

TONE SANDHI COMPOUNDING IN WHITE HMONG

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1. Tone Sandhi and Compound Formation¹

The term "sandhi" refers to phonetic changes occurring in words which are caused by certain phonetic characteristics of contiguous words. Thus "tone sandhi" is the change of tone in one word caused by the tone of a neighboring word. According to Kenneth Pike (1948: 25), "regular tone sandhi" narrowly described is "forced meaningless substitutions of one toneme for another . . . in which one toneme is perturbed by another." Eugénie Henderson (1967: 174) refers to "tonal alternation and compounding" and differentiates "tonal alternation," which affects meaning, from "tone sandhi," which she takes in the narrow sense given above.

White Hmong tone sandhi does not conform to either of the above descriptions of tone sandhi or tonal alternation exactly. It is of Pike's "arbitrary type" (1948: 26), in which the proper phonetic environment is not sufficient to guarantee tone change. Grammatical category and the particular lexical items involved also play a role. The compounds which result from tone change are sometimes different in meaning from a phrase involving the two unaltered words, but usually they are not. I choose to call tonal alternation in White Hmong "tone sandhi" (1) to emphasize the syntagmatic nature of the alternation, and (2) to emphasize the historical connection between the White Hmong "system relic" and the "regular" (mechanical) tone sandhi system from which it came (see Section 3. below). For reasons concerning the semantic unity of the members of the resultant tonally defined pairs and the behavior of a few of them as syntactic units (see Section 2.5.), I choose to call these pairs "compounds" after Lyman², and indicate their compound status with a linking hyphen in the orthography. Inasmuch as tone sandhi serves to create new words in White Hmong, it constitutes one of the morphological functions of tone in the language.

2. A Synchronic Account of White Hmong Tone Sandhi

2.1. On the Nature of White Hmong Tone Sandhi

Many words with high falling, low level, low checked, mid rising, and mid level tones (those words marked with -j, -s, -m, -v, and ɔ) respectively) have alternate tonal realizations when they enter into a particularly close relationship with a preceding word which has either a high level or high falling tone (-b, -j). Almost five hundred pairs of words which involve alternate tonal realizations, i.e., tone sandhi compounds, are listed in Appendix I of my dissertation (not

¹ This paper is simultaneously an expansion of a paper presented at the 1985 SEASSI Conference Panel on Hmong Linguistics and a reduction of Chapter II of my Ph.D. dissertation, "The Morphological Functions of Tone in White Hmong" (University of Chicago: 1986).

² Unpublished notes of Thomas A. Lyman, 1963, quoted in Heimbach, p. 454.

reproduced here in the interest of economy). A few examples here will serve to give an introduction to the nature of these tonally-defined compounds:

Noun-Verb Attribute (no change of style or meaning)	<i>dej siav</i> water cooked "boiled water" (H 298) ³	<i>dej-sia</i> "boiled water" (H 34)
Noun-Noun Attribute (with reported stylistic difference)	<i>hnoob tes</i> sun hand "sunray" (B <i>taw</i>)	<i>hnoob-teg</i> "sunray" (B <i>tes</i>)
Verb-Noun (with reported meaning difference)	<i>poob dej</i> fall water "to fall into water" (native speakers)	<i>poob-deg</i> "to drown" (B <i>dej</i> ; H 447)

There are both strict phonological (Section 2.2.) and syntactic (Section 2.3.) conditions on the occurrence of tone sandhi compounding; I have also observed that certain lexical items are more likely than others, given the same phonological and syntactic environments, to enter into such compounds (Section 2.4.). However, even after long familiarity with the compounds that do exist and the rules which limit their occurrence, it is impossible for me to predict which pairs of words must always compound, which (of those that meet the minimal criteria) must never compound, and which, as those examples cited above, can occur either way. Of those pairs of words which have been found both in a collocation of independent morphemes and in a tonally defined compound, some have concomitant meaning differences and some do not.

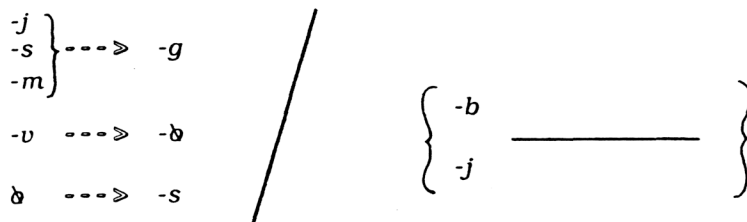
Apart from a number of frozen compounds which all sources and speakers seem to agree on (such as *teb-chaws* "country," from *teb* "land" and *chaw* "place"), the sporadic appearance of these compounds in the lexicon and the equal acceptability of both the compounded and the uncompounded forms in many cases indicates to me the truth of what Gordon Downer (1967) postulates: the tone sandhi system in White Hmong is an historical relic of a system that dates back no further, probably, than Proto-West-Hmongic (the Sichuan-Guizhou-Yunnan *fangyan* protolanguage), and which is in the process of dying out. The existence of a Proto-West-Hmongic sandhi system is inferred by Downer from a comparative study of five dialects of that branch including White Hmong, in which the system is eroded the furthest (see Section 3.1. for an expanded comparative analysis). Downer believes the sandhi system may someday disappear completely: it is possible for the original forms to replace the tonally derived forms in most cases, since speakers rarely cease to identify the base form and the sandhi form as the same "word" (1967: 596). Young speakers, as represented by the two young men I have had the greatest contact with, are beginning to use words with the base tone even in the syntactic collocation which most predictably gives rise to tonal compounding: the numeral-classifier collocation. They often meet questions about which tone is acceptable or better in certain collocations with a shrug of the shoulders, meaning that either is all right, and that neither will obscure communication.

³ "H" and "B" refer to the Heimbach and Bertrais White Hmong dictionaries.

