto-Lolo-Burmese voiceless nasals might reflect different degrees of cohesion of the prefix with the root initial: if the two segments had coalesced into a voiceless nasal phoneme by Proto-Lolo-Burmese times, the tonal reflex became the same as that of *aspirated stops. If they still behaved as a cluster, the tonal reflex remained the same as for clusters of an s- prefix with a voiced stop initial (Thurgood 1973:6-9). Let us give an example

to show the double treatment of *s + nasal clusters:

'eye' PLB *s-myak Lisu myɛ 33ʔ

'heart' PLB *s-nik Lisu ni 35ʔ (-ma 33ʔ)³³

1.249 The clusters formed of a nasal prefix with a *voiceless (aspirated) stop initial also developed a 33ʔ tone in *checked syllables. We can now introduce on the chart this extra tonal reflex of *checked syllables.³⁴ The analysis of *smooth syllables is not detailed enough to say whether more subclasses will be needed there too or not.

Table 19
Lisu stop and nasal initials and tones

| PLB initials and their Lisu reflexes | PLB tones: | | | |
|---|------------|-----|----|-------|
| | *3 | *1 | *2 | *-C |
| *ʔb or *bb > p | | | | 55 |
| ----- | 33ʔ | 33ʔ | 55 | ----- |
| *s-b > p | | | | 33ʔ |
| *p(h) > ph | | | | 35ʔ |
| *k-m (or *s-m) > *hm > m | | | | ----- |
| ----- | 33ʔ | 33 | 21 | ----- |
| *s-m > m | | | | 33ʔ |
| *N-p > b | | | | ----- |
| ----- | 33ʔ | 33 | 21 | 21ʔ |
| *b > b | | | | |
| *m > m | | | | |

The Sani tonal split

1.250 In Sani, one of the rare languages where PLB tone *3 split, we find that the merger of initials and the compensatory tonal split occurred along the same lines as in Lahu and Lisu. The only differences are in the mergers of the architonemes with the tonemes. A chart will show the similarities and differences

most clearly (after Matisoff 1973c:28, completed by personal communications from Stephen P. Baron and Graham Thurgood³⁵):

Table 20
Sani initials and tones

| PLB initials and their Sani reflexes | PLB tones: *3 *1 *2 *-C | | | |
|---|-------------------------|------|------|-----|
| *ʔb (or *bb) > p, *ʔm > m | 44 | 55 | 44 | 55 |
| *p(h) > ph, *hm > m | 44 | 33 | 11 | 44 |
| *b > { _b ^p , *m > m | 33 | p+33 | b+11 | 22ʔ |

The three proto-series of initials which determine the three tonal classes HIGH, MID, and LOW are defined by the same features as in Lahu and Lisu: *glottalized, or fortis, *voiceless or aspirate, *voiced. The modern values of Sani tones consistently show a higher phonetic pitch for the series of tonemes deriving from *glottalized³⁶ initials, and a lower pitch for those deriving from *voiced initials. This is a justification for the terms HIGH and LOW series which I have used.

1.251 In Sani, as in Lahu and Lisu, the two tonemes and the architonemes were phonologized into three tones in *checked syllables. In *smooth syllables the architonemes deriving from PLB tones *1 and *2 merged with the corresponding toneme of the LOW class, as in Lisu. The architoneme deriving from PLB tone *3 merged with the corresponding toneme of the HIGH class.³⁷

The other Loloish languages

1.252 Ahi, Nasu, Lü-ch'üan, and Akha also show traces of the tonal split in their *checked syllables (Matisoff 1972a:11).

Table 21

Tonal reflexes of the *checked tone
according to *initials in Ahi, Nasu, Lü-ch'üan, and Akha

| PLB initials and their modern reflexes | Tonal reflexes in *checked syllables | | | | |
|---|--------------------------------------|------|-------|-----------|-----------------|
| | Ahi | Nasu | | Lü-ch'üan | Akha |
| | | *ʔr | other | | |
| *ʔb > b, *ʔm > m | 55 | 34 | 55 | 55ʔ | LS ^a |
| *p(h) > ph, *hm > m | 44 | | 32ʔ | 22ʔ | HS |
| *b > b, *m > m | 44ʔ | | 55 | 55ʔ | LS |

a. LS stands for 'low-stopped', HS for 'high-stopped'

In Ahi and Nasu, dissimilation between initial and final glottalization turned *checked tones of the HIGH class into open tones, as in Lahu, Lisu, and Sani. This did not happen in Lü-ch'üan and Akha: although the *checked character of the syllable is reflected by a simple constriction on the vowel, this is still different from the reflexes of *smooth syllables. The LOW *checked syllables of Nasu, however, became open, like the *glottalized.

1.253 From the chart above it appears that three tonal classes are distinct in Ahi, and partly distinct in Nasu. The Lü-ch'üan and Akha reflexes suggest that the tonal split might have followed different lines in these two languages. The *glottalized and the *voiced series have the same tonal reflex: 55ʔ in Lü-ch'üan; low-stopped in Akha. It looks as if the split involved only two classes. *Voiced and *glottalized, whose common feature is voicing in Matisoff's reconstruction, could be considered to have been opposed jointly to the *voiceless series.

Akha smooth syllables are not supposed to have undergone any tonal split. For Ahi and Nasu, no analysis of *smooth syllables exists. For these three languages we cannot propose any interpretation. But for Lü-ch'üan we find some information on the rest of the system in Matisoff (1973c:19,28).

Table 22
A preliminary view of Lü-ch'üan evolution

| PLB initials and their Lü-ch'üan reflexes | PLB tones: | *3 | *1 | *2 | *-C |
|--|------------|--------|----|-------|-----|
| | | | | | |
| *ʔb > p, *ʔm > m | | | 33 | 33,11 | 55ʔ |
| *p(h) > ph, *hm > m | | 11,22ʔ | 33 | 55 | 22ʔ |
| *b > b, *m > m | | | 11 | 33 | 55ʔ |

Values separated by a comma are both attested, and the conditioning is unknown.

1.254 From this it appears that three classes of initials have to be taken into account. PLB tone *2, when the initial was *glottalized, developed "sporadically" the low level tone, while it developed into a high level tone when the initial was *voiceless, and into a mid level tone when the initial was *voiced. Although much more research has to be done on Lü-ch'üan before we can understand the process of tonal split in that language clearly, I think that the influence of the *glottalized initials cannot be ignored even if it seems inconsistent. Against the hypothesis of a simple binary opposition between a *VOICED series, including the *glottalized and the *voiced, and a *voiceless series, we may also note that the tonal reflexes of *glottalized and *voiced on Proto-Lolo-Burmese tone *1 are different, and that, in this case, the *glottalized side with the *voiceless against the *voiced.

1.255 Nevertheless, we would not expect the tonal reflexes of the two series which we have supposed to be the active ones in the split to have merged as they did on tones deriving from PLB tone *2 and *checked. We would expect the architonemic series to be involved in such mergers, as it was in Lahu, Lisu and Sani. Could this observation lead us to posit a different MID series for Lü-ch'üan? The series of tones deriving from *glottalized initials

seems to be the architonemic series for Lü-ch'üan.

1.256 Another puzzling question in Lü-ch'üan is the conditioning of the tonal split in tone *3 syllables. Only in Lü-ch'üan and Sani have I seen reported a split of tone *3. The uncovering of its conditioning would not only help us understand the mode of action of the different classes of initials in the process, but should also tell us something about the possible phonetic value of tone *3 in Proto-Lolo-Burmese. If tone *3 is characterized by a particular phonation type, as is currently admitted, rather than by melodic features, the results of the interaction of different manners of articulation of the initials with this phonation type in the final should narrow the range of possible phonetic definitions of tone *3.

1.257 Can we find a common principle for the tonal split in all the Loloish languages that we have examined? It may be observed that, in all the Loloish languages, including Nasu, Akha, and Lü-ch'üan, the one series of phonemes which consistently changed phonetically from Proto-Lolo-Burmese to the modern languages is the *glottalized, or 'fortis' series.³⁸ Secondly, this change always went in the direction of simplification; the modern reflexes of these phonemes are all 'plain' according to general phonetics. The obstruents and the sibilants became voiceless unaspirated, which is the most unmarked character for these classes of phonemes, and the nasals became voiced, which is also the unmarked member among possible nasal phonemes. Thirdly, the process of simplification of the *glottalized or fortis into simple plain phonemes resulted in mergers with members of other series, sometimes the *voiced series, as in Lahu, sometimes the *voiceless series, as in Akha.³⁹ In most languages whichever merger resulted from the simplification of the *glottalized can be regarded as the trigger of the tonal split. The series which did not enter into a merger with the *glottalized acted as a context in which the tonal split did not occur, what I have called a MID series. In Lahu and Lisu the MID series is the *voiceless (aspirated). In a

second stage, when the simplification of the MID series occurs (especially with nasal initials), this phonologizes the architecture of some vertical series, thus resulting in a three-way split as compared with the original system.

In some cases (Lü-ch'üan) the mergers of initials resulting from the simplification of the *glottalized were only partial: they occurred under the *checked tone and partly under tone *2. In such cases, this merger did not trigger the tonal split. The tonal split occurred only later, when the *aspirated nasals lost their aspiration, thus merging with the *voiced. In this split the *aspirates were the fortis series and what was left of the *glottalized series acted as a MID series. For languages like Lü ch'üan, the tonal split starts at what is the second stage for the others.

1.258 Should we suppose that the tonal split occurred in Common Loloish? I do not believe it. Certainly, similarities are numerous, so much that it is not likely that the split occurred in each language entirely independently. I think this is a case of parallel development, such that the elements for the split, and its motive forces were present in the common language. But the process of merger of initials and compensatory tonal split was probably not even started in Common Loloish.

Conflations of architonemes with tonemes sharing some distinctive features with them have to occur during a tonal split.⁴⁰ Once the tonal system has been phonologized the original structural relations existing between the tones disappear, and are eventually replaced by others. Confusions of tones then occur only according to phonetic proximity. They do not involve tones with a common etymology any more than others. This is what is happening in modern Lahu where young speakers now tend to confuse tones 11 and 21, which had no common feature in the original system (personal communication from J. Matisoff). To me, the fact that most of the mergers between tones born from the split occurred inside the same line or the same column is a proof that they occurred right after the split or during the split. Since these mergers involve dif-

ferent tones in each language, we have to suppose that the languages separated at the latest while the split was occurring, and most probably before it.

1.3. BODISH INITIAL MUTATION

Tibetan

1.301 We have seen a large number of cases where a reduction in the number of oppositions 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.⁴¹ When a voicing correlation disappears in non-tonal languages of Southeast Asia it is more readily replaced by a phonation-type opposition, often accompanied by a multiplication of vowel qualities, rather than by properly tonal oppositions. Such systems are commonly referred to as "register" systems.⁴² 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."

1.302 Both typologically and in their historical origin register systems and tone systems are very similar. Shorto (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) likens the consonantal mutation which led to the Mon Khmer registers to that which led to tonal splits in Southeast 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 tons d'Extrême-Orient dont il a été question [in Haudricourt (1961)]. 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..."

1.303 The Lhasa dialect of Tibetan provides an example of the birth of tonal, or should we say register, contrast in 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 (1972a:91,195) states that the two tones he reconstructs for Sino-Tibetan had been lost by Written Tibetan times. For those who believe that no tones are to be reconstructed in Proto-Tibeto-Burman, the absence of tones in Proto-Tibetan is self-evident.

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 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 ṣ and ṣ̣, or between s and ṣ,⁴³ not in the consonant, but in the Tone, pronouncing ṣ and s with a high note (as my Tibetan authorities were wont to describe it 'with a woman's voice', shrill and rapidly), ṣ̣ and ṣ, 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 spelling rules and reading rules, but rarely do they say anything as detailed and insightful as Jäschke's remarks on tones.

The tones of modern Tibetan

1.304 In the past twenty years detailed phonetic studies of the pronunciation of modern Central Tibetan have appeared. Some of them systematically correlate pronunciation and spelling, and are thus useful for diachronic analysis. Among those we may mention Sedláček (1959) and Richter (1964). These studies have to be used with caution, however, since their authors' aims did not include the structural analysis of sound change. Sedláček 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 p'al-skad."

1.305 Richter on the other hand did a strictly 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 overdifferentiation, some accidental phonetic realization being taken as the norm for the particular context where it occurred.

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

1.306 In spite of very real divergences in description, there is some agreement at least among those descriptions where the material is phonologically analyzed, as Sprigg⁴⁴ (1954, 1955,

1972), R. A. Miller (1955), Chang and Shefts (1964) and Betty Shefts Chang (1968a,b,c,d). 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 divergences come up when the authors consider the modern reflexes of old final consonants. For Shefts, the disappearing finals left behind laryngealization and, when this laryngealization is itself deleted, a falling tone. This contrast between a falling tone and a non-falling tone, 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 Sheft's informant, remarked 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 Sheft's analyses may be due to differences in the level of speech used by their informants. We will treat the tonal features linked with the finals later (section 2.2). We will first consider only the link between the high and low tones, or series of tones, and the old manners of articulation of the initial consonants.

The distributional relation of tones and word-initials

1.307 The distributional relation of tones and word-initials in modern Central Tibetan is 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 and do not dismiss the possibility of redundant voicing for some phonemes. Sprigg's system (1955) can be interpreted in the same terms: high-toned words can have a voiceless aspirated or a

voiceless unaspirated stop 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 "unaspirated," and the two systems are equivalent. R. A. Miller's material (1955a,b) needs some comments before it can be compared to Sprigg's and Shefts'. Miller reports for Central Tibetan⁴⁵ two series of initial stops on the low tone, voiceless and voiced, both unaspirated (1955a:52, and b:46). These two can be easily correlated to the two series reported on the low tone by Sprigg and Shefts.

1.308 On the high tone Miller's analysis diverges (1955b:46). He reports three series: voiceless unaspirated, voiceless aspirated, and voiced. He is the only author to report voiced initials on the high tone. But note that until now we have been talking only of the relation of word-initials to tone. In Miller's examples (1955b:49-50) there is not a single example of a voiced word-initial on the high tone, but only syllable-initials word-internally. So in word-initial position Miller's analysis can also be regarded as showing two series on the high tone. Since word-interior consonants had no effect on the development of tone in Tibetan (cf. section 3.207 sqq.) we will not comment on the possibility of three series in word-interior position.