For reasons that will be discussed fully in Section 3. below, I believe that compound formation by tone change is a new use being made of an old, once more regular and thoroughgoing, phonetically motivated tone sandhi system. The points of interest in a synchronic analysis of White Hmong tone sandhi are why it occurs when it does, what kinds of words are likely to be involved within the recognized phonological and syntactic constraints, and how these tonally defined compounds may differ in meaning and behavior from collocations made of the base forms of their component parts.

2.2. Phonological Conditions

White Hmong tone sandhi is of the progressive type; that is, the trigger word precedes the word that undergoes the tone change⁴. Although the changes were most likely due to neutralization under loss of stress in non-prepausal environments originally (see Section 3.3.), the tones that these changes gave rise to have become associated with certain tones in the basic inventory of lexical tones, so that the system in White Hmong today is one of paradigmatic replacement of one tone by another. The "neutralization effect" is still evident in the fact that five different tones collapse into a system of three. A representation of the specific changes which take place appears below:



It is important to remember that the above description of the phonological environment and changes captures the necessary phonological facts about tone sandhi, but that the proper phonological conditions alone are no longer sufficient criteria for change. As mentioned above, sandhi takes place optionally and, although its likelihood can be assessed, it takes place unpredictably. The focus is properly on its occurrence, therefore, rather than on its nonoccurrence. Nonetheless, there are three important exceptions to the scheme above, which are fairly easily explained.

2.2.1. Low Level (-s) Tone Exceptions

In an account of the White Hmong tone system from a diachronic perspective, we need to differentiate two low level (-s) tones. In White Hmong, the reflex of category B2 (the second of the three Proto-Hmong-Mien tones A, B, and C; the "2" indicates an ancient voiced initial consonant) merged with the reflex of category D1 (the D tone belongs to words that had final *-p or *-t in Proto-Hmong-Mien and arose later than the first three; the "1" indicates an ancient voiceless initial consonant). Only the words with low level tones which

⁴ Tone sandhi in the Mienic branch, on the other hand, is regressive. See Lu Yichang, [The Tonal Change in Morphology in Biaoimin Dialect of Mien Language] MZYW 6 (December 1985), pp. 16-20, and Solnit (1985:175-91). Interestingly, tone sandhi in North Hmongic is also regressive (Ying 1962:73; Institute 1962:5).

can be assigned to tone category B2 on the basis of comparative evidence undergo tone sandhi. This indicates that the period when the tone sandhi process was productively generating new compounds predated the White Hmong tonal merger, since no low level (-s) tone word which can be assigned to tone category D1 undergoes tone sandhi. To illustrate the different behavior of the -s¹ tone (< B2) from the -s² tone (< D2), the following comparison between White Hmong and Green Hmong, which did not undergo the same tonal merger, is given below:

tone sandhi with

White Hmong -s¹ (< B2) corresponding to Green Hmong -g (< B2)

<i>tus</i> :	<i>ib-tug</i>	"1-animate- "	<i>tug</i>
<i>tais</i> :	<i>ib-taig</i>	"1-bowlful- "	<i>taig</i>
<i>tes</i> :	<i>pob-teg</i>	"round part-hand"	<i>teg</i>
		(=wrist bone)	

no tone sandhi with

White Hmong -s² (< D1) corresponding to Green Hmong -s (< D1)

<i>caws</i> :	<i>ib caws</i>	"1 leap- "	<i>caws</i>
<i>qais</i> :	<i>ib qais</i>	"1 skein- "	<i>qais</i>
<i>kws</i> :	<i>pob kws</i>	"corn"	<i>kws</i>

Similarly, tone sandhi does not affect the following D1 -s tone words:

<i>nqaj dais</i>	"meat bear" (=bear meat) (cf. <i>nqaj-npuas</i> "pork" and <i>nqaj-nyug</i> "beef") (H 450)
<i>paj kws</i>	"flower corn" (=popcorn) (cf. <i>paj-npleg</i> "puffed rice" (H 449)
<i>sib ntaus</i>	"(recip)-strike" (=to strike each other) (cf. <i>sib-nraus</i> "to butt each other") (H 185)
<i>sib zas</i>	"(recip)-face off" (=to face off against each other) (cf. <i>sib-zeg</i> "to tease each other") (H 450)

2.2.2. The Voiceless Aspirated Stop, Voiceless Fricative/Breathy (-g) Tone Cooccurrence Restriction

The voiceless aspirated stops and the voiceless fricatives constitute a natural class in White Hmong, in that they share a feature which might be called "heightened voiceless noise"; impressionistically, "heightened air flow."⁵ Since aspiration is distinctive in White Hmong, the voiceless aspirated stops have a pronounced period of aspiration before the onset of voicing in the vowel. The voiceless fricatives *f*-, *h*-, *hl*-, *s*-, *x*-, *xy*-, are characterized, of course, by voiceless airflow as well as by friction. The phonological distinctions based on "heightened voiceless noise" would be difficult to maintain if the syllable in question were to be pronounced with the breathy (-g) tone, the main feature of which is also heightened voiceless noise.⁶ Therefore, no Hmong word which begins with one of these initials will carry the breathy (-g) tone.⁷ As a corollary

⁵ These consonants constitute a class in the Tai languages as well, and are referred to as the "high consonants." Certain dialects, including Siamese, underwent a tone split on the basis of whether or not the initial was of this class (Li Fang-Kuei, *A Handbook of Comparative Tai* [Hawaii: University Press, 1977], p.29).

⁶ This tone is a more "whispered" than "murmured" breathy tone.

⁷ Bertrais, introduction: "Les mots qui ont une aspiration ne portent jamais le ton 'neeg'." Mottin, p. 16. "Notons qu'aucun mot aspiré ne se prononce sur ce ton [-g]."

to this fact, no word beginning with either a voiceless aspirated stop or a voiceless fricative will undergo these sandhi changes:

$\begin{array}{c} -j \\ -s \text{ ---} \rightarrow -g \\ -m \end{array}$	/	$\left\{ \begin{array}{c} -b \\ -j \end{array} \right. \text{ --- }$
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Examples of this cooccurrence restriction appear below:

<i>ib phaj mov</i>	"1 plate of rice" (H 448)	(cf. <i>ib-roog mov</i> , "1 tableful of rice")
1 plate rice		
<i>ib phom</i>	"1 shot" (H 244)	(cf. <i>ib-nplawg</i> , "1 blow")
1 gun/shot		

Similarly:

<i>ib chim</i>	"a little while" (H 24)
<i>ib faj</i>	"1 of a pair" (H 44)
<i>ib feem</i>	"1 part; 1 portion" (H 44)
<i>ib fij</i>	"a shift of work" (Vwj 1983: 44-45)
<i>ib hom</i>	"1 kind" (H 54)
<i>ib hwm</i>	"an ensemble of pieces" (B <i>hwm</i>)
<i>ib phaum mob</i>	"1 sickness" (H 450)
<i>ib phiaj</i>	"1 row; 1 set" (H 243)
<i>ib sas</i>	"1 spurt" (H 287)
<i>ib sij</i>	"continually; repeatedly" (H 293)
<i>ib sim neej</i>	"1 lifetime" (H 294)
<i>ib suam nag</i>	"1 shower" (B <i>suam</i>)
<i>ib thaj</i>	"1 stretch of land" (B <i>thaj</i>)
<i>ib thaj neeb</i>	"1 session of spirit worship" (B <i>thaj</i>)
<i>ib thooj</i>	"1 lobe; 1 clump; 1 packet" (B <i>thooj</i>)
<i>ib tshaj</i>	"1 case at law" (H 448)
<i>ib tshooj</i>	"1 level; 1 story" (H 369)
<i>ib txhij</i>	"at the same time" (H 392)
<i>sib fim</i>	"to be acquainted with each other" (H 45)
<i>sib foom</i>	"to set a curse on each other" (H 46)

Although the cooccurrence restriction between the native initials *hl-*, *s-*, *x-*, and *xy-* and the breathy (*-g*) tone seems to be a restriction of a solely phonological nature, the restriction on the cooccurrence of many *f-* and *h-* words and the breathy tone is apparently due both to phonology and to the fact that words with these initials are often loans from Chinese. Recent loans came into the language when the tone sandhi process was no longer productive, and are hence less likely to undergo change (see below).

2.2.3. The Non-Involvement of More Recent Chinese Loans

Contact between the Chinese and the Hmong has existed over centuries and the traffic in loanwords has been extensive. This is a matter of general knowledge, shared both by those who claim a genetic relationship between the two families and those who do not. The difficulty in analyzing these loans lies in identifying the dialect(s) of Chinese from which the loans came, and the times at which they entered the language. The Southwest variety of Mandarin as spoken in Yunnan province is the form of Chinese used as a probable source of recent

loans in Lyman's Green Hmong dictionary. Studies of Chinese loans in Hmong-Mien languages include Institute 1962 (loans in Mien, Bunu, and Lakkja) Ying 1962 (loans in several Hmongic dialects), Downer 1973 (strata of loanwords in Mien), and Benedict 1985 (early Sino-Tibetan/Hmong-Mien loan relationships).

Ying (1962:74) and Ruey and Kuan (1962:525) both mention that Chinese loans do not undergo tone change in XIANJIN and XUYONG, respectively. The same is true in White Hmong. Such loanword exceptions in the most exceptionless environment for tone sandhi, the collocation numeral-classifier, are listed below (the Southwest Mandarin forms are from Lyman's dictionary):

<i>lwm</i> (< SWMan <i>er</i> "two")	"another; times, occasions"
- <i>nyeem ib lwm</i>	"read one time" (H 123)
- <i>dav hlau yuj ob peb lwm</i>	"the plane makes 2-3 turns" (B <i>yuj</i>)
hawk iron hover 2 3	
<i>tiam</i>	"generation"
- <i>ib tiam neej</i>	"1 generation" (Downer 1967: 594;
1 gen. person	B <i>tiam</i>)
<i>vam</i> (< SWMan <i>wán</i> "10,000")	"tens of thousands" ⁸
- <i>ib vam</i> ; <i>ob vam</i>	"10,000"; "20,000" (H 398)
<i>yam</i> (<SWMan <i>yáng</i> "thing")	"kind, sort, type"
- <i>ib yam</i>	"1 thing; the same thing" (H C19)

The loanword exception also explains the absence of sandhi forms in compounds such as the following:

<i>cwj mem</i> (< SWMan <i>mě</i> "ink")	"pencil; pen" (H 21)
pointed ink	
stick	
<i>sib cam</i>	
(recip) argue	"argue with each other" (H 7)

Although I will not attempt to read too much into the fact that the six examples cited above bear the checked (-*m*) tone, I think that it suggests that a proper study of "loan-tones" in Hmong would be fruitful.

2.3. Syntactic Conditions

The following word class conditions on tone sandhi were recognized by Lyman (of Green Hmong) in 1963, and were reproduced by Heimbach in his dictionary (p. 454):

TONE SANDHI

At the present stage of research, it would seem that sandhi changes occur when members of certain word classes are joined syntactically, in what may be called "compounds." The following have so far been recorded:

1. Numerals joined to classifiers: *ob-leeg* 'two persons'

⁸ As David Strecker points out (p.c.), the word for "10,000" has tone C2 in seven of the nine dialects represented in Wang 1979, and tone D2 only in White Hmong, Green Hmong, and SHIMEN. It may be that it was an early loan in the majority of the dialects, and a later loan in the latter three.