The evolution

1.309 The comparative study of several Tibetan dialects has shown that those dialects which have developed phonemic tone have reduced their initial clusters of prefix + root initial to simple initial consonants (Sprigg 1972:553-557). In the light of Table 23 this is a surprising connection, since the presence or the absence of a prefix in front of a WT initial stop seems to have affected the manner of articulation of the modern initial rather than the tone.

If we set aside for the moment the idea that the reduction of prefixial clusters was the cause of the phonemicization of Tibetan

tones, we are left to look for mergers in the manner of articulation of the initials. The voicing correlation which existed in Old Tibetan seems to have been completely lost when the initial was not prefixed, and to have been sporadically lost when the initial was prefixed. So we could hypothesize that the merger of the old prefixless voiced series with the old prefixless voiceless series into a voiceless aspirated series phonemicized the tone system. Aside from the fact that the merger of these two series is not total in some dialects (Miller's Central), there is a logical counterargument to this theory. Miller (1955:52, 1955b:46) and Sedláček (1959:188) report that the high tone following a modern aspirated initial is pronounced with a mid variant. This would be a very unexpected result for a series which actively participated in a split; the mid value of the high tone would rather point to the old prefixless voiceless (aspirated) stops as the neutral series in the split.

Table 23

Initial stops and tones in modern Central Tibetan

| Class of the initial in WT | Central Tib. reflexes of the initial | | | TONE |
|---------------------------------------|--------------------------------------|------------------------|-------------------------|----------------|
| | Shefts | Sprigg | Miller | |
| Voiced | (voiceless) aspirated | voiceless aspirated | voiceless (unaspir.) | LOW |
| Prefix + Vd | unaspirated (?[voiced]) | voiced | voiced | LOW |
| Voiceless ^a (aspirated) | | voiceless aspirated | | HIGH ?[mid] |
| Prefix ^a + Vl | | voiceless unaspirated | | HIGH |

- a. I will not comment here on the behavior of m- and a (see section 1.211 above for more details).

Among continuants on the contrary, we may observe that the merger of the old voiced and voiceless sibilants is complete (see Jäschke's statement, section 1.303 above). The rare modern aspi-

rated nasals are clearly secondary and the opposition between them and the modern plain nasals is not reflected in Tibetan spelling.⁴⁶ The modern plain nasals are the reflexes both of prefixed and prefixless nasals of WT. Now we can connect the reduction of initial prefixial clusters and the phonemicization of tones in Tibetan.

1.310 The mechanism of the evolution seems to have been the following: the reduction of initial clusters to simple consonants turned the prefixed nasals and resonants into a fortis series, probably voiceless. This fortis series merged with the plain series (WT plain unprefixes) triggering a compensatory tonal split where the *fortis initials produced high-toned syllables, and the *plain produced low-toned syllables. Among sibilants, the fortis series were the voiceless, s and ʃ.

The stop initials went along with the split started by the continuants, with the two series of *voiced (both prefixed and prefixless) joining the low class, and the *voiceless unaspirated (from prefixed voiceless) being the high series. The voiceless aspirates (from unprefixes voiceless) probably behaved as a neutral series, which could account for their phonetically mid pitch in the modern language.

The subsequent evolution of the Tibetan system has obscured this pattern. In modern Lhasa Tibetan, another aspirated series was formed, deriving from the old unprefixes voiced initials, probably by a reinterpretation of the breathiness of low toned syllables. These new aspirates now are the low tone partners of the old aspirates, which, functionally speaking, occur on the high tone, be it a mid variant of it. This is a secondary evolution.

The late origin of the aspirates on the low tone is shown by their absence in Written Tibetan spelling, as also by the dialectal variability of their occurrence. In the Lhasa dialect described by Miller all *voiced initials, whether prefixed or not, became voiceless aspirated (1955a:52). Goldstein (1970:xiv) mentions free variation between aspirate and nonaspirate on the low tone. In Miller's Central Tibetan neither prefixed nor unprefixes *voiced became aspirated: the prefixed ones remained voiced,

while the unprefixes ones became plain voiceless. In what most authors consider to be 'Lhasa' Tibetan, though, the prefixed *voiced remained voiced, and the unprefixes ones became aspirated.

1.311 Initial stops, in Tibetan as in Loloish, were not at the origin of the split, and they retain some redundant features from the period which preceded the split. The whole process in both families seems to have been set in movement by the reduction of initial clusters to simple unstable phonemes. In Loloish we have seen the motive force of the split to be the loss of an opposition of glottalization or of aspiration. In Tibetan it seems to be the loss of a voicing opposition.

Tamang

1.312 The four languages which comprise the Tamang group of Bodish (Tamang, Gurung, Thakali, and Manangba) present an evolution similar to that of Tibetan. However, the behavior of the different series at the time of the split appears more clearly because some later developments of Central Tibetan did not occur in the Tamang group (Mazaudon 1973a, 1975).

The Tamang dialect of Risiangku (Central Nepal) has a system of four tones. The language has retained 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 Tamang tonal system, namely high/low, has the same origin as 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 2.2, the Tibetan contrast is easily related to the deletion of final stops. A glance at the modern Tamang phonological system shows that this cannot be the origin of the Tamang contour/level opposition since the finals, including the obstruents, are all still

fully pronounced, and are not even "unreleased" (Mazaudon 1973b).

1.313 Modern Tamang displays a system of four tones which occur after initial liquids, nasals, sibilants, and unaspirated obstruents. When the initial is aspirated, only the two high tones can appear. In other words, 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 voiceless on all tones, the nasals and liquids are voiced on all tones. The aspirated stops are voiceless, as are the unaspirated stops when they occur with the two high tones. The obstruent archiphoneme which occurs on the low tones is usually voiceless, but is often lenis, or slightly voiced, or murmured. The vowel on the low tones is breathy with all initials. We can represent this system in the following table.

Table 24
Correlation of initials and tones in modern Tamang

| | | | | | | |
|-------------------------------|---|--------|-----|---------|----|-----|
| HIGH, clear voice quality | { | tone 1 | kha | ka | ŋa | sa |
| | | tone 2 | kha | ka | ŋa | sa |
| LOW, breathy voice quality | { | tone 3 | | ka (ḡa) | ṇa | sḡa |
| | | tone 4 | | ka (ḡa) | ṇa | sḡa |

In Table 24, ḡ stands for 'breathy a', and ḡ for 'murmured k'. kh stands for all aspirate stops, k for unaspirated ones, ŋ for all the nasals and liquids, and s for the fricatives.

1.314 This system derives from an older phonemic system which contrasted three manners of articulation of initial stops, instead of two in the modern language, and two tones (let us call them *A and *B⁴⁷) instead of four.

Table 25Co-occurrence of initial stops and tones in Proto-Tamang

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 toned ones come from a *voiceless s-. High tone syllables with nasal initials correspond to WT prefixed nasals, and low ones to WT plain nasals.

1.315 The evolution of the old three-manner/two-tone system into the modern two-manner/four-tone system was the result of an initial consonantic mutation.

Table 26The Tamang tonal split

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

From Table 26 it appears that the merger of the old *voiced and *voiceless series into a plain series, voiceless for the stops and sibilants, voiced for the nasals, brought about the phonologization of the high and low allotones of tone *A and tone *B into a system of four tones. The aspirates did not merge with anything, and so there was no tone split of *A and *B on syllables with aspirated initials. Functionally speaking, the tones which occur after the modern aspirates are not tone 1 and tone 2, but tones *A and *B themselves, unsplit. In terms of the modern system, they

can be called the architonemes of tones 1 and 3 (= *A), and of tones 2 and 4 (= *B).

1.316 Historically, the unsplit tones *A and *B which remained on syllables beginning with aspirated stops may have been kept phonetically distinct from both series of tones deriving from them at the time of the split. In a later stage, the architonemes A and B merged with their tonemes of the high class, leading to the modern system where the aspirates fail to appear with the two low tones (see Table 24).

The hypothesis that the unsplit tones A and B remained for a while distinct from the tonemes derived from them, as the MID series did in Loloish, is only a logical possibility for Tamang. If we go back to the Tibetan case though, where the birth of a tonal system from an old voicing correlation is exactly parallel to the splitting of the Tamang tone system, we can propose that the phonetically mid pitch of the syllables with an aspirated initial (deriving from an *aspirate) is explained by the behavior of this series as a MID series at the time of the split. The Tibetan tones were born from a merger of *voiced and *voiceless series which left the *aspirates 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.

2. TONOGENETIC EFFECTS OF NASALS

2.01 The transphonologization of syllable final features onto the preceding vowel is not as well attested as that of syllable initial features onto the following vowel. This is stated from the viewpoint of general phonetics by Ohala (1973:3), and it 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 final glottal occlusion or friction as opposed to their absence is well attested in Southeast Asian languages. An

example is the Vietnamese tonal split, transforming a three-way final opposition between -ʔ, -h, and open syllable into the three tones of VIth century Vietnamese (Haudricourt 1954a:159).

In the Tibeto-Burman family, Tibetan and Khaling afford examples of a similar process. Final laryngeals are also supposed to be at the origin of Old Chinese tones, and probably of Proto-Tibeto-Burman tones as well.

2.02. The influence of voice or voicelessness of the final on the pitch of the preceding vowel is a controversial hypothesis. Outside the TB family, it has been proposed for Punjabi. But we will see in section 3 that the Punjabi tones are better explained by positing a disyllabic word-base in the pre-tonal language.

In Tibeto-Burman, Jingpho might be an example of such a process.

2.1 The role of the finals in relation to proto-tones *A, *B, and *C

2.101 It seems well attested that the old tones *A, *B, and *C are not Tibeto-Burman developments but predated the split of the family into its different branches. As is only natural, the origin of these older tones is even more uncertain than that of the more recent ones which we have considered until now. Some scholars, like Benedict, think that tones *A and *B are to be traced to Proto-Sino-Tibetan under their tonal form. More, like Egerod, Pulleyblank and Haudricourt, believe that the origin of Proto-Tibeto-Burman tones *A and *B is the same as that of Chinese proto-tones *A and *B, but that their development into tones, from features which were not previously properly tonal, is relatively recent. For these three scholars, the origin of the tones *A and *B, as also of *C, for languages which developed it, is to be found in syllable final features. The phonetic nature of the original syllable final segments is mysterious, but there is agreement on the fact that these segments must have been opposed to each other by laryngeal features by the time they determined tonal variants on the preceding vowel.

2.102 The level at which, in the genealogical tree of the family, the final laryngeal features evolved into tonal features is of course not known. Egerod's view of the process makes this question somewhat vacuous. He explains that laryngeal features do not usually disappear after affecting the melodic characteristics of the preceding vowel, but survive for a very long time as redundant phonetic features. Some Chinese dialects keep to this day the glottalization which was characteristic of Archaic Chinese tone shang (Egerod 1971a:163). In Burmese we can easily hear syllable final breathiness on the heavy tone (tone 2), and final creakiness on tone 3. The point where the pertinence shifts from the final laryngeal feature to the tone of the vowel can vary from language to language.

2.103 Benedict (1972b) likens PLB tone *1 and *2 respectively to Archaic Chinese ping and shang. Egerod too compares the tones of Burmese to those of Archaic Chinese; but he traces both to the same phonation type, not to the same melodic pattern. "In old Burmese the phonation type system of finals is exactly like the one reconstructed for Archaic Chinese. The system is preserved with no splitting of vowels. It has not developed into a pure tonal system." (1971a:168).

We are confronted here with a small difficulty. The nature of the laryngeal feature reconstructed as the origin of Archaic Chinese tones is not the same as that which survives in Modern Burmese. Burmese heavy tone which is genetically related to Chinese shang tone, is pronounced with final breathiness, whereas Archaic Chinese shang tone is reconstructed with final glottal friction or creakiness. On the contrary, Burmese tone 3, which is likely to have the same origin as Chinese qu tone, possibly a final -s suffix,⁴⁸ is characterized by creakiness, whereas Chinese qu is considered to derive from final breathiness. There is an inversion of the features of tones *B and *C between Chinese and Burmese.

2.104 Such an inversion is not exceptional. The same thing

happened in the correspondences of Vietnamese and Chinese tones. In the oldest loan-words from Chinese in Vietnamese (III to VI century) Chinese words under the qu tone have been borrowed in Vietnamese with the hỏi-ngã tone (Haudricourt 1954a:153). Chinese words with the shang tone have been borrowed with the sắc-nặng tone (ibid:155). In Sino-Vietnamese (Xth century) the relation of Chinese shang and qu tones to Vietnamese tones is inverted. Words which had the Chinese shang tone are pronounced with Vietnamese hỏi-ngã tones. Words which had the Chinese qu tone are pronounced with Vietnamese sắc-nặng tones (Haudricourt 1961:300). This means that either the features of Chinese shang and qu, or those of Vietnamese hỏi-ngã and sắc-nặng had been inverted between the VIth and the Xth century. The same inversion of features between Chinese shang and qu on the one hand, and Proto-Lolo-Burmese tones *2 and *3, does not weaken the likeliness of their genetic relationship.

2.105 If we retain a definition of Proto-Lolo-Burmese tones in terms of final laryngeal features and phonation types, we can explain the divergent reflexes of some initials according to the proto-tone much better than if we posit a melodic definition of the PLB tones.

The development of PLB *voiced initials in Sani

From Matisoff (1973c:18-20) I understand that the development of PLB *voiced into modern Sani voiced or voiceless was random, or at least seems so, under tone *3 and *checked, but that *voiced regularly went to voiceless under tone *1, and stayed voiced under tone *2 (cf. section 1.250). As Matisoff suggests, if the data are confirmed, this would be a rare case of the tone influencing the manner of initial consonants.

If Proto-Lolo-Burmese tones were defined by purely melodic features, the Sani evolution would be exceptional. If they are defined by some syllable-final laryngeal features, the Sani developments become similar to a much better attested type of evolution,

which is found for instance in Akha and Mandarin Chinese dialects.

The Akha parallel

2.106 In Akha, PLB *glottalized and *aspirates merged into a voiceless series, without compensation in old smooth syllables and with a compensatory tonal split in old *checked syllables (Burling 1967; Matisoff 1972a, 1973c:19). *Checked syllables became "creaky" (Egerod 1971b) or "laryngealized" (Lewis 1968:xii). *Smooth syllables are now breathy when the initial is voiceless, and simply "non-creaky" or clear, when the initial is voiced.