2. Numerals joined to numerals: *ib-puas* 'one hundred'
3. Nouns joined to modifying words (these latter being either Nouns or Verbs): *teb-npleg* 'rice field'
4. Autotelic Verbs joined to Nouns (as locative objects): *poob-deg* 'fall in the water'

(The label "Noun" is here taken to include localizers, a subgroup of nouns which correspond to English prepositions, e.g., *qab* 'bottom' or 'under'. The label "Verb" is here taken to include words corresponding to English adjectives, e.g., *liab* 'to be red'. An "Autotelic Verb" is a verb which may or may not take a noun object. In the latter case, the object modifies the verb.)

Heimbach's only objection to the above account of Hmong tone sandhi is that it does not explain the countless times tone sandhi fails to occur in such syntactically defined compounds. In his introduction to the above quotation, Heimbach states that the two factors of word class and juncture are important in determining whether a change of tone is "required" or not. I would go further than Heimbach: to assert that word class and juncture are sufficient to insure that tone sandhi will take place ignores the frozen collocations without tone change, certainly compounds in terms of meaning and behavior, such as *pojnam* 'woman; wife' (literally "woman-woman"). I think it is better to say that tone change indicates close juncture rather than that close juncture is a prerequisite of tone change. (See Section 3. on why it is impossible to fully specify the conditions under which tone sandhi will occur.)

Gordon Downer (1967: 592-93) lists the following:

... constructions in which the modified tones are commonly found. As the grammatical analysis of WM [White Miao] is far from complete, all grammatical labels must be taken as purely provisional.

- (1) Num. + Quant. (when the Num is *i*¹ 'one'
*ɔ*¹ 'two,' *pe*¹ 'three,' *plɔ*¹ 'four,' *tɕi*¹
'five,' *kyua*² 'nine,' and *ti*¹ 'only one')
- (2) Nominals (the first syllable is Noun, the second may be Noun, Verb, or Adj.; both subordinate and coordinative constructions occur)
- (3) Quant. + Noun (only three examples found)
- (4) VPref. + Verb (the only VPref. is *ɕi*¹ or *ɕi*⁴ 'each other')
- (5) Verb + Noun

Downer recognized two important constructions which Lyman omitted: the reciprocal-verb construction, and the rare, though very interesting, classifier (Downer uses the term "quantifier")-noun construction (see Sec. 4.2.).

Mottin (p. 19) recognized roughly the same constructions as Downer:

Cela [changement de ton] semble être la plupart du temps
le cas quand les mots forment une entité, un syntagme:

- avec un numéral: *ib-qho* = un lieu, une chose
- avec un verbe ou nom pris comme adjectif:
dej sov = l'eau est chaude

- dej-so = de l'eau chaude
 kauj-ntseg = des pendants d'oreille
 -avec un verbe normalement intransitif, mais qui peut être
 directement suivi d'un nom avec lequel il fait comme expression:
 poob-deg = tomber (dans) l'eau
 -avec des mots comme "sib":
 sib-tog = se mordre l'un l'autre⁹

2.3.1. Constructions Involving Numerals

As Heimbach observed (p. 446), tone sandhi is "particularly noticeable in words preceded by one of the first five numerals."¹⁰ A large number of examples involving each one of the possible changes is easy to find:

<i>ib-rag</i>	(< <i>raj</i>)	<i>dej</i>	"1 tubeful of water"
<i>ib-pluag</i>	(< <i>pluas</i>)	<i>mov</i>	"1 meal (of rice)"
<i>ob-daig</i>	(< <i>daim</i>)	<i>ntawv</i>	"2 sheets of paper"
<i>peb-kw</i>	(< <i>kwv</i>)	<i>taws</i>	"3 shoulderloads of firewood"
<i>ib-los</i>	(< <i>lo</i>)	<i>lus</i>	"1 mouthful of language" (=1 word)

The above collocations are all numeral-classifier.

The collocation numeral-numeral also gives rise to tone sandhi when the second numeral is *caum* ("10's" - 30 and above) or *pua* ("100") and the first numeral is 1-5 or 9 (with the interesting exception *cuaj caum* "90"¹¹):

<i>plaub-caug</i>									"40"
4		10							
<i>ib txhiab</i>	<i>cuaj-puas</i>	<i>yim</i>	<i>caum</i>	<i>rau</i>					"1986"
1	1,000	9	100	8	10	6			

Notice that *vam* "10,000," perhaps in White Hmong a more recent Chinese loan, does not undergo tone sandhi, as mentioned above (Section 2.2.3.):

<i>ib vam</i>	"10,000"
<i>ob vam</i>	"20,000"

A third category of words is affected by the numeral *ib* "one": nouns used as measure words, or nouns the entirety of which is being expressed:

<i>ib-hmos</i>	(< <i>hmo</i>)	"1 night" (H 452)
<i>ib-vog</i>	(< <i>vog</i>)	"1 circle" (H 401)
<i>ib-ce</i>	(< <i>cev</i>)	"the entire body" (B <i>cev</i>)
<i>ib-zog</i>	(< <i>zos</i>)	"the whole village" (H 449)

Finally, there are two words which are "numeral-like" in meaning, bear the right tones, and can effect tone sandhi: *tib* "single, sole; 1 blow of . . ." and *thawj* "first; head":

<i>tib-leeg</i>	(< <i>leej</i>)	"sole person" (B <i>leej</i>)
<i>tib-qho</i>	(< <i>qhov</i>)	"sole thing" (H 315)
<i>tib-tug</i>	(< <i>tus</i>)	"sole person" (B <i>tib</i> ; H 315, 325)
<i>tib-plhaws</i>	(< <i>plhaw</i>)	"1 jump" (B <i>plhaw</i>)

⁹ I have added hyphens to the quotation to indicate when tone sandhi has taken place, since the base forms are not given.

¹⁰ In at least one instance, the numerals themselves, in ordinal postposition, are changed: in the compounds referring to the days of the waxing of the moon, *xiab-raus* "the sixth day of the moon's increase," *xiab-xyas* "the seventh . . .," *xiab-yig* "the eighth . . .," *xiab-cuag* "the ninth . . .," *xiab-kaug* "the tenth . . ."

¹¹ Heimbach, p. 457; Downer 1967: 592; Vwj 1983: 37; Xab Xyooj (p.c.)

<i>tib-riag</i>	(< <i>riam</i>)	"1 stroke of the knife" (H 450)
<i>tib-teg</i>	(< <i>tes</i>)	"1 blow of the hand" (H 316)
<i>thawj-caw</i>	(< <i>cawv</i>)	"'head' of the whiskey" (B <i>cawv</i>)
<i>thawj-zaug</i>	(< <i>zaum</i>)	"first time" (B <i>thawj</i> ; H 335)

When I first started looking at tone sandhi in White Hmong, it seemed as though these numeral collocations came fairly close to constituting an exceptionless environment for tone change, probably because the most common classifiers (for example, *tus* "animate, long and slender," *leej* "human," *nkawm* "pair," *daim* "flat object") seem to change exceptionlessly. On a careful reading of both Bertrais' and Heimbach's dictionaries, though, I discovered a great number of exceptions in this syntactic collocation, too, bringing it more in line with the other syntactic environments in which tone sandhi compounding may occur. A list of these exceptions follows:

<i>ib cim</i>	"1 turn of work; 1 season" (H 13, 90; B <i>cim</i>)
<i>ib com</i>	"1 measure of 6 kilos" (B <i>com</i>)
<i>ob cum</i>	"2 sides, groups, clans" (H 17)
<i>ib cuam teeb</i>	"opium smoking utensils" (B <i>cuam</i>)
<i>ib cuam nqajf</i>	"1 'stretching' of meat" (B <i>cuam</i>)
<i>ib cuam nplooj</i>	"1 length of roofing leaves" (H 20)
<i>ib cuam</i>	"1 time" (B <i>cuam, nrau</i>)
<i>ib cham neeg</i>	"1 group of people" (B <i>cuam</i>)
<i>ib chaw</i>	"1 place" (B <i>chaw</i>)
<i>ib dav hlau</i>	"1 plane/ful (of goods)" (B <i>thauj</i>)
<i>ib kauj hlua</i>	"1 coil of rope" (H 77, 448)
<i>ib kuam</i>	"1 hand (of bananas)" (H 90; B <i>kuam, thij</i>)
<i>ib kheev</i>	"1 bundle" (B <i>kheev</i>)
<i>ib leej</i>	"1 line (of houses)" (H 110, 448; B <i>leej</i>)
<i>ib lo lus</i>	"1 mouthful of language" (B <i>lo</i>)
<i>ib naj zia</i>	"1 gummy stick" (B <i>naj</i>)
<i>ib ncauj hntav</i>	"1 mouthful of teeth" (H 145, 448)
<i>ib ncuav pias</i>	"1 slap" (H 149)
<i>ib ntsauv</i>	"1 clump" (B <i>ntsauv</i>)
<i>ib ntsis</i>	"1 moment" (H 201)
<i>ib ntsuj teb</i>	"1 portion of field" (H 204)
<i>ib ntshua</i>	"1 cluster" (B <i>ntshua</i>)
<i>ib ntuxj</i>	"1 slab" (B <i>ntuxj</i>)
<i>ib ntuxj tsua</i>	"1 out-jutting of rock" (H 448; B <i>ntuxj</i>)
<i>ib nyuam qhuav</i>	"1 moment" (H 222, 272)
<i>ib pam quav</i>	"1 passage of defecation" (H 224)
<i>ib phau ntawv</i>	"1 book" (B <i>phau</i>)
<i>ib pheev teb</i>	"1 slope of field" (B <i>pheev</i>)
<i>ib plhaw</i>	"1 jump" (H 254)
<i>ib qhov tshiab</i>	"1 new thing" (B <i>qhov</i>)
<i>ib qhoo</i>	"1 bundle" (B <i>qhoo</i>)
<i>ib rauj rau</i>	"1 hammer blow on" (B <i>rauj</i>)
<i>ib rauv</i>	"1 cluster (of fruit)" (B <i>rau</i>)
<i>ib rauv</i>	"1 square (of embroidery)" (B <i>rau</i>)
<i>ib rooj</i>	"1 tableful" (B <i>rooj</i>)
<i>ib ruam</i>	"1 step" (B <i>ruam</i>)
<i>ib tauv nroj</i>	"1 clump of weeds" (B <i>tauv</i>)
<i>ib tawm tsheb</i>	"1 train of cars" (H 311)
<i>ib tom</i>	"1 time" (H 322)
<i>ib twv huab</i>	"1 cloud" (B <i>twv</i>)
<i>ib tsam</i>	"1 period of several hours" (B <i>tsam</i>)
<i>ib tsum mov</i>	"1 tableful of food" (Yaj, forthcoming)
<i>ib txwm</i>	"a long time" (H 386)

<i>ib txwm ntawv</i>	"1 letter of the alphabet" (H 386)
<i>ib txhia</i>	"some; a portion" (H 393)
<i>ib voj-teg</i>	"a circle made with the 2 hands" (B tes)
<i>ib yoj thee</i>	"1 ovenful of charcoal" (B yoj)

Many of these unmodified words have been found with the expected sandhi forms. The places where the exceptional unmodified forms were found is indicated. As of now, I have no explanation for these exceptions, except to say that a number of these words will doubtlessly prove to be Chinese loanwords (those words with initials *h-*, *f-*, *y-*, and/or tone *-m* are suspect, for example). But if tone sandhi compounding is no longer a live process in the language, it stands to reason that there would be exceptions in every eligible syntactic collocation. The proper focus here, too, then, is on the occurrences rather than the non-occurrences of the tone change.