Table 27
Initials, tones, and laryngeal features in Akha

| PLB initials \ PLB tones | *3 | *1 | *2 | *checked |
|--------------------------|-------|-------|-------|----------|
| *ʔb | pha M | pha H | pha L | pa LS |
| *ph | | | | pa MS |
| *b, *mb | ba M | ba F | ba L | ba LS |
| *mph | | | | ba MS |

a stands for "breathy vowel," a for "creaky vowel," M, H, L, LS and MS respectively for mid, high, low, low-stopped and mid-stopped tones.

There is one more tone in the system described by Egerod (1971b), a high creaky tone (HS). This tone is not originally Akha and appears mainly in loan-words.⁴⁹

2.107 Note that in Akha the two allophones, aspirated and un-aspirated, of the voiceless phonemes are conditioned by the phonation type, breathy or creaky, of the syllable. The laryngealization produced by the old finals of *checked syllables prevented the development of aspiration in the initial consonant, or alter-

natively caused its deaspiration, if we consider the result of the merger of *glottalized and *aspirates to have been aspirated.

2.108 In Akha the origin of the opposition of two phonation types (which is also reflected in the manner of the initial) is the difference between *smooth and *checked syllables. In Sani, the two tones involved are derived from PLB tones *1 and *2, which are both supposed to occur on smooth syllables. Admitting that we posit some laryngeal incident less than a stop at the end of tone *2 syllables will this be enough to explain the split in Sani initials (cf. section 2.105)?

The Mandarin parallel

2.109 In Mandarin Chinese dialects it seems that any laryngeal incident was enough to influence the initial.

Of the three initial stop series reconstructed for Ancient Chinese, the voiceless aspirated and the voiceless unaspirated survived unchanged in Modern Mandarin dialects. The series reconstructed as voiced or breathy, depending on the analysis, has two different reflexes in the modern language. If the syllable was under the ping, or 'even' tone, in Ancient Chinese, the initial became voiceless aspirated in the modern language; if the syllable was under any of the other three tones of Ancient Chinese the initial developed into a voiceless unaspirated obstruent.

2.110 Briefly, the Chinese evolution can be schematized in the following way (Chao 1933:122, Martin 1953; Egerod 1955:471, 1970: 70-71; Pulleyblank 1962:66,142,211):

Table 28

Initials, tones, and laryngeal features in Mandarin Chinese

| | | | | | |
|---|----------|-------------|------------------------------|---------|----|
| Archaic syllable final features | ∅ | -ʔ | *ks > x *s > h *fs > h | -k | |
| Laryngeal features in Middle Chinese | unmarked | glottalized | breathy | checked | |
| Manners of articulation in Late Middle Chinese | MC tones | píng | shàng | qù | rù |
| *ph | ph I | ph III | ph IV | ph IV | |
| *ph̥ | ph II | p IV | p IV | p II | |
| *p | p I | p III | p IV | p IV | |

In Chinese, the absence of aspiration in the reflex of the *voiced or breathy series is interpreted as a dissimilation due to the presence of some laryngeal or oral friction or occlusion in all ancient tones but píng, which was 'unmarked'.

2.111 According to Benedict, PLB tone *1 is the genetic correspondent of Chinese píng and PLB tone *2 that of Chinese shàng. If we admit the idea of the persistence of phonation types during tonal development, PLB *1 and *2 have to be opposed to each other by the absence of any laryngeal mark in tone *1, against the presence of some laryngeal mark (whether breathiness as in modern Burmese, or creakiness as in Ancient Chinese) in tone *2. Then, the differential treatment of Sani initials under tone *1 and tone *2 does not reflect an influence of properly tonal features on a segment, but rather the much better attested influence of phonation types on segments, although whether the exact mechanism in Sani was dissimilation or some other process will have to remain a question for future research.⁵⁰

2.112 Other Lolo-Burmese languages may offer similar evolutions.

The correspondences of initial stops between Maru and Burmese seem to show that laryngeal features can easily move from the initial segment of the syllable to the final one and vice-versa (see also note 34 on Lisu). Bernot (1972:38) observes that Maru syllables with a fortis initial (aspirate or glottalized) correspond to Burmese syllables which have either an aspirate initial, or an unaspirate initial under a 'strong' tone (tones 2, 3, and 4 of Cornyn's notation)--i.e., tones which have a final laryngeal incident. Bernot suggests that these initials might have all been aspirated, and that aspiration was lost under certain tonal conditions. Could we hypothesize some kind of dissimilation of the initial aspiration by the final laryngeal incident of the 'strong' tones?

2.2 Finals and tones in Tibetan

The development of tonal features from final-based segmental features is attested, in historical times, by Tibetan.

2.201 Richter (1964:33-36) says that when the -g final of Written Tibetan is pronounced as a velar stop in modern Lhasa Tibetan, it has no 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 -g 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 by Sprigg (1955) it seems that the final -g of Written Tibetan is replaced by vocalic length in Sprigg's informant's 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.

2.202 Shefts devoted a series of articles (1968a,b,c,d) to the question of the final falling tone in Lhasa Tibetan. 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 grants that all the tones have a final phonetic fall, 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 (1968b:8). The articulatory correlate of this medial precipitous fall is probably "a degree of glottal stricture less than a full stop" (*ibid*:9). "Even if the 'high' tone falls, it differs from the 'falling' tone in the absence of glottalization" (1968a: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 [low] falling tone over half or less of the pitch record as opposed to the long, gentle rise of the low tone."

2.203 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." (1968a: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).

2.204 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 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 obstruent, which is pronounced 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.

2.205 Some authors (Kjellin 1975; Lehman in the preface to Goldstein 1973) observing that the only series of final stops in WT is spelled with the same letters used for the voiced series in initial position concluded that these finals were phonetically voiced in Old Tibetan. This is not impossible, although an orthographic device cannot be trusted to represent exactly the phonetics of a language. What is more important is that it cannot be the voicing of these finals which influenced the pitch of the preceding vowels. Certainly, the open syllables, or the syllables ending in -m, -n, -ŋ, -r, or -l were at least as voiced as those ending in -b, -d or -g. How then could the voicing of -b, -d, -g be the origin of a development which was not shared by smooth syllables? Furthermore WT final -s and post-final -s had the same tonal effect as final -b, -d, -g. There is no evidence that these -s were ever voiced.⁵¹

2.3. Finals and tones in Khaling

2.301 A recent study of the Khaling verbal system (Michailovsky 1975) affords another example of the development of tones from finals. Modern Khaling has two tones, high and low, distinguished by the pitch of the first syllable of the phonological word. In the conjugation, verb roots, which are all monosyllabic, are followed by a number of affixes. These affixes determine some modifications of the final consonant of the root. In particular, suffixes with an initial nasal determine an assimilation of a stop final to the corresponding nasal. Thus two verbs like /wáb-u/ 'I scoop out,' and /wám-u/ 'I stick in,' are only differentiated by their tone in the infinitive: /wám-ná/ 'to scoop out' versus

/wām-nā/ 'to stick in.' A systematic examination of verbs whose root ends in /m/ in the infinitive shows that 46 out of the 48 high-toned verbs have a root final /b/ or /pt/ in front of the suffix /u/, and 45 of the 47 low-toned verbs have a root final /m/ in front of the suffix /u/ (Michailovsky 1975:208). By internal reconstruction of all the other finals, Michailovsky was able to demonstrate the correlation of high tone with an obstruent root final, and low tone with a liquid, nasal, or open root final.

2.302 It seems clear that in Khaling final obstruents had a raising effect on the pitch of the preceding vowels. It is interesting to note that the final stops are still present in Khaling, which seems to show that the obstruents do not need to have already merged to a glottal stop before they can have the pitch raising effect usually attributed to the glottal stop. Michailovsky (1975:214) suggested that the explanation might lie in a pronunciation of the final stops which is attested in some neighboring languages like Hayu (Michailovsky and Mazaudon 1973). In Hayu we found that the final stops were pronounced unexploded and with a simultaneous glottal occlusion. Such a pronunciation has not been recorded in modern Khaling. Whether it might have occurred in older Khaling is an open question.

2.4. Finals and tones in Jingpho

2.401 Jingpho as described by Maran (1971) shows a contrast of manner of articulation in the final, determining allotonic variants on the preceding vowel, and eventually transphonologizing into a tonal contrast. This is a typologically rare evolution, and since Maran's work is the first on Jingpho historical phonology, it is worth discussing in some detail his point of view and the objections which have been raised against it.

The modern Jingpho system

2.402 For a Tibeto-Burman language, modern Gauri Jingpho has

a rich system of syllable final consonants. Three oral occlusives, p, t, and k, and a glottal stop can close the syllable. On these checked syllables there is a two-way tonal opposition. Syllables which end in a nasal, m, n, and ŋ, are functionally "smooth," as the open syllables. On smooth syllables three tones are in opposition. Final occlusives on the high tone are voiceless; on the low tone, they are voiced. In close juncture, open syllables under the high or low tone can exhibit some final glottal friction when they are followed by a syllable beginning with a vowel. Maran transcribes this glottal friction as -h on high-tone syllables, and as -x on low-tone syllables. When the syllable is under the mid tone, this phenomenon does not occur (Maran 1971, 1973; Matisoff 1973).

2.403 Thus the pattern of co-occurrence of finals and tones is the following:

Table 29
Finals and tones in Modern Jingpho

| Features of the final C | checked syllables | | smooth syllables | | tone |
|----------------------------|-------------------|----|------------------|----|------|
| | -C | -ʔ | -N | -V | |
| voiceless [+ raised] | p, t, k | ʔ | hm, hn, hŋ | h | high |
| neutral | | | m, n, ŋ | V | mid |
| voiced [-raised] | b, d, g | ɰ | xm, xn, x | x | low |

The tonal opposition high/low is redundant with the voicing contrast in the final consonants. Maran (1971:177 sqq.) chooses to retain voicing⁵² as the pertinent feature in his synchronic description, and to consider the tonal oppositions as redundant. He also considers that this syllable-final voicing contrast which he posits as the underlying structure in his synchronic description is the historical origin of the Jingpho tones.⁵³ Thus the

chart of the Jingpho synchronic relation between finals and tones coincides with the chart of its diachronic evolution.

The difficulty with Maran's hypothesis is not so much the process by which a final voiced/voiceless opposition would influence the tone of the preceding vowel, a rare but perfectly plausible process, than the origin of the voicing opposition in final consonants.

The plausibility of the process

2.404 The direct reinterpretation of a final voicing correlation may not be attested until now, but Egerod admits it as a likely origin of the pre-Ancient phonation types which developed into Ancient Chinese tones.⁵⁴

It is not necessary either that Jingpho should have accomplished that change in one step. It could have gone through several stages, keeping as a redundant phonetic feature the once phonemic distinction of voicing. The transphonologization of a final voicing correlation into a length opposition on the preceding vowel is well attested in Germanic dialects (as in Alsatian where the voicing correlation has disappeared), and is happening in modern English as well (where it still is only phonetic). A long/short vowel opposition is reinterpreted as a tonal contrast in Shan and in some Southern Chinese dialects.⁵⁵

If this last step is contested, another series of steps is also possible: a long/short opposition can easily become a vowel quality opposition; the great English vowel shift is an example of this process. In William S-Y. Wang's interpretation of the split of the yin ru tone in Cantonese, an old opposition of vowel quality was replaced by a combination of length and tone: long-mid/short-high (personal communication 1974).

If the starting point and the end point of the Jingpho evolution were both well established, phonetic implausibility would not be a sufficiently strong argument against relating the two stages causally. It is in ascertaining the stages through comparative evidence that the confirmation or disproof of the hypothesis resides.

The origin of the voicing contrast

2.405 Maran does not claim that the voicing opposition in syllable-final position is very ancient.⁵⁶ So we can reconstruct Proto-Jingpho as a language devoid of tones and of voicing opposition in syllable-final position, but which probably already had the phonation types or glottal incidents that appear in the modern language--the final -h, and -x which occur with open tones in close juncture. The proto-language would exhibit the following syllable structures:

Table 30
Syllable structures in Proto-Jingpho

| checked | | smooth | |
|---------|-----|--------|------|
| CVC | CV? | CV | CVN |
| | | CVH | CVHN |

where final C stands for a final obstruent, N for a nasal, ? for glottal stop, and H for some final fricative, possibly glottal.

The above system is fairly similar to the system reconstructed for Proto-Lolo-Burmese, except for the absence of a *CVN? structure. For typological comparison the two systems can be lined up in one chart.

Table 31
Reconstructed syllable types for PLB and Archaic Jingpho

| PLB | *1 { CV CVN | *2 { CV CVN | *3 { CV CVN | *checked, CVC |
|--------------------|-------------------|----------------------|--|---------------|
| Burmese | open | some -h character | creaky | glottal stop |
| Archaic Jingpho | CV CVN | CVh CVNh | CV? <div style="border: 1px solid black; width: 40px; height: 15px; margin: 0 auto;"></div> | CVC |

The Burmese reflexes of the different PLB tones have been put in because of their phonetic similarity to the Jingpho tones.

2.406 The above chart is typological, and genetic inferences should not be drawn from it without great caution. For instance Matisoff (1973d:742, 1972b:4) showed that Jingpho words under the glottalized tones are cognate with words which reconstruct in Proto-Tibeto-Burman with a final *-k. Thus the glottalized tones in Jingpho, although phonetically similar to reflexes of PLB tone *3 in Burmese and Lisu, are not to be traced to the same Proto-Tibeto-Burman origin. The PTB *-k origin of these tones also explains the absence of a *CVN? syllable structure in Jingpho. Thus, Jingpho CV? syllables are only a special case of CVC syllables.

From Archaic Jingpho to Modern Jingpho

2.407 To lead us from the Archaic Jingpho system, with six syllable types (or five if we consider CV? as a part of CVC), no tones and no voicing contrast in the final consonants, to the modern system with ten syllable types involving the use of tone and/or a voicing contrast in the final (cf. section 2.403), two ways are open. Either a contrast was added to the rhyme, or a contrast was transphonologized from the initial system onto the rhyme.

The addition of a contrast in the rhyme, a morphological process

To explain the appearance of the [+raised]/[-raised] correlation between Archaic Jingpho and Modern Jingpho, Maran calls upon a morphological process (1973:105): "the formation of pairwise contrastive finals develops for a purpose, namely morphology ...in Jingpho the same linguistic process has apparently led to the p/b, t/d, k/g phonetic contrast in the finals." The way Maran envisions the process is an extension to the final position of the voicing opposition which was already used, both for lexical and

morphological purposes, in initial position (1971:196). He suggests that this extension could have been facilitated by contact with other languages which used a voicing contrast in the finals for morphological purposes.

Until the case is proven, it is difficult to admit this type of evolution as the most likely hypothesis. A phonological opposition which exists in one position and is neutralized in another is not readily generalized to the position of neutralization without some substance to be transphonologized into the new feature.

2.408 **Maran** left undeveloped an idea which he proposed, and which would in my view much strengthen his interpretation of the Jingpho evolution. He writes, "Furthermore, in a work to appear, we will show that the epenthetic addition of final obstruents such as Burling (1966) has written about in Maru, may be far more extensive in Jingpho, and that this might be due to its productive lexical morphology." The process described by Burling is really the addition of "epenthetic" stops since their appearance in the language is entirely conditioned by the phonetic context. Since **Maran** refers to "lexical morphology" as the source of the addition of final stops in Jingpho, it seems to be rather a suffixation process than the appearance of epenthetic stops. If Jingpho made an extensive use of suffixation, could we trace the origin of the voicing contrast in the final to some suffix, whose interaction with the root final would have modified the manner of articulation of the latter?

2.409 In this case we would wish to find traces of that suffix in neighboring languages. To my knowledge no one has looked into this aspect of the problem. We have seen (section 2.406) that Jingpho glottalized tone is not related to PLB tone *3 (the ancestor of modern Burmese creaky tone), so that we have found no traces in Jingpho as yet of the pan-Sino-Tibetan -s suffix, the suffix which is blamed for Chinese qu tone as well as for Burmese creaky tone.⁵⁷ Let us suppose with Benedict that PLB tone *1 and tone *2 go all the way back to Proto-Sino-Tibetan, and that there

was no tonal contrast on checked syllables. Can we go from that original system (*1, *2, *checked) to the modern Jingpho tones through the influence of the same -s suffix that added tone *3 to the above system in the Lolo-Burmese branch of the family?

2.410 If we admit the idea that original laryngeal features often persist, as redundant phonetic material, in tones which developed from them, we may be justified in tracing to a common ancestor the two Jingpho tones in -h and -x and the Burmese second or heavy tone, which shows redundant breathiness. The checked tones of Jingpho are naturally traced to the same source as PLB *checked, and Jingpho mid open to the same source as PLB tone *1. The Jingpho syllables in nasal final behave exactly as the syllables in vowel final (this type including final -h and -x), so that we do not deal with the nasals separately. Since Jingpho glottalized tones are traceable to syllables with final -k (cf. section 2.406), they are not separated from CVC syllables. The Archaic Jingpho system would then have the following pattern:

| | | |
|-----|--------------|---------------|
| CVC | CV (tone *1) | CVH (tone *2) |
|-----|--------------|---------------|

The intervention of the -s suffix in Burmese adds only one tone ("tone" being at this stage a combination of syllable structure, phonation type, and pitch) to the system, but this is not the only way it could influence the system. We could very well imagine the following evolution in Jingpho:

Table 32

One of the many ways Archaic Jingpho
could have acquired a final voicing opposition

| | CVC | CV(*1) | CVH(*2) |
|------------|-----|--------|---------|
| + s : | àb | ā | à(x) |
| no suffix: | áp | ā | á(h) |

in which -b stands for any final voiced stop, and -p for any voiceless one, á is high tone, ā mid, and à low tone.

2.411 This would be easy enough to check by comparison: for instance, PLB *1 should correspond exclusively to Jingpho mid tone, open, but Jingpho mid could possibly correspond to either PLB *1 or PLB *3 (from -s) Jingpho high open should correspond to PLB *2⁵⁸ and so on.

Working from internal evidence only it is impossible to reach a conclusion. The reflexes of the suffixed and non-suffixed forms could be exactly the reverse of what I supposed here. The -s suffix could have a 'devoicing' effect rather than a 'voicing' effect, and the suffixed forms could be reflected by the high tone instead of the low tone. The non-suffixed form would then be assumed to have developed the low tone. The suffix itself could be anything other than -s.

In his search for comparative evidence which might bring some light on the Jingpho evolution, Matisoff (1972c) directed his investigations to the initial part of the syllable rather than towards its end. Comparative work checking hypotheses which would link the development of tone to syllable final features remains to be done.

The influence of initials in Jingpho tonal development

2.412 Matisoff (1972c) examines the question of whether the tones of modern Jingpho can be related in a systematic way to those reconstructed for Proto-Lolo-Burmese (tone *1, tone *2, and *checked). For that purpose he compares some four hundred sets of cognates, and his conclusion is that: "On the basis of the present evidence it looks as if the Jingpho and LB tone-systems were once genetically related somehow; but this relationship has since been obscured by internal developments peculiar to Jingpho, so that only dim vestiges remain" (1972c:2). Nevertheless, some regularities appeared especially in checked syllables: "The two-way tonal split in Loloish stopped syllables (a split which did

not occur in Burmese) shows unmistakable correlations with a similar split in Jingpho stopped syllables, though many details remain unclear." (ibid.)

2.413 Among smooth syllables some correspondences point to an influence of the initial consonant in the tonal development.

1/ The high open tone of Jingpho (-áh) "has special affinity for PLB *2" (ibid.:40), and "an almost total antipathy for *voiced obstruental initials."⁵⁹

2/ "In words corresponding to PLB tone *1, Jingpho mid-tone is associated with *voiced stop initials, while Jingpho low-tone shows a fairly strong correlation with *voiceless stop initials." (ibid.:21)

2.414 As far as stopped syllables are concerned, "Loloish HIGH syllables show a very strong correlation with the Jingpho low-stopped tone" (ibid.:45). Since Loloish "HIGH" syllables can be traced to PLB *plain, redundantly aspirated, stop initials, we can see here again the correlation of Jingpho low-tone with PLB *voiceless initials, mentioned in the preceding paragraph, for Jingpho correspondences to PLB tone *1.

"The situation is somewhat less open-and-shut with regard to the Jingpho correspondences to Loloish LOW syllables--but even here we can say that the regular correspondence is Loloish LOW/Jingpho high-stopped." (ibid.)⁶⁰

Can we conclude anything from the Jingpho system?

We are very far from understanding the system in details; we don't even see the broad outlines clearly yet. One of the Jingpho tones is not accounted for at all, the falling tone, which is supposed to be a very late development (Matisoff 1972c:6). This makes it less instructive for the historical development of tones in Jingpho, but on the other hand this should also make it easier to trace, and the uncovering of its origin could have some typological value, if nothing else.

2.415 As incomplete as our understanding of Jingpho may be, the correlations between tones and initials exposed by Matisoff are too numerous and too regular to be due to chance. On the other hand the patterns do not fall into place as easily as they do in Loloish, when we call upon the influence of the initials alone to explain the origin of tones. We may have to take into account a combination of initial-based and final-based phenomena. If we admit that the proto-tones *1, *2, and eventually *3, in languages which have it, developed from laryngeal elements in syllable final position, we could have in Jingpho an interaction between the last stages of the final-based pitch developments (especially if the *-s suffix, or some equivalent of it, started disappearing and getting replaced by tonal features later in Jingpho than in PLB) and the beginning of the initial-based perturbances that led to the Loloish tonal split.

Egerod (1971:163) says: "Tones however often tend to retain laryngeal features from their origin, as redundant phonetic material, and these redundant features may clash with each other and influence the actual phonetic tone which develops." We have seen some traces of this process in Sani and Mandarin (see sections 2.105-111), where the final-based phonation type has influenced the manner of articulation of the initial consonant. Jingpho then might be an example of the influence of final based phonation types on the tone, while the tone is developing from the initials.

3. DEVELOPMENT OF TONE ON POLYSYLLABIC UNITS

Another 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.

3.1. Modern 'word-tone' systems

3.101 It has been assumed that all Southeast 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 Southeast 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 it 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." Bernot (1963:164) says virtually the same thing for Burmese, although she qualifies her statement.

3.102 Tone is also considered to be an attribute of each syllable. And since this has been reported for most Tibeto-Burman languages, Matisoff (1973a: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 (ibid.:78) "The Tibeto-Burman languages have always been monosyllabic."

3.103 I admit this view as generally true. But I think that a 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 (1965a: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 syllables or 'major' and 'minor' syllables, and the per-

mitted combination of these", as well as vowel systems, and final consonant patterns and their distribution.

Unfortunately, although she recognized the importance of analyzing 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 indispensable detail as her own description of Cambodian (Henderson 1952).

3.104 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.⁶¹ As a consequence of this prejudice many descriptions of languages fail to describe the behavior 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 modifications or neutralizations of tones 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).

3.105 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.

Sandhi

Difficult sandhi problems have been reported in a number of Tibeto-Burman languages. Akha, according to Bradley (1971a: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 (Lehman 1973:525-532) baffles the imagination by the complexity of its tone sandhi rules. But when all the rules have applied only a small number of tonal patterns applicable to each type of word (monosyllable or polysyllable) 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 Bawm does not seem to have a tone per syllable. Is it then a "true" tone system?

The tonal dissimilation which occurs in Western Bwe Karen when two monosyllables are built into a compound word (e.g., ni¹ 'to obtain' + mɛ¹ 'wife' > ni²mɛ¹ 'to marry') bears witness to the reality of the word as a phonological and grammatical unit in that language too (Henderson 1961:68-69).

Weak syllables

3.106 In some languages we find syllables which never occur outside of larger units and never have a tone of their own. These syllables are pronounced with markedly less stress than the neighboring ones, and often the quality of their vowel is not distinctive. In Western Bwe Karen, the unstressed syllables do not have distinctive pitch and "are therefore not regarded as characterized by a tone" (Henderson 1961:60). Their vowel is either "mid central unrounded" or "it may be pronounced with the 'colour' of the vowel of the preceding stressed syllable" (*ibid.*).

3.107 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.*:165). 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 analyse 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.

3.108 Luce (1959b: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 neighbors in the texts are, unlike stressed syllables, never differentiated by vowel length or pitch, and are never closed by a consonant" (Henderson 1965b: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

3.109 In languages of the Bodish section the tonal system on polysyllabic items is more straightforward, and at the same time more difficult to account for diachronically. In Tamang (Mazaudon 1973b:61-92) a word can be defined as a string of one lexical item, noun or 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 in Nepal as yet studied (Hale and Pike 1970 passim; Pike 1970:153).

3.110 Chao Yuen-ren (in Yu Dawchyan 1930) analyzed the tonal system of Lhasa Tibetan into two tonemes: high falling (53) and low rising falling (131). He states the relation of tones to words in the following terms: "The actual tones in connected speech follow the general principle of one tone being spread over two or more connected syllables. Thus, the high falling tone often becomes a high level tone, the following syllable or syllables, whatever its original tone, taking up a low or falling tone; the low circumflex tone often becomes a rising tone, the following syllable or syllables taking up a low or falling tone" (ibid.:27-28).

Turning to more recent descriptions of the tonal system of Lhasa Tibetan, we find that Sprigg (1954, 1955) and Shefts (1968a,

b,c,d), despite the fact that these two scholars work with totally different theoretical assumptions, are in agreement with each other and with Chao 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:

Table 33
The tones of Modern Lhasa Tibetan

| <u>monosyllable</u> | <u>disyllable</u> | <u>trisyllable</u> | <u>more than 3</u> |
|---------------------|-------------------|--------------------|--------------------|
| ā | āpā | āpāpā | āpāpā..pā |
| a | apā | apāpā | apāpā..pā |
| āà | apà | apāpà | apāpā..pà |
| apà | apà | apāpà | apāpā..pà |

where ".." 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 Tamang and the Tibetan systems. Tibetan has a number of suffixes, perhaps only verb

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.

3.111 Sprigg's description of the Lhasa Tibetan tonal system is very similar, with one difference. The falling/level feature is not used by Sprigg. The falling contour in Shefts is linked to the disappearance of final consonants. We have already said that the speech described by Sprigg transcribes more finals than that described by Shefts (cf. section 1.306). Sprigg's analysis thus retains only two tones, those defined by the low/high feature on the beginning of the word in terms of Shefts' 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 states 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.

3.112 Neither the "schwa languages" nor the Bodish word-tone fits into the traditional classes of prosodic phenomena. Neither accent nor tone, their suprasegmental distinctive features have been called "pitch-accent", a very misleading term which allies a phonetic notion (pitch) to a functional one (accent) to define a functional unit and thus conceals the structural originality of these suprasegmental systems.

3.2. What is the historical origin of word-tone?

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 were never more complete than they are now.

3.201 The most widely proposed explanation is the first one, as illustrated by Matisoff (1973a: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 co-occurrence restrictions have to be stated for sequences of tones within a word.

3.202 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 pronounced 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."

3.203 This string of events is a possible origin for 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, vowel or consonant, have the full array of their distinctive possibilities in each syllable⁶² and yet 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" (this last type including also the mixed types like Tibetan). 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 the tone developed after the language had acquired the word structure which it shows nowadays, and not at a time when it was still monosyllabic.

The development of word-tone in "schwa languages"

3.204 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.⁶³ Schwa syllables in Burmese and Jingpho cannot occur word finally;

they almost never can in Karen (Burling 1969:23,47-48). The same thing is true in Mon-Khmer. Although Cambodian is not genetically related to Tibeto-Burmese, its structure is typologically similar to that of the schwa languages, and it is worth quoting Henderson's description of its word structure: "Note the gradual progression 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. Only its presence or absence is distinctive but the vowel does not carry a tone and does not commute with the vowels of full syllables.

3.205 The vowel [ə] which appears in five of the six Karen dialects examined by Jones (1961) is reconstructed by Burling (1969:47-48) as *əʔ. 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." "*əʔ² 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 Jingphaw, 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.⁶⁴

3.206 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.⁶⁵ 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.

The development of word-tone in "non-schwa languages"

3.207 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 these to one tone per word through sandhi, nor the explanation just proposed for "schwa languages" is satisfactory. Both explanations require accentual prominence of one syllable over the others, which is not attested in modern Bodish languages. Of course it might be assumed to have existed in the past, but we would expect to find some traces of it in that case.