An interesting re-analysis of tone sandhi involving the numerals was offered by Lauj Pov Vaj, who was a 21-year old instructor in Hmong at the Southeast Asian Studies Summer Institute at the University of Michigan, summer 1985. He used the sandhi tone with the common classifier *tus* (> *tug*) after the numerals, but said it was not necessary to do so, and that both tonal realizations sounded equally good to him. Then, seemingly as an afterthought, he added that perhaps *tus*, the base form, was the singular form (*ib tus dev* "1 dog"), and that *tug*, the sandhi form, was the plural form (*ob tug dev* "2 dogs"). His own speech did not bear out his analysis, but it was a familiar attempt to make sense out of the remains of an ancient process.

2.3.2. Reciprocal-Verb

Roughly as often as not, the reciprocal *sib* induces tone sandhi in the following verb, if it bears one of the proper tones.

It is not clear yet whether or not for some speakers there is a meaning differentiation correlated with the base form as opposed to the sandhi form of the verb. For example, with the verb *tom* "to bite," does *sib tom* mean "to bite each other" (the sum of its component parts) whereas *sib-tog* means "to fight" (with specific acts of biting raised to the main event of which they are a part)?

With regard to this collocation, it is very interesting to note that *sis*, an alternate form of the reciprocal, often appears with the sandhi form of the verb in Bertrais' examples. It is not a feature of the White Hmong of Laos to the exclusion of the White Hmong of Thailand, apparently, since Heimbach (p. 294) mentions that *sis* is a variant form of *sib* which is "often used." Heimbach gives fewer examples with *sis*, though, having regularized to *sib* for the most part, so the following examples all come from Bertrais:

<i>sis-ceg</i>	"to argue with each other"
<i>sis-ncag</i>	"to make a line with each other"
<i>sis-nraus</i>	"to butt each other"
<i>sis-qawg</i>	"to embrace each other"
<i>sis-tog</i>	"to bite each other"
<i>sis-tuas</i>	"to kill each other"
<i>sis-tuag</i>	"to kick each other"
<i>sis-txig</i>	"the same height"
<i>sis-xyaws</i>	"mixed up together"
<i>sis-zeg</i>	"to tease each other"

Note that *sis* bears the wrong tone for a tone sandhi trigger: it is extremely unusual to have the sandhi tones follow anything other than a word with a -b or a -j tone, and it always suggests something interesting about the history of the language. The other situation where this occurs is "sandhi form promotion," where the sandhi form of a word, generated in the usual fashion, has, over time, become detached from the trigger which gave rise to it and has gained base form status, either co-existing with the old base (often with an accompanying semantic split), or supplanting the old base entirely. To understand the appearance of sandhi forms following *sis*, it is necessary to look at Wang's comparative data on this root (1979:89):

YANGHAO	XIANJIN	SHIMEN	GAOPO	FUYUAN	FENGXIANG
çi ^{4 4}	çi ³³	hi ¹¹ /çi ¹¹	shoŋ ¹³	si ³¹	çou ³³
(C1)	(D1)	(D1)	(B1)	(A/D)	(A1)

The tonal reflexes of this root all indicate an ancient voiceless initial, yet all four Proto-Hmongic tones are represented. White Hmong *sib* is a reflex of category A1 and *sis* is a reflex of category D1. Although Wang writes that it is difficult to account for the vast discrepancy among the tones in the different localities, or to reconstruct the original tone, his discussion of the final-ŋ of the GAOPO form (1979: 124) may provide a clue as to the cause. He reports that in GAOPO, the final of the reciprocal will harmonize with the final of the following verb. Accordingly,

shoŋ ¹³	zɔŋ ⁴³	"to be good to each other"
shu ¹³	tɕu ^{2 2}	"to meet each other"
shə ¹³	pə ⁵⁵	"to see each other"
shi ¹³	zi ²²	"to bind each other"

The intimate nature of the relationship between the reciprocal and its verb (both Wang [1979: 124] and Downer [1967:593] refer to the reciprocal as a "prefix") could explain the different tonal reflexes as well: in GAOPO, a live process of vowel harmony marks the relationship¹²; perhaps in ancient Hmong, a process of tone harmony marked the relationship. As this process faded out, one or another of the shifting forms became the sole form, or, as in White Hmong, two forms persisted. The connection thereafter was marked, for those languages of the West branch of Hmongic which preserved the A1-reflex reciprocal, by tonal modification of the right-hand member, the verb, rather than by modification of the left-hand member, the reciprocal.

The explanation for the tone sandhi forms following thesis variant could be, therefore, (1) the identification of *sib* and *sis* as trivially different manifestations of the same root, with no differentiation in meaning, and (2) the need, existing through reconstructible history, to signal this semantic relationship as being an unusually close one through the deformation of one or the other of the two words.

¹² We can only speculate as to how the vowel harmony in GAOPO developed. It is reported that some GAOPO prefixes also change to harmonize with the vowel of the root (nouns and ordinal numerals) to form disyllabic words (Insitute 1962:5-6).