3.208 The development of tones from a consonantal mutation in truly polysyllabic languages is exemplified by Punjabi (Haudri-

court 1971a, 1972a), Camuhī (Haudricourt 1968, 1972a, and Rivierre 1972), and Balto-Slavic (Purcell 1974a,b). The process in Punjabi and Camuhī is very straightforward. Briefly, in Punjabi old voiced aspirates became voiceless aspirates or voiced unaspirates. When this mutation occurred, the old voiced aspirate left a low tone on the following vowel. If the *voiced aspirate was word-initial the low tone of the first syllable determined a low tone word. If it was medial the low tone on the second syllable was reinterpreted, by opposition, as high tone on the first and determined a high tone word (Gill and 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 were the initial of the word. In Camuhī, the process is the same except that the mutation here affects old fortis consonants (old geminates), which upon becoming plain voiceless unaspirated phonemes leave a high tone word if they were initial and a low tone if they were medial. If there was no such consonant in the word the tone is mid (Haudricourt 1972). This process requires a disyllabic word to occur. Modern monosyllables have to be derived from polysyllables where the second vowel dropped.⁶⁶

3.209 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 (WB) is interpreted as having had two syllables, each of which had back (tense) or front (lax) tongue-root articulation. Each WB therefore had one of four possible combinations of the two prosodies; tense-tense, tense-lax, lax-tense, or lax-lax. Each WB 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 voicing/voicelessness of consonants in the parent language. This, of course, is an

attractive hypothesis 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 position. Then we would have to posit some process analogous to that supposed in Jingpho, where a final voicing correlation would be reinterpreted as vowel length, and eventually as tone. But reconstructing all word-bases as CVC is no more satisfactory than reconstructing them all as CVCV, at least according to the type of forms currently proposed in reconstructions of Proto-Tibeto-Burman. In the present state of research the old tones A and B of the Gurung branch will have to be left unaccounted for, and we must posit two different events as the source of the high/low correlation on the one hand and of the level/contour correlation on the other hand.

It seems clear that the word-initial mutation which led to the two-way split of the tonal system occurred much later than whatever phenomenon created the level/contour opposition. The word-initial mutation is basically the same as that which occurred in Tibetan, where the tones which we called A and B in Proto-Tamang had never existed or had disappeared.

3.210 While in Punjabi or Camuhī, the word had to be disyllabic, and the mutation occurred at the initial of all syllables, in Tibetan and in the Gurung branch, the mutation occurred only word-initially, and affected words of any length. It is impossible to explain the modern system if one supposes that tone developed on a still monosyllabic language, or on each syllable of a polysyllabic language.

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 Lh. kár-mà (*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, ʔ, r, l and vowel (Hahn 1971:27).

3.211 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 a historical one as well. Second syllables of Tibetan words in general either begin with a consonant in which the voicing opposition, source of the tonal split, did not exist (cases of the suffixes) or retained the prefixed elements which disappeared in the word-initial consonantal mutation. Second syllables of Tibetan words either never had or have kept to this day the material which first syllables used to create the tonal contrasts.

NOTES

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¹ I wish to draw the attention of the English-reading public to the excellent expanded translation of this article by Christopher Court, in Harris, James D. and Richard Noss, ed., Tai Phonetics and Phonology, Bangkok, 1972. This version includes a short and very well done summary of the theoretical basis on which Haudricourt's work rests. The use of the fundamental concept of neutralization both in synchrony and in diachrony, and the difference between neutralization, a synchronic relationship, and merger, a diachronic process, all notions taken for granted by Prague School phonologists are explained and exemplified in a few paragraphs.

² Benedict (1972a) has suggested that Karen might be a separate branch (on a level with Tibeto-Burman) of a larger group to be called Tibeto-Karen, rather than a branch of Tibeto-Burman. Jones (1975) has even questioned the affiliation of Karen to Sino-Tibetan. On the basis of my experience with languages of the Bodish subfamily (Shafer's classification), I find a large number

of cognates between Jones' Karen and the Tibetan side of the family, cognates which are more easily recognizable, and I think more numerous than those I can find between Bodic and Burmic. On this impressionistic basis I tend to favor Shafer's view that Karen "might almost be called intermediate between Bodic and Burmic" (1955:107), and I would tentatively include Karen among Tibeto-Burman languages, at the same level as Bodic and Burmic.

³Jones (1975) misrepresents Haudricourt's explanation. He says that Haudricourt's reconstruction is "a very tightly structured system of two tones, in each of which initial consonants occurred in two major classes--voiced and voiceless, the latter including aspirates and non aspirates" (1975:2-3). This is a fundamental misunderstanding. Haudricourt does not reconstruct two major classes but three. Aspirates and non aspirates do not form one class for tonal development, but two. If the mid series of allo-tones was collapsed with the high series from the start, there would be no way of explaining the divergent evolution in Moulmein Sgaw and Moulmein Pwo for the words which comprise Luce's class II. The existence of an architonemic series is fundamental to Haudricourt's explanation.

Haudricourt's latest revision of his Proto-Karen reconstruction restitutes four tones (three open and one checked) instead of three (cf. below section 1.222). The basic principle remains the same.

⁴A misprint in Burling's paper causes this term to appear as "voiceless aspirated."

⁵A few misleading misprints should be corrected in the 1972 reprint of Haudricourt's article, page 135. 'blanc', 'mari', and 'lune' should be transcribed with an initial glottal stop: ʔ. This mark has been confused with the inverted comma which transcribes aspiration in the article: ʼ .

⁶In fact, for the younger generations of Geba speakers, it seems that the merger of aspirate and plain nasals has already occurred. Luce (1959a:8) quotes his informant saying: "My mother says... hmi¹, but we children say...mi¹"[for the word 'to sleep'].

⁷Lolo-Burmese as used by Matisoff and Burling corresponds more or less to Shafer's Burmish Section of the Burmic Division of Tibeto-Burman. It must be noted that in the usage of Burling and Matisoff the term Burmish does not include the same languages as in Shafer. Briefly, Shafer's Burmish Section includes a Burma Branch, which Burling and Matisoff reconstruct under the name "Proto-Burmish", and a Lolo Branch, which these authors reconstruct under the name of "Proto-Loloish". Shafer's Burmish Section includes two more small "branches:" Hor Branch and Hsihsia Branch (Shafer 1955).

⁸Chang Kun (1973:337) thinks that they probably all ultimately derive from only three proto-prefixes: one stop prefix, one sibilant prefix, and one nasal prefix.

⁹See below, section 1.236, for some attempts at an explanation of the process, and for alternative hypotheses.

¹⁰In Maru and Atsi the *glottalized survive to the present day. They are unvoiced, and their glottalization is mainly audible as constriction on the following vowel (Burling 1967:16,19; Bernot 1972:36).

¹¹Burling does not state clearly that the existence of a *glottalized series is one of the main conditioning factors for the tone split in Lahu and Lisu *smooth syllables, but this is apparent from his chart p. 69.

¹²It should be remembered that nasal prefix + sibilant may also have triggered the glottal dissimilation rule as in 'breath' Lh šá, which Matisoff would now prefer to reconstruct as *Nsak rather

than *Csak (personal communication 1974).

¹³Matisoff (1972a) established the recent origin of the tonal split in *checked syllables. After noticing correspondences between the tones of Loloish and Jingpho checked syllables (1972c), he reopens the question and proposes that we may have to posit a two-way tonal contrast at the proto "Ji-bur-ish" level (defined as the latest stage when Jingpho and Lolo-Burmese were not yet separated). I believe that this is a case of parallel development in Jingpho and Loloish, and that Matisoff (1972a) remains the most satisfactory explanation of the origin of the Loloish tones.

¹⁴All these statements should be qualified. About PTB final -r, -l, and -s, Matisoff (1973c:9) says: "These seem all to have disappeared without trace by the PLB stage, though there is some slight evidence that they could trigger the development of Lahu high-rising tone in the manner of a final stop."

¹⁵The source used here is Matisoff (1973b:22). Although the Grammar of Lahu was published in 1973, it was written in 1971. The reconstruction used in the Grammar for the PLB initials is that of 1968 and 1970. This is superseded by Matisoff (1972a), so that the terms used in our source have to be changed (as I did in the text) in the following way: Plain → voiced, Voiced → prenasalized, Aspirated → plain (redundantly aspirated; I keep the redundant term in the text for clarity).

¹⁶There is no evidence in Lahu to show that tone *3 ever took part in any split. It did in Sani and Lü-ch'üan, as we will see later, but we can ignore it in the discussion of the Lahu evolution. We put it on the chart only for completeness.

¹⁷The values of modern Lahu tones do not reflect this relation anymore in the case of the tones born from PLB tone *2. I suppose that there occurred a 'flip-flop' between these two tones in Lahu.

Lisu and Sani, as we will see later, support the reconstruction of two complete HIGH and LOW series. Meanwhile let us consider them as abstract terms.

¹⁸While plain voiced stops can easily lose their voicing, voiced preglottalized stops usually retain it. This general observation casts some doubt on the process which I suppose here. It would be possible for Lahu (but not for Lisu and Sani) to suppose that the *voiced glottalized first merged with the *plain voiced series into a plain voiced series, a merger which triggered the tonal split, and that in a subsequent phonetic evolution the resulting plain voiced series became voiceless. Several other interpretations of the phonetic value of the "glottalized" series can be proposed, see above section 1.215, and discussion, section 1.241.

¹⁹If we suppose that this series was plain voiceless in Proto-Lolo-Burmese, we can say that their becoming aspirate prevented their merger with the two other series.

²⁰Lahu k, kh < *kr, *khr; q, qh < *k, *kh (Matisoff 1973b:8).

²¹I use here Prague School theory and terminology. The term 'correlation' is not frequent in American usage: it refers for me to a couple of distinctive features on which the opposition of two series of phonemes rests.

The use of the term 'neutralization' can be more confusing since the term is sometimes used in American linguistics with a different meaning. In my terminology, neutralization and merger are not synonymous. A merger is a diachronic process of conflation. A neutralization is a synchronic relation between sub-systems. A system with a neutralization is a system where in a context A a given opposition exists, and where in another context B that opposition does not exist--is 'neutralized'. Two historical sources are logically possible for such a system: 1/ the opposition used to exist in all contexts and was lost in context

B. 2/ the opposition did not exist any place and was created in context A (through some transphonologization).

Let us consider a theoretical example of the first process. A neutralization can historically be the result of a merger only if the same phonemes which become confused in a certain context remain separate in other contexts. For example consider a language at stage I: it has two series of phonemes, p, t, k, and b, d, g, which all occur in all positions. At stage II the two series have become confused (have merged) only in intervocalic and final position, they remain distinct in initial position. Synchronically, we describe the language at stage II as showing a neutralization of the two series in interior and final position. We are entitled to speak of neutralization only because the two series are kept distinct someplace else in the language, namely in initial position. At stage III suppose the language merges the two series in all positions: this is simply a complete merger, there is no place for the concept of neutralization.

If a merger is accompanied by a transphonologization of features, this is another possible historical origin for a synchronic system with a neutralization. This is the process number two, where an opposition is created in some contexts and is not created in others. In the context where the opposition was not created there is a neutralization. Suppose system I becomes system II:

| I | | | II | | |
|-----|-----|-----|-----|-----|-----|
| ba | da | ga | pà | tà | kà |
| pa | ta | ka | pá | tá | ká |
| pha | tha | kha | pha | tha | kha |

What merged between system I and system II are the voiced and voiceless unaspirate initials. What is neutralized in system II is the tonal opposition high/low in the context of aspirated initials. This is the case exemplified by the Lahu tonal split. For an example of a language where this process is occurring nowadays, see the Tamang case below (section 1.3).

²²The inversion of the values of *2 HIGH and *2 LOW in Lahu is hard to explain. In Lisu and Sani it did not occur (cf. section 1.247 and 1.250). We can observe that, in these two languages, *checked HIGH became confused with another tone of the HIGH series: with *2 HIGH in Lisu, with *1 HIGH in Sani. The risk of such a merger might have been the cause, in Lahu, of the evolution which led to an inversion of the high and low values in tones deriving from PLB *2. Two interpretations of the sequence of events are possible: either the Lahu *2 architoneme merged with its LOW partner, and the inversion of values between LOW + MID (merged in one tone) and HIGH occurred afterwards, or the inversion of values occurred first, and the architoneme then merged with the tone of the same origin which was nearest to it in pitch. I tend to think that the first sequence of events may be more likely: 1. *2 MID merges with *2 LOW; 2. the loss of final glottalization of *checked HIGH turns it into an open tone, which threatens to merge with *2 HIGH; 3. *2 HIGH progressively shifts to a low value. Whether the tone which is now 54 had this value before the shift of *2 HIGH to low is an open question.

²³This is not true of Lisu *checked syllables, where *s-b > p- + tone 33?, while *ʔ-b > p- + tone 55 (Thurgood 1973:17).

²⁴Nakhi might be a key language in this respect if it is confirmed that it kept separate reflexes of the *glottalized nasal series--which yielded voiceless spirants--and of the *s- prefixed nasals--which developed into simple nasals (Matisoff 1973c:26).

²⁵Matisoff deals only with *checked syllables, but I propose to consider it a likely hypothesis that the initials of *smooth syllables followed the same evolution.

²⁶It is not worth developing too much what is only one hypothesis among many. It should be noted though that this explanation is more satisfactory for words with the á- prefix (HIGH class) than for those with the *kə- prefix (MID class). It would be better

in this line to reconstruct the word 'six' with a "glottalizing" prefix (HIGH class), e.g. *ʔə-krok, or *ʔgə-rok > *kə HIGH -rok LOW > khəʔ (LOW).

²⁷Only *checked syllables are considered here since published data are lacking on other syllable types.

²⁸Jg phàʔ 'tea-plant', cognate of Lahu 'leaf', is on the low-stopped tone, but the set is also irregular in Lisu and Nasu (Matisoff 1972a:34).

²⁹"En Extrême-Orient lorsqu'il y a deux séries de sonores, celle qui s'assourdit est la série sonore-simple, et celle qui est stable est la série sonore-préglottalisée" (Haudricourt 1972b: ix).

³⁰Prof. Matisoff kindly supplied a few examples: šī 'to know', šī 'blood', šī 'seven', šē 'particle', šē 'liver'.

³¹The form Lh šēʔ (54ʔ) has to derive from a proto-initial of the MID series according to Matisoff's reconstruction (1972a:24). The form šē (11) could derive either from a HIGH (*C-s) or a MID (*s-) initial. Lahu words in s- + 11 probably have both origins. The two Lahu homonyms 'three' and 'liver,' both šē, could derive the one from *s-, and the other from *C-s, as suggested by comparison with Jingpho, where the two words are not homonyms: 'three' məsūm (high tone), 'liver' məsɪn (low tone), and with Burmese: WB sūm 'three' (without prefix), ʔəsān (with a glottal prefix). I would tentatively reconstruct 'liver' with a prefixed initial (> HIGH class) and 'three' without a prefix (> MID class). Matisoff disagrees: he thinks the tones of these two words had merged by PLB times.

³²Matisoff explains the form šēʔ by metanalysis: "the usual form is šēʔ, with final -ʔ. This arose from metanalysis with an automatic [ʔ-] before the vowel-initial in 'four' /ɔ/" (in Benedict

1972a: note 413). (Tone marks in the Conspectus are aberrant, I corrected them after Matisoff 1973c:28,31). This explanation, if accurate, points to an original 54 form for the word 'three' since there is no way to explain how 11 + ? would become 54?. The value 54 is that expected for the combination *2-MID in syllables which had a PLB obstruent initial. This brings us back to the same origin for the word.

³³G. Thurgood suggested that items with a nasal initial under the tone 35?, as 'heart,' might be better reconstructed with a *k- prefix, in opposition to the *s-prefix which would regularly develop into tone 33? (personal communication 1974).

³⁴This fourth tonal reflex of *checked syllables has the same phonetic value, 33?, as the reflex of *3 unsplit, and *1-HIGH. This seems to be the 'neutral' value for tones which had glottalization some place in the old form, syllable-final position for *3 and *checked, initial position for *1-HIGH.

³⁵According to Thurgood, the value 44 for the reflex of tone *3 with *glottalized initials is well attested for nasals, and probably correct for obstruents.

³⁶The reconstruction of this series as *glottalized has been discussed above, sections 1.241-242. The term is used here and in what follows as an abstract designation for the class.

³⁷The divergent reflexes of PLB *voiced initials under tone *1 and tone *2 are an interesting peculiarity of Sani which will be discussed below, sections 2.105-111.

³⁸All this of course would become vacuous if the series was reconstructed as *plain voiceless (cf. section 1.242).

³⁹Voiceless aspirated and voiceless unaspirated initials are in complementary distribution in modern Akha (Lewis; Egerod 1971b).

40 "Les confusions de tons qui se produisent, avant que ceux-ci soient phonologisés en tonèmes, se produisent...entre tons de la même série horizontale ou verticale" (Haudricourt 1961:300). "Une fois constitué, le système tonal évolue sans souci de sa valeur ancienne étymologique" (*ibid.*:286).

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

42 Following Henderson (1952 and 1965a: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...).

43 Jäschke uses here the Tibetan character, which I have transliterated according to his own system.

44 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 favor of phonetics. What is denounced by Sprigg in particular is rather a certain conception of phonology, the "monosystemic Phoneme Theory" in his terms (1957:106, note 3).

45 Miller (1955b:46) explains that for him the term Central Tibetan refers to "the language of non-Lhasa speakers of central, and especially south-central, Tibet." In his opinion, most authors who claim to describe Lhasa Tibetan describe in fact Central Tibetan. So Miller's "Central" is to be compared to other authors' "Lhasa", and Miller's "Lhasa" is to be held as different.

46 An example of this is Chang and Shefts' minimal pair $\tilde{n}\bar{e}\tilde{e}$ 'to tan' : $\tilde{n}h\bar{e}\tilde{e}$ 'to be tanned' (1964:2), both spelled as mñes in Goldstein (1970:268), and spelled as mñel and mñed, respectively, in Chang and Shefts. In both cases, they are spelled with the same initial.

⁴⁷In Mazaudon (1973a), I proposed to name the level/contour opposition which predated the tonal split 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. Benedict (1973a: 135) has proposed the identification of the two tones of Proto-Tamang with the two tones *A and *B which he reconstructs for Proto-Sino-Tibetan as a whole. This hypothesis is far from being demonstrated. One of the major difficulties with it is that Benedict wishes to reconstruct A and B only for smooth syllables, while the Tamang data stubbornly shows an identical behavior of checked and non-checked syllables. In my reconstruction, Proto-Tamang *A and *B have to occur on all syllable types.

⁴⁸While lexical correspondences have been put forward to demonstrate the genetic relationship of Chinese shang and PLB tone * (Benedict 1972b), the relation of Chinese qu to PLB tone *3 is probably only typological. For Benedict the two are "quite distinct in origin", PLB tone *3 being a "glottal accent" and Chinese qu being derived from the neutralization of ping and shang in the first syllable of compound words. Haudricourt (personal communication) also underlined the difference in the frequency of these two tones in the lexicon: Chinese qu is very frequent, while Burmese creaky tone is very rare.

⁴⁹This tone is not in fact phonetically creaky; it is simply 'less-breathy' (Egerod 1971b). The insertion of this foreign tone in the net of correlations of the Akha tonal system is an interesting case of restructuring an unbalanced tonal system. The two tones born from the split in *checked syllables redefined themselves as to be the laryngealized partners of two of the old unsplit tones which survived on *smooth syllables, tones *3 and *1. This created a hole in the pattern: the high laryngealized slot was not filled. Loan words came into that slot. So the modern relations are the following:

| | | | |
|----------|-------------------|-------------------|-------------------|
| | mid | high | low |
| *smooth | pha _{..} | pha _{..} | pha _{..} |
| *checked | pa _~ | pa < loan | pa _~ |
| *smooth | ba | ba | ba |
| *checked | ba _~ | | ba _~ |

Loan-words could not very well provide a filler for a creaky tone, so the hole for *checked-high-voiced initial remains.

⁵⁰I am indebted to Stephen P. Baron for attracting my attention to the typological significance of the Sani evolution and pointing out its similarity to the Mandarin Chinese treatment of initials in relation to tone.

⁵¹Kjellin (1975:39) claims that the production of 'voice' in obstruents is somewhat more complex than in vowels or sonorants. So he sets up a feature [-tense] which he attributes only to voiced obstruents (initial and final) and to initial sonorants. The feature [+tense] is attributed to all the other phonemes of the language: voiceless obstruents, vowels, and final sonorants. -s is conveniently interpreted as 'underlying' /z/, so that it may have the appropriate tonal effect. These arbitrary decisions, in an otherwise well documented and valuable paper, result from the author's attempt to collapse many centuries of evolution into a synchronic derivation, in the hope of demonstrating that Tibetan is not yet a tone language.

⁵²The phonetic nature of -h, -x, -ʔ, and -ʔ̥ is not quite clear. They form a correlation h/x, ʔ/ʔ̥ where the distinctive feature is [+raised]/[-raised], and which includes also p/b, t/d, and k/g. The [+raised]/[-raised] opposition is realized as voiceless/voiced for stop finals, "however, as the glottal stop and the glottal glide are not articulatorily 'voiceable', the suggestion was made that the features of raised F and lowered F account for this" (Maran 1973:101).

⁵³From our point of view there is no link between the two assertions

the underlying structure does not have to be historically anterior. But Maran did not admit the theoretical possibility for a "derivability rule" (1973:109) to reverse its direction from a historical stage I where: $V \rightarrow V_x / ______ C_1$, and $V \rightarrow V_y / ______ C_2$ to some stage II where:

$$C \rightarrow C_1 / V_x ______, \text{ and } C \rightarrow C_2 / V_y ______.$$

This constraint limited the number of historical processes acceptable in his model. We have seen in the last section a number of examples where such a reevaluation by a language of what is pertinent and what is redundant is precisely the motive force of historical change.

⁵⁴"It is entirely possible that from the point of view of Proto-Chinese the second type (shang sheng) is the result of a merger of several voiced suffixes, and the third type (ch'U sheng) the merger of several voiceless ones, the common feature in the latter being the gradual drop in laryngeal activity, in the former maintenance of activity." (1971a:163) "The phonetics which conditioned the origin of tones 2 and 3 (shang and ch'U...) of Ancient Chinese had their origin in two kinds of laryngeal activity, one voiced and lax (and crescendo) the other one voiceless and tense (and diminuendo)" (1971a:161).

⁵⁵"Nous avons vu précédemment que le Shan de Birmanie avait perdu la distinction de longueur des voyelles, il en est résulté que les anciennes longues sont à un autre ton que les anciennes brèves. Le même phénomène a lieu en chinois: déjà le cantonnais, qui conserve la longueur vocalique, distingue un neuvième ton qui est spécial aux voyelles longues, et la dialecte de Po-peï décrit par Wang-li, qui a abandonné toute distinction de longueur, connaît quatre tons pour les mots à occlusion finale." (Haudricourt 1948: 96). From a general phonetic point of view this process is discussed by Ohala (1974:18).

⁵⁶"While we have shown that synchronic Jingpho has a system of finals which contrast phonetically in terms of voicing, archaic

Jingpho as preserved by its ritualized form shows only one series there." (Maran 1971:194).

⁵⁷If Benedict (1972b) was right in rejecting the -s suffix origin for both of these tones, this would weaken the Jingpho case. Haudricourt (1975:342) derives the heavy tone of Burmese from a final -s, and considers that the origin of the creaky tone is obscure. A dissertation on the origin of the Burmese creaky tone is currently being written at Berkeley (Graham Thurgood, forthcoming 1976).

⁵⁸Benedict (1972a:195) says that Kachin (alias Jingpho) high tone corresponds to his Proto-Sino-Tibetan tone B, which itself corresponds to PLB tone *2. Matisoff (1972c:35) confirms this correspondence: "there are twice as many cases where Jg. high-tone corresponds to PLB *2 as there are where Jg. high-tone corresponds to PLB *1."

⁵⁹Matisoff's only counter-example to his own generalization can be dismissed on the grounds that the PLB initial must have been glottalized: set 265 (1972c:36) 'dwarf' Jg krum, Lh chɔ-kɛ-nɛ. lahu /kɛ/, on the mid tone with an unaspirated initial, should come either from *3 or from *1 with a glottalized initial (cf. chart, section 1.227). Since Matisoff reconstructs the tone as *1, the initial has to be *ʔg-, and cannot be *g-. We have seen numerous examples of the different tonal reflexes of *glottalized series as compared to *voiced, so this example should not be considered as an occurrence of *voiced on the high open tone in Jingpho.

⁶⁰Matisoff (1972c:50) correlates the correspondence Loloish LOW/Jingpho low-stopped with the presence of a voiced initial in Jingpho or in Lahu, "pointing to earlier prenasalization." The correspondence Loloish LOW/Jg high-stopped, on the other hand, correlates with the presence of a plain voiceless unaspirated initial in modern Jingpho, but to a bewildering variety of initials in PLB.

⁶¹Pike's own work did not overlook contextual variations of tones, and in fact led him to enlarge somewhat the scope of his definition of tone languages in recent publications (cf. Pike 1970, Hale and Pike 1970).

⁶²Some restrictions are found in certain positions, but they differ from language to language and have no relation to stress.

The feature 'stress' is used in Glover's description of Gurung but the meaning of the term for him is not what is most commonly meant by 'stress'. A few statements from Glover will point out the difference: "word-stress is not phonemic in Gurung--that is it does not establish contrastive units" (Glover 1969:60). In this statement 'stress' is taken in its ordinary meaning, and it is said that stress does not exist in Gurung (to which I agree).

Later Glover used 'stress' or 'accent' indifferently to mean the placement of high pitch in the tone curve. So the four tone-patterns on monosyllables are described in the following way (Glover 1972:21):

| Phonemic | Phonetic |
|--------------------|--------------|
| clear-accented | high falling |
| clear-unaccented | high level |
| breathy-accented | low rising |
| breathy-unaccented | low level. |

It appears that the feature stressed/unstressed (or accented/unaccented) in Gurung is another name for the feature contour/level which I used in the description of Tamang (see section 1.312). The motivation for Glover's choice of terms is the redundant feature crescendo /decrescendo which accompanies the articulation of the contour/level opposition in all the languages of the Tamang group.

⁶³Haudricourt criticized this idea on the grounds that the introduction of epenthetic vowels is not a natural evolution inside a language. It is typical of languages with clusters which have been learned by people who spoke a language without them (cf. the pronunciation of French by speakers of Provençal). Whether a situation of this kind could be supposed for some TB languages is

an open question. Another hypothesis is that 'schwa-languages' might represent a state of the language older than Written Tibetan. In both cases what I suppose is that the structure CəCV- had developed in the language before the development of tone.

⁶⁴Matisoff (1972c:6) reports Maran's claim that Jingpho prefixed syllables carry a two-way tonal opposition. Matisoff does not consider this tonal contrast, if it is confirmed, to be ancient. Could this be an indication that Jingpho schwa syllables are now in the process of acquiring full phonemic status as they did in Karen?

⁶⁵According to Haudricourt (personal communication 1974) the apparent exceptions to this rule in Thai (Haas 1956:49-51) can be explained by the fact that these words are loan-words. Neither initial clusters nor CVCV structures are native to Thai. So Haudricourt traces a word like sāmǎə 'always' to the borrowing of a word with an initial sm- cluster, which Thai broke up by inserting a schwa. In the source language though, the /m/ being in contact with the /s/ was probably devoiced, so that: sm- > sām-. Thus when tone developed in Thai, the initial of the second syllable was voiceless, and thus determined a tonal reflex of the high class. If this hypothesis is accepted, there is no need to have a special rule for this class of words stating that it was the initial of the first syllable which determined the tone of the word.

⁶⁶In old Indo-Aryan languages the words spelled with a final consonant were pronounced as disyllabic with the inherent vowel a following the 'final' consonant. In Camuhî also an originally disyllabic pattern was reconstructed.

ABBREVIATIONS

| | |
|--------------------|--|
| AM | Asia Major |
| Acta Lgca Haf. | Acta Linguistica Hafniensia |
| Am. Anthr. | American Anthropologist |
| Anthr. Linguistics | Anthropological Linguistics |
| ASEMI | Bulletin du Centre d'Etudes et de Recherches sur l'Asie du Sud-Est et le Monde Insulindien |
| BSLP | Bulletin de la Société de Linguistique de Paris |
| BSOAS/BSOS | Bulletin of the School of Oriental (and African) Studies |
| CLA | California Linguistics Association |
| CLS | Chicago Linguistics Society |
| HJAS | Harvard Journal of Asiatic Studies |
| IJAL | International Journal of American Linguistics |
| JA | Journal Asiatique |
| JAOS | Journal of the American Oriental Society |
| JAS | Journal of Asian Studies |
| JASB | Journal of the Asiatic Society of Bengal |
| JBRS | Journal of the Burma Research Society |
| JRAS | Journal of the Royal Asiatic Society |
| Lg | Language |
| LTBA | Linguistics of the Tibeto-Burman Area |
| MIM | Monthly Internal Memorandum, Phonology Laboratory, University of California, Berkeley |
| OPWSTBL | Occasional Papers of the Wolfenden Society on Tibeto-Burman Linguistics |
| POLA | Project on Linguistic Analysis, Phonology Laboratory, University of California, Berkeley |
| SIL | Summer Institute of Linguistics |
| TAK | Tōnan Ajia Kenkyū |

- TP T'oung Pao
Trans. Phil. Transactions of the Philological Society,
London
- TRESEAL "The Toneme and its Realization in East
and South-East Asian Languages," col-
lection of papers presented at the Ost-
asiatischer Institut of the Karl-Marx
University in Leipzig, June 1965,
Wissenschaftliche Zeitschrift der Karl-
Marx-Universitaet Leipzig. 16 Jahrgang
(1967), Part 1/2
- UCPL University of California Publications in
Linguistics
- ZDMG Zeitschrift der Deutschen Morgenlaendischen
Gesellschaft

Bahl, Kali Charan

- 1956 "Tones in Punjabi", Indian Linguistics 17, 139-147, Poona, 1957.
- 1957 "A Note on Tones in Western Punjabi (Lahanda)", Indian Linguistics 18, 30-34.