2.3.3. Noun-Modifier

In normal White Hmong word order, modifiers follow the words they modify. When the relationship between modifier and noun is a close, common, and conventionalized one (see Section 2.4. below) and the right phonological conditions obtain (Section 2.2.), a tone sandhi compound may result. Of the two kinds of modifiers, noun and verb, compounds with noun modifiers are four times as numerous as compounds with verb modifiers in the examples presented in Appendix I of my dissertation. Some examples follow:

<i>ciab-mu</i> (< <i>mu</i>)	"beeswax"
wax bee	
<i>dab-npuas</i> (< <i>npua</i>)	"pig trough"
trough pig	
<i>kab-teg</i> (< <i>tes</i>)	"lines of the hand"
line hand	
<i>vaubkib-deg</i> (< <i>dej</i>)	"turtle"
turtle water	
<i>nab-qa</i> (< <i>qav</i>)	"lizard"
snake frog	
<i>nqob-nplej</i> (< <i>nplej</i>)	"the upper part of the rice stalk"
upper stalk rice	

Sandhi compounds with verb modifiers, however, are not unusual (there are approximately fifty in the examples presented in Appendix I). It is well known that a separate class of "adjective" does not exist in most Asian languages, including Hmong, since adjective-like verbs are predicated of nouns with no need for the support of a copula. Many of the noun-verb modifier compounds involve one of these "adjective-like" verbs. A few examples follow:

<i>dib-caug</i> (< <i>cauj</i>)	"early-bearing cucumber"
cucumber early	
<i>nkauj-mog</i> (< <i>mos</i>)	"young girl"
girl soft	
<i>nplooj-qhua</i> (< <i>qhuav</i>)	"dry leaves"
leaf dry	
<i>tiab-nres</i> (< <i>nre</i>)	"pleated skirt"
skirt to pleat	
<i>vab-tshaus</i> (< <i>tshau</i>)	"sieve"
tray to sift	

2.3.4. Noun-Noun

Repetition with a slight variation in four word coordinative constructions is typical of Hmong figurative language (P'an and Ts'ao 1958; Johns and Strecker 1982). It is found in miniature in a number of two-word sandhi compounds. Here neither word modifies the other, but together they form a coordinative construction; either a repetitive compound involving words with only slight meaning differences or a compound pair involving objects or people which belong together:

<i>hlab-hluas</i>	"cord-rope" (=viscera)
<i>hlab-kag</i>	"cord-band" (=tatters, rags)

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this position). *Tshis* "goat" does not participate in these compounds since *-s* changes to *-g* in the right-hand member, and there is a cooccurrence block between aspirated initials and the breathy (*-g*) tone (see Section 2.2.2.). Thus we have *nqaij-npuas* "pig meat" and *nqaij-nyug* "cow meat," but *nqaij twm* "buffalo meat" and *nqaij ntses* "fish meat." My tutor explained that the relative prominence of "pig" and "cow" in compounds had to do with their central role in everyday life, and the time and effort expended in their care. Poultry, goats, pigs, buffalo, cattle, and horses constitute the chief domestic animals of the Hmong of highland Laos (Barney 1967: 284-85). The explanation for the involvement of "pig" and "cow" seems good, but still does not explain the lack of involvement of *nees* "horse" and *twm* "water buffalo." Similarly, *zaj* "dragon" is involved in four tone sandhi compounds, but the culturally important *tsov* "tiger," even more central a figure in Hmong folk tales, has not yet been found in one compound.

The only way to account for this selective involvement of certain lexical items in tone sandhi compounds over their semantically related cousins is to mark in the lexicon the fact that these words, namely the sixty reproduced above, or some subset thereof, are particularly powerful when it comes to inducing tone change and thereby creating a compound (if it is a *-b* or a *-j* word), or are particularly susceptible when it comes to being influenced by a preceding *-b* or *-j* word (if they bear the tones *-j*, *-s*, *-v*, or *-b*). I think it possibly significant that no word with a low checked (*-m*) tone appears in the table of high frequency words (which may be related to the limited involvement of *twm* "water buffalo" mentioned above). This tone is the reflex of historical category D2, the words of which can be shown to have once had a final **-p* or **-t*. It may be that the *-m* tone does not play as great a role in tone sandhi compounding due to its special development from checked syllables, or due to its possible role as a "loan tone" for borrowed words (see Section 2.2.3. above), or both.

Although a number of semantic relationships hold between the members of a tone sandhi compound, it is important to describe some of the typical relationships in order to come to an understanding of the above high-frequency words in a different way. These are specialized relationships which can be considered subordinate to the general syntactic relationship of noun-modifier described in Section 2.3.3. Although it still may be desirable to analyze the syntactic relationship between the two members of the compound as noun-modifier in the following categories of specialized relationships, semantically the first member of these compounds specifies and delimits the broader category represented by the second member.

2.4.1. Part-Whole

In the following compounds, if the left-hand member is "A" and the right-hand member is "B," each can be glossed as "the A of the B." Thus *nplooj-ntoos* can be understood as "the leaf of the tree" (that part of the tree), or as "tree leaves" (as opposed to rice leaves). This group includes spatially delimiting words also: *nrab/nruab* "in the middle of" and *qab* "on the underside of; at the base of; on the downhill side of." The following examples are representative:

ncej-cog
post treadmill

"treadmill post"

<i>ncauj-ke</i> mouth road	"entrance to the road"
<i>nruab-ntug</i> middle sky	"in the heavens"
<i>qab-pag</i> bottom lake	"the bottom of the lake"
<i>qib-hnee</i> trigger crossbow	"the trigger of the crossbow"
<i>rooj-ntxas</i> gate grave	"the opening of the grave"
<i>taub-qeeg</i> gourd keng	"the body of the keng"

2.4.2. Object-Material

Another type of tone sandhi compound in which the left-hand member delimits the right-hand member is the object-material type. As with the part-whole compounds, the relationship between the two members can be understood in one of two ways. *Khawb-hlaus* can be understood as "a link of iron," where "link" serves as a unit of measure of an infinite quantity of iron, or as "an iron link" (as opposed to a silver link).