Bauman, James and Marc Okrand

- 1972 "The Relationship between Final Stops and Tones", MS.

Benedict, Paul K.

- 1948 "Tonal Systems in Southeast Asia", JAOS 68, 184-191.
- 1972a Sino-Tibetan: A Conspectus (=Princeton-Cambridge Studies in Chinese Linguistics II) (Cambridge: University Press).
- 1972b "The Sino-Tibetan Tonal System", Langues et techniques, nature et société, en hommage à André G. Haudricourt, ed. by Jacqueline Thomas and Lucien Bernot (Paris: Klincksieck) Vol. I, 25-33.
- 1973a "Tibeto-Burman Tones with a Note on Teleo-Reconstruction", Acta Orientalia Lund 35, 127-138.
- 1973b "The Proto-Sino-Tibetan (PST) Reconstruction", paper presented at the Sixth International Conference on Sino-Tibetan Language and Linguistics, San Diego, October 1973.

Bernot, Denise

- 1958 "Rapports phonétiques entre le dialecte marma et le birman", BSLP 53:1, 273-294.
- 1963 "Esquisse d'une description phonologique du birman", BSLP 58, 164-224.
- 1965 "The vowel systems of Arakanese and Tavoyan", Lingua 15, 463-474.
- 1972 "Quelques correspondances entre Maru et Birman", Langues et Techniques, nature et société, en hommage à André G. Haudricourt, ed. by J. Thomas and L. Bernot (Paris: Klincksieck) Vol. I, 35-39.

Bradley, David

ca. 1968-69 "Comparison of Nishida's and Lewis's Akha materials", MS.

1971a "Prosodies in Akha: Questions to Investigate", MS.

1971b "Prefixes and Suffixes in Burmese-Lolo", Fourth Sino-Tibetan Conference, Indiana.

1973 "Phunoi Today", Sixth Sino-Tibetan Conference, San Diego, 1973.

Bright, William

1957 "Alternations in Lushai", Indian Linguistics 18, 101-110.

Burling, Robbins

1957 "Lushai Phonemics", Indian Linguistics 17, 148-155.

1959 "Proto-Bodo", Lg 35, 433-453.

1966a "The Addition of Final Stops in the History of Maru (Tibeto-Burman)", Language 42:3, 581-586.

1966b "A Problem in Lahu Phonology", Artibus Asiae, Essays offered to G. H. Luce 1:97-101.

1967 "Proto Lolo-Burmese", IJAL 33:2, part II, issued simultaneously as Publication 43 of the Indiana University Publications in Anthropology and Linguistics (The Hague: Mouton). 101 p.

1969 "Proto-Karen: a Reanalysis", OPWSTBL 1, 1-116.

1971 "The Historical Place of Jinghpaw", OPWSTBL 2, 1-54.

Burton-Page, John

1955a "Two Studies in Gurungkura: I. Tone; II. Rhotacization and Retroflexion", BSOAS 17, 111-117.

1955b "An analysis of the syllable in Boro", Indian Linguistics 16, 334-44.

Chang, Betty Shefts see Shefts.

Chang Kun

1973 Review of P. K. Benedict, Sino-Tibetan. A Conspectus, JAS 32:2, 335-337.

Chang Kun and Betty Shefts

1964 A Manual of spoken Tibetan (Lhasa dialect), (Seattle: University of Washington Press)

1965 "A Morphophonemic Problem in the Spoken Tibetan of Lhasa", JAOS 85, 34-39.

- 1968 "Vowel Harmony in spoken Lhasa Tibetan", POLA, second series 7.

Chao Yuen-ren

- 1933 "Tone and Intonation in Chinese", Acad. Sin. 4, 121-134.

Cheng Chin-Chuan and William S-Y. Wang

- 1973 "Tone Change in Chaozhou Chinese: a study in lexical diffusion", Papers in Linguistics in Honor of Henry and Renée Kahane, 99-113.

Cornyn, William S. and D. Haigh Roop

- 1968 Beginning Burmese (New Haven: Yale University Press).

Dellinger, David W.

- 1967 "Notes on Akha segmental phonemes and tones", Papers on South East Asian Linguistics 1, Linguistic Circle of Canberra Publications, 35-43.

- 1968 "Ambivalence in Akha Phonology", Anthropological Linguistics 10:8, 16-22.

Egerod, Søren

- 1955 Review of Samuel E. Martin, "The Phonemes of Ancient Chinese", Language 31:3, 470-477.

- 1956 The Lungtu Dialect, a descriptive and historical study of a South Chinese idiom, (Copenhagen: Ejnar Munksgaard).

- 1970 "Distinctive Features and Phonological Reconstructions", JAOS 90, 67-73.

- 1971a "Phonation types in Chinese and South-East Asian languages", Acta Linguistica Hafniensia 13:2, 159-172.

- 1971b "Some Akha Basic Features", Fourth Sino-Tibetan Conference, Bloomington.

Forrest, R. A. D.

- 1960 "Les occlusives finales en chinois archaïque", BSLP 55:1, 228-239.

Gandour, Jack

- 1974 "The Features of the Larynx: N-ary or Binary?", Fourth Annual California Linguistics Association Conference, Los Angeles, May 5, 1974.

Gedney, William J.

- 1973 "Notes on the Tai Dialect of Ning Ming: Part I", Fourth Sino-Tibetan Conference, San Diego.

Gill, Harjeet Singh and Henry A. Gleason

- 1969 A Reference Grammar of Punjabi, Patiala.

- 1972 "The Salient Features of the Punjabi Language", Pākha Sanjam 4, 1-3.

Glover, Warren W.

- 1969 "Gurung Phonemic Summary", mimeo., (Kathmandu: SIL).

- 1971 "Register in Tibeto-Burman Languages of Nepal: a comparison with Mon-Khmer", Papers in South East Asian Linguistics 2, (Canberra: The Australian National University), 1-22.

- 1972 "A Guide to Gurung Tone", mimeo., (Kathmandu: SIL).

Goldstein, Melvyn C. and Nawang Nornang

- 1970 Modern Spoken Tibetan: Lhasa Dialect, (Seattle: University of Washington Press).

Goldstein, Melvyn C., with the help of Tsering Dorje Kashi

- 1973 Modern Literary Tibetan, OPWSTBL 5, (Urbana: University of Illinois).

Haas, Mary R.

- 1956 The Tai System of Writing. (Washington: American Council of Learned Societies).

Hahn, Michael

- 1971 Lehrbuch der Klassischen Tibetischen Schriftsprache (Hamburg: by the author).

Hale, Austin and Kenneth L. Pike

- 1970 Tone Systems of Tibeto-Burman Languages of Nepal, OPWSTBL 3.

Halle, Morris and K. N. Stevens

- 1971 "A note on laryngeal features", MIT Quarterly Progress Report 101, 198-213.

Hamp, Eric P.

- 1959 "Lushai syllables", Indian Linguistics 20, 238-40.

Hashimoto, Oi-kan Yue

- 1972 Studies in Yüe dialects 1: Phonology of Cantonese.

Princeton-Cambridge Studies in Chinese Linguistics
(Cambridge: Cambridge University Press).

Haudricourt, André G.

In the text, page references for the earlier articles are to Haudricourt 1972b.

- 1946 "Restitution du karen commun", BSLP 42 (1942-45), 103-111, reprinted in Haudricourt 1972b, 131-140.
- 1948 "Les phonèmes et le vocabulaire du thai commun", Journal Asiatique 236, 197-238, reprinted in Haudricourt 1972b, 85-118.
- 1950 "Les consonnes pré-glottalisées en Indochine", BSLP 46, 172-82, reprinted in Haudricourt 1972b, 119-130.
- 1953 "A propos de la restitution du karen commun", BSLP 49, 129-132, reprinted in Haudricourt 1972b, 141-145.
- 1954a "De l'origine des tons en vietnamien", JA 242, 68-82, reprinted in Haudricourt 1972b, 147-160.
- 1954b "Comment reconstruire le chinois archaïque", Word 10, 351-364, reprinted in Haudricourt 1972b, 161-182.
- 1958 "Des consonnes uvulaires en tibéto-birman", BSLP 53, 257-267.
- 1961 "Bipartition et tripartition des systèmes de tons dans quelques langues d'Extrême-Orient", BSLP 56, 163-180, reprinted in Haudricourt 1972b, 283-302.
- 1963 Review of Jones Karen Linguistic Studies, BSLP 58.2: 323-6.
- 1965 "Les mutations consonantiques des occlusives initiales en mon-khmer", BSLP 60, 160-172, reprinted in Haudricourt 1972b, 303-316.
- 1968 "La langue de Gomen et la langue de Touho", BSLP 63, 218-235, reprinted in Haudricourt 1972b, 363-381.
- 1971a "On tones in Punjabi", Pākha Sanjam 4: 1-3.
- 1971b "Les langues karen", ASEMI 2:4, 27-30.
- 1972a "L'apparition des registres des langues à tons ponctuels", Proceedings of the VIIth International Congress of Phonetic Sciences, 22-28 August 1971, 895-896 (Montreal: Mouton).

- 1972b Problèmes de Phonologie Diachronique, (Paris: SELAF)
[a collection of articles previously published in
various journals].
- 1972c "Two-way and Three-way Splitting of Tonal Systems in
Some Far-Eastern Languages", translated and developed
by Christopher Court, and reviewed by the author, in
Harris and Noss, ed., Tai Phonetics and Phonology.
(Bangkok: Central Institute of English Language, Mahi-
dol University).
- 1973 "Sur la mutation des occlusives sonores productrices
de tons en indo-européen", communication à la séance du
18 mars 1972, BSLP 68:1, ix.
- 1975 "Le système des tons du karen commun", BSLP 70:1, 339-
343.

Haudricourt, André G. and André Martinet

- 1946 "Propagation phonétique ou évolution phonologique?
Assourdissement et sonorisation d'occlusives dans
l'Asie du Sud-Est", BSLP 43, 82-92.

Henderson, Eugénie J. A.

- 1948 "Notes on the Syllable Structure of Lushai", BSOAS 12,
713-725.
- 1951 "The Phonology of Loan-words in some South-East Asian
Languages", Trans. Phil., reprinted in F. R. Palmer,
ed., Prosodic Analysis (London: Oxford University
Press), 1970.
- 1952 "The Main Features of Cambodian Pronunciation", BSOAS
14, 149-174.
- 1961 "Tone and Intonation in Western Bwe Karen", Burma Re-
search Society Fiftieth Anniversary Publication 1,
59-69 (Rangoon).
- 1965a "The Topography of Certain Phonetic and Morphological
Characteristics of South-East Asian Languages", Lingua
15, 400-434.
- 1965b Tiddim Chin, A Descriptive Analysis of Two Texts,
(London: Oxford University Press), 172 p.
- 1967 "Grammar and Tone in South-East Asian Languages",
TRESEAL, 171-178.

- 1973 "Bwe Karen as a Two-Tone language? An enquiry into the interrelations of pitch, tone and initial consonant", Sixth Sino-Tibetan Conference, San Diego.

Hombert, Jean-Marie

- 1973 "An experimental study of the tones of Lahu", MS.
 1974 "A phonetically based explanation of 'unexplainable' tonal developments", Fourth CLA Conference, Los Angeles, May 5, 1974.
 1975 Towards a Theory of Tonogenesis. Ph.D. dissertation, Berkeley.

Huffman, Franklin E.

- 1972 "The Boundary between the Monosyllable and the Disyllable in Cambodian", Lingua 29, 54-66.
 1973 "The Register Problem in Fifteen Mon-Khmer Languages", (Ithaca: Cornell University).

Hyman, Larry M.

- 1973 "The role of consonant types in natural tonal assimilations", in Hyman, ed., Consonant Types and Tone, Southern California Occasional Papers in Linguistics 1, 151-179.

Jäschke, Heinrich A.

- 1881 A Tibetan-English Dictionary, with special reference to the prevailing dialects, reprinted in 1968 (London: Routledge and Kegan Paul).

Jones, Robert B.

- 1961a "Laryngeals and the Development of Tones in Karen", Burma Research Society Fiftieth Anniversay Publication 1, 101-107.
 1961b Karen Linguistic Studies, University of California Publications in Linguistics 25:1.
 1968 "Proto-Burmese Finals", First Sino-Tibetan Conference.
 1971 "Some Problems with Proto-Karen Tones", Fourth Sino-Tibetan Conference, Indiana.
 1975 "The Question of Karen Linguistic Affiliation", VIIIth Sino-Tibetan Conference, Berkeley.

Kjellin, Olle

- 1975 "How to explain the 'tones' in Tibetan", Computational Analyses of Asian and African Languages 2, 37-52
(Tokyo, Japan).

Ladefoged, Peter

- 1973 "The Features of the Larynx", Journal of Phonetics 1:1, 73-83.

Lea, Wayne A.

- 1973 "Segmental and Suprasegmental Influences on Fundamental Frequency Contours", in Larry M. Hyman, ed., Consonant Types and Tone, 15-70.

Leben, William R.

- 1973 "The Role of Tone in Segmental Phonology", in Larry M. Hyman, ed., Consonant Types and Tone, 115-150.

Lehmann, Frederick K.

- 1972 Review of Burling, Proto-Lolo-Burmese, Am. Anthr. 74, 103-104.
- 1973 "Tibeto-Burman Syllable Structure, Tone and the Theory of Phonological Conspiracies", in Kachru, ed., Issues in Linguistics (Studies in honor of Henry and Renée Kahane), University of Illinois Press, 515-547.

Lewis, Paul

- 1968a "Akha Phonology", Anthr. Linguistics, 10:2, 8-19.
- 1968b Akha-English Dictionary (Linguistic Series III, Data Paper 70, Southeast Asia Program) (Ithaca: Cornell University).

Li Fang-kuei

- 1933 "Certain Phonetic Influences of the Tibetan Prefixes upon the Root Initials", Academia Sinica 4, 135-57.
- 1973 "Notes on Sino-Tibetan and Tai", Sixth Sino-Tibetan Conference, San Diego.

Löffler, Lorenz G.

- 1970 "The Bawm (Lai-zo) Tonal System", Third Sino-Tibetan Conference.
- 1972 "Pitch and Tone in Baum", Ethnologische Zeitschrift Zürich 1, 285-289.

- 1973 "Bawm Verbal Forms and the Tonal System of Central Chin",
Sixth Sino-Tibetan Conference, San Diego.

Luce, Gordon H.

- 1959a "Introduction to the Comparative Study of Karen Languages", JBRs 42:1, 1-18.
1959b "Chin Hills Linguistic Tour", JBRs 42:1, 19-31.

Lyovin, Anatole

- 1968 "Notes on the Addition of Final Stops in Maru", POLA,
second series 7.
1970 "Gaps in the Verb Paradigms of Classical Tibetan",
Working Papers in Linguistics, University of Hawai 2:8,
129-135.
1973 "Gaps in the Verb Paradigms of Written Tibetan revisited",
Sixth Sino-Tibetan Conference, San Diego.

Ma Hstieh-liang

- 1948 Lo-wen "Tso-chi, hsien-yao, kung-sheng ching" i-chu,
(=Academia Sinica 20), Taipei.
1951 Sa-ni Yi-yü yen-chiu [A Study of Sani, a Yi dialect],
(Peking: Advanced Studies Publishing House).

McCawley, James D.

- 1970 "Some Tonal Systems that come close to being pitch
accent systems but don't quite make it", CLS 6, 526-532.

Maran, La Raw

- 1971a A Note on the Development of Tonal Systems in Tibeto-Burman,
OPWSTBL 2, Urbana
1971b Burmese and Jingpho: a Study of Tonal Linguistic Processes,
OPWSTBL 4, Urbana.
1973 "On becoming a tone-language: a Tibeto-Burman model
of tonogenesis", in Larry M. Hyman, ed., Consonant Types and Tone,
97-114.

Martin, Samuel E.

- 1953 "The Phonemes of Ancient Chinese", supplement to JAOS
16, ii-46p, Baltimore.

Matisoff, James A.

- 1968 Review of Burling, Proto-Lolo-Burmese, Lg 44:4, 879-97.

- 1969a "Lahu Bilingual Humor", Acta Linguistica Hafniensia 12:2, 171-206.
- 1969b Lahu and Proto-Lolo-Burmese, OPWSTBL 1, 117-221.
- 1970 "Glottal Dissimilation and the Lahu High-Rising Tone: a tonogenetic case-study", JAOS 90:1, 13-44.
- 1971 The Tonal Split in Loloish Checked Syllables, OPWSTBL 2.
- 1972a The Loloish Tonal Split Revisited, Berkeley, Center for South and Southeast Asia Studies, Research Monograph Series 7.
- 1972b "Tangkhul Naga and Comparative Tibeto-Burman", TAK 10:2, 271-283.
- 1972c "The tones of Jingpho and Lolo-Burmese: common origin vs. independent development", Fifth Sino-Tibetan Conference, also Acta Lgca Haf. 15:2, (1974), 153-212.
- 1973a "Tonogenesis in South-east Asia", in Larry M. Hyman, ed., Consonant Types and Tone, 71-96.
- 1973b The Grammar of Lahu, UPCL 75.
- 1973c "Problems and Progress in Lolo-Burmese: Quo Vadimus?", Sixth Sino-Tibetan Conference, San Diego.
- 1973d Review of Law Raw Maran: "Burmese and Jingpho: a study of Tonal Linguistic Processes", JAS 741-743.
- 1974 "Diachronic and Synchronic Issues in Tibeto-Burman Causatives", paper presented at the "Causative Festival," University of Southern California, Los Angeles, May 2-3, 1974.

Mazaudon, Martine

- 1973a "Comparison of Six Himalayan Dialects of Tibeto-Burmese", paper read at the International Seminar on Anthropological Linguistics, Patiala, 11-14 October 1972, Pākha Sanjam 6 (Patiala), 78-91.
- 1973b Phonologie du Tamang, (Paris: SELAF).
- 1974 "Notes on Tone in Tibeto-Burman", LTBA 1:1, 27-54. [superceded by the présent paper.]
- 1975 "Tonal Developments in the Tamang sub-family of Tibeto-Burman", VIIIth Sino-Tibetan Conference, Berkeley.

Michailovsky, Boyd

- 1975 "Notes on the Kiranti Verb", LTBA 2:2, 183-218.

Michailovsky, Boyd and Martine Mazaudon

- 1973 "Notes on the Hayu Language", Kailash 1:2, 135-152
(Kathmandu).

Miller, Roy Andrew

- 1955a "The Independent Status of the Lhasa Dialect within Central Tibetan", Orbis 4: 49-55.
1955b "Studies in Spoken Tibetan I: Phonemics", JAOS 75:1, 46-51.
1956 "Segmental Diachronic Phonology of a Ladakhi Dialect", ZDMG 106, 345-362.
1966 Review of Richter, Grundlagen der Phonetik des Lhasa-Dialektes, ZDMG 116, 430-431.
1969 "The Tibeto-Burman Languages of South Asia", Current Trends in Linguistics 5, Linguistics in South Asia, 431-449.
1970 Review of Burling, Proto-Lolo-Burmese, Indo-Iranian Journal 12:2, 146-159.

Minn Latt

- 1967 "Tone and Juncture, Terminal and Stress, in Modern Burmese", TRESEAL, 207-211

Morse, Robert H.

- 1963 "Phonology of Rawang", Anthr. Linguistics 5:5, 17-41.

Nishi, Yoshio

- 1972 "Remarks on Reconstructions of Some Proto-Tamang Rimes", MS.

Nishida, Tatsuo

- 1958 "Chibetto-go to Biruma-go ni okeru tonēmu no taiō ni tsuite" [Equivalence of tonemes in Tibetan and Burmese], Gengo Kenkyū 35, 90-95.
1964 "Biruma-go to Roro shogo: sono seichō taikei no hīkaku kenkyū" [Burmese and the Lolo languages, a comparative study of their tone system], TAK 1:4.
1969 "Some Problems in Proto Lolo-Burmese", TAK 6:4.

Ohala, John

- 1973 "The Physiology of Tone", in Larry M. Hyman, ed., Consonant Types and Tone, 1-14.
- 1974 "A Note on Tonal Development as a Function of Final Consonants", MIM: January 1974, POLA, University of California, Berkeley, 17-18.

Pike, Kenneth L.

- 1948 Tone Languages (Ann Arbor: University of Michigan Press).
- 1970 "The Role of the Nuclei of Feet in the Analysis of Tone in Tibeto-Burman Languages of Nepal", in Prosodic Feature Analysis (Montreal: Didier)

Pittman, Richard and Jessie Glover

- 1970 "Proto-Tamang-Gurung-Thakali", in Hale and Pike, ed., Tone Systems of Tibeto-Burman Languages of Nepal, OPWSTBL 3, 9-22.

Pulleyblank, E. G.

- 1962 "The Consonantal System of Old Chinese", AM, series 2: 9, 58-144, and 206-265.
- 1963 "An Interpretation of the Vowel System of Old Chinese and of Written Burmese", AM series 2: 10, 200-221.

Purcell, Edward T.

- 1974a "From dynamic stress to word-tone, the consonantal origin of Balto-Slavic tone", Fourth Annual CIA Conference, Los Angeles, May 4-5, 1974.
- 1974b On the Origin of Tone in Balto-Slavic, MS, 78 p.

Ray, Punya Sloka

- 1965 "Kham phonology", JAOS 85:3, 336-342.

Richter, Eberhardt

- 1964 Grundlagen der Phonetik des Lhasa-Dialektes (= Schriften zur Phonetik Sprachwissenschaft und Kommunikation-forschung Nr. 8) (Berlin: Akademie Verlag).
- 1967 "Experimentelle Untersuchungen zur Theorie der Toneme im sprachlichen System des modernen Burmesischen" [Experimental studies on the toneme theory in the linguistic system of modern Burmese], Wissenschaftliche Zeitschrift der Karl-Marx Universität, Leipzig 16:1-2.

Rivierre, Jean-Claude

- 1972 "Les tons de la langue de Touho (Nouvelle-Calédonie): étude diachronique", BSLP 67, 301-316.

Roerich, Georges de

- 1931 "Modern Tibetan Phonetics, with special reference to the Dialect of Central Tibet", JASB 27:2, 285-312.
 1933 "The Tibetan Dialect of Lahul", Urusvati 3, 83-189.
 1958 Le parler de l'Amdo (=Serie Orientale Roma 18), Rome.

Sedláček, Kamil

- 1959 "The Tonal System of Tibetan (Lhasa Dialect)", TP 47, 181-250.

Shafer, Robert

- 1940-41 "The Vocalism of Sino-Tibetan", JAOS 60, 302-337, JAOS 61, 18-31.
 1944 "Problems in Sino-Tibetan Phonetics", JAOS 64, 137-143.
 1945 "Prefixes in Tibeto-Burmic", HJAS 9:1, 45-50.
 1950a "The Naga branches of Kukish", Rocznik Orientalistyczny 16, 467-530 (Krakow, 1953).
 1950b "The Initials of Sino-Tibetan", JAOS 70:2.
 1950-51 "Studies in the Morphology of Bodic Verbs", BSOAS 13:3, 702-724, and BSOAS 13:4, 1017-1031.
 1952 "Phonétique historique des langues lolo", TP 41, 191-229.
 1955 "Classification of the Sino-Tibetan Languages", Word 11, 94-111.
 1966-74 Introduction to Sino-Tibetan (Wiesbaden: Harrassowitz), 5 vol.

Shafer, Robert and Paul K. Benedict, ed.

- 1937-41 Sino-Tibetan Linguistics, MS, Berkeley.

Shefts, Betty Shefts Chang

- 1968a "A Projected Study on Tibetan Tones", MIM, Feb. 1968.
 1968b "Notes on Length and Tone in Tibetan", MIM, March 1968.
 1968c "Glottalization and the Falling Tone", MIM, May 1968.
 1968d "Sedláček's 'The Tonal System of Tibetan (Lhasa Dialect)'", MIM, July 1968.

Shefts, Betty and Kun Chang

- 1967 "Spoken Tibetan Morphophonemics: p", Lg 43:2.

Shorto, H. L.

- 1966 "Mon Vowel Systems: A Problem in Phonological Statement", In Memory of J. R. Firth (London: Longmans).
- 1967 "The Register Distinctions in Mon-Khmer Languages", TRESEAL, 245-248.

Simon, Walter

- 1940 "Certain Tibetan suffixes and their combinations", HJAS 5, 372-91.

Sprigg, Richard K.

- 1954 "Verbal Phrases in Lhasa Tibetan", Part I, BSOAS 16, 134-156, Part II, BSOAS 16, 320-350, Part III, BSOAS 16, 566-591.
- 1955 "The tonal system of Tibetan (Lhasa dialect) and the nominal phrase", BSOAS 17:1, 133-153; reprinted in Palmer, ed., Prosodic Analysis (London: Oxford University Press), 112-132.
- 1957 "Junction in Spoken Burmese", Trans. Phil., Studies in Linguistic Analysis (Oxford).
- 1964 "Burmese orthography and the tonal classification of Burmese lexical items", JBRs 47:2, 415-444.
- 1966 "Lepcha and Balti Tibetan: tonal or non-tonal languages?" AM new series 12:2.
- 1967 "Balti-Tibetan verb syllable finals, and a prosodic analysis", AM new series 13:1-2, 187-201.
- 1972 "A polysystemic approach, in Proto-Tibetan reconstruction, to tone and syllable-initial consonant clusters", BSOAS 35:3, 546-587.
- 1973 "'Vocalic alternation' in Balti, the Lhasa, and the Sherpa verb, as a guide to corresponding alternations in Written Tibetan, and to Proto-Tibetan reconstruction", Sixth Sino-Tibetan Conference, San Diego.
- 1974 Review of Matisoff: The Loloish Tonal Split Revisited, BSOAS 37:1, 259-262.
- 1975 "The inefficiency of 'tone change' in Sino-Tibetan descriptive linguistics", LTBA 2:2, 173-181.

Stern, Theodore

- 1963 "A provisional sketch of Sizang (Siyin) Chin", AM
new series 10, 222-278.

Taylor, L. F.

- 1920 "On the tones of certain languages of Burma", BSOS 1:4,
91-106.

Thurgood, Graham

- 1973 "Lisu and Proto-Lolo-Burmese", MS, Berkeley.
1974 "Tone Height and Prefixes in Lolo-Burmese Checked
Syllables: the Case in Lisu", MS, Berkeley.
forthcoming (1976) The Origin of Burmese Creaky Tone, Ph.D.
dissertation, Berkeley. [I was not able to consult
this work.]

Wang, William S-Y.

- 1967 "Phonological features of tone", IJAL 33:2, 93-105.
1969 "Competing changes as a cause of residue", Lg 45:1,
9-25.
1972 "The many uses of F₀", Papers in Linguistics and
Phonetics to the Memory of Pierre Delattre, (The Hague,
Paris: Mouton), 487-503.

Wolfenden, Stuart N.

- 1929a "On Ok Myit and She Pok, with a Proposed Revision of
the Terminology of Burmese 'Tones'", JBRs 19.3: 57-66.
1929b Outlines of Tibeto-Burman Linguistic Morphology (London).
1937 "Concerning the Variation of Final Consonants in the
Word Families of Tibetan, Kachin, and Chinese", JRAS,
625-655.

Yang, Paul Fu-mien, S.J.

- 1973 "Initial Consonant Clusters kl- in Modern Chinese
Dialects and Proto-Chinese", Sixth International Con-
ference on Sino-Tibetan Language and Linguistics, San
Diego.

Yu Dawchuan

- 1930 Love Songs of the Sixth Dalailama Tshangs-dbyangs-rgya-
mtsho, Academia Sinica, History and Philology Mono-
graphs, Series A No. 5, Peking. [transcribed by Chao
Yuen-ren].