<i>hleab-ntoos</i> coffin tree	"wood coffin"
<i>khawb-hlaus</i> link iron	"iron link"
<i>khawb-nyiaq</i> link silver	"silver chain"
<i>npauj-nyiaq</i> jewelry silver	"silver jewelry"
<i>nqaj-hlaus</i> bar iron	"iron bar"
<i>ntaub-pag</i> cloth cotton	"cotton material"
<i>roj-a</i> fat earth	"fat of the earth" (=oil)
<i>roj-npuas</i> fat pig	"pig fat"
<i>roj-nyug</i> fat cow	"cow fat"
<i>voj-hluas</i> circle rope	"circle made of rope" (=lasso)
<i>voj-teg</i> circle hand	"circle made with the two hands"

2.4.3. Shape-Object

What I consider "shape prefixes" in these compounds are actually nouns, but semantically they seem to fall somewhere between classifiers such as *lub* "round, bulky object," *txoj* "long object (often abstract)," and *tus* "long, slender object (shorter than *txoj*)" on the one hand and the semantically meatier nouns with which they are paired on the other. They are not classifiers because they occur with classifiers, and, secondarily, because classifiers generally do not trigger tone sandhi (but see Section 2.3.7.). They serve to describe what facet of a multifaceted object is under consideration. For example, *tes* "hand" is probably better understood as "the protuberance at the end of the forearm" because it includes a body part which we do not include in our notion of "hand," namely the wrist. Thus we have *dab-teg* "wrist" and *pob-teg* "wrist bone" as well as *taub-teg* "fingertip" (from *dab* "narrowing," *pob* "round object," and *taub* "gourd-shaped object"). Similarly, for *ntsej* "ear" we have *nplooj-ntsej* "the outer ear" (leaf-shaped) and *taub-ntsej* "the earlobe" (gourd-shaped). A few more examples, arranged by shape prefix, appear below:

<i>pob</i>	"round object"	
<i>pob-a</i>		"clod of earth"
earth		
<i>pob-ntoos</i>		"tree stump"
tree		
<i>pob-ntsej</i>		"ear" (the whole thing)
ear		
<i>pob-tsuas</i>		"rock mass"
rock		
<i>taub</i>	"gourd-shaped"	
<i>txiv taub-ntoos</i>		"papaya"
fruit tree		
<i>taub-nkawg</i>		"mass of hornets" (either swarm
hornet		or nest)
<i>tswb</i>	"bell-shaped"	
<i>tswb-tsaig</i>		"bell jaw" (=jowls)
jaw		
<i>txoj</i>	"long" ²⁰	
<i>txoj-hmoo</i>		"fortune" (regarded as a length)
luck		
<i>txoj-ke</i>		"road" (regarded as a length)
road		
<i>txoj-sia</i>		"life" (regarded as a length)
life		

2.4.4. Sex/Agent Designators

Tub "son, boy; male," *nkauj* "girl" and *poj* "woman" are involved in tone sandhi compounds as agentive prefixes or simply as sex designators. *Tub* "son" is normally matched with *ntxhais* "daughter," which cannot effect tone change. *Poj* "woman" is matched with *txiv* "man, father," which also is powerless to

²⁰ *Txoj* has been labelled a classifier, but its behavior in these compounds is much more noun-like.

effect tone change. Thus we do not have parallel tone sandhi compounds according to sex, with the exception of *tub-qhe* "male servant"/*nkauj-qhe* "female servant":

<i>tub-nkeeg</i>	"a lazy person"	<i>nkauj-npuas</i>	"female pig"
boy lethargic		girl pig	
<i>tub-ntsog</i>	"an orphan"	<i>nkauj-qhe</i>	"female servant"
boy ?		girl servant	
<i>tub-qhe</i>	"male servant"	<i>nkauj-zag</i>	"female dragon"
boy servant		girl dragon	
<i>tub-txawg</i>	"an able person"		
able			
		<i>poj-cuag</i>	"mother of child's spouse"
		woman (kin)	
		<i>poi-sua</i>	"foreign woman"
		woman foreign	

2.4.5. Body Part Designator

Although it has been found in only one tone sandhi compound so far, the prefix *caj*, with no independent meaning (*caj dab*) "the neck," *caj tw* "buttocks," *caj npab* "the upper arm"), is the clearest example of a prefix triggering tone sandhi. That one compound is *caj-pas* "wind pipe" from *pa* "breath."

2.5. Compounding and Semantic or Syntactic Shift

In the majority of cases, if tone sandhi compounding is optional, it either results in no change in meaning, or only a stylistic change, the compound being perceived as "smoother," "gentler," or "more poetic" than the uncompounded collocation (see Section 2.3.4.). In a few interesting cases, though, either meaning or meaning and structure seem to be changed when the tone is changed. These five cases are discussed in some detail below:

(1) *Zaub* "vegetable + *ntsim* "peppery."

Both Bertrais and Heimbach record *zaub-ntsog* as the name for a particular plant: Bertrais (*zaub*) simply writes "espèce de légume" and Heimbach (p. 200) describes it as "a kind of pickled peppery vegetable prepared from the tops of mustard greens." This is to be contrasted with the following sentence from the same entry in Heimbach:

Zaub ntsim ntsim li kuv tsis noj
vegetable peppery peppery this I not eat
way

"I don't eat peppery vegetables."

Here the subject is not a particular peppery dish, but rather those vegetables of which a peppery flavor is being predicated. The semantic contrast is particular versus general, the syntactic contrast is noun-modifier versus subject-predicate.

(2) *Kub* "horn" + *twm* "water buffalo."

Both Bertrais (*twm*) and Downer (1967: 594) record a contrast in meaning between the compounded and uncompounded collocations of the above two words. *Kub twm* is a water buffalo's horn still attached to the buffalo,

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In some cases a "high" tone raises and in some cases a "high" tone lowers the tone of a following word. Such an analysis has nothing to do with our understanding of "harmony" as exemplified by tone harmony phenomena such as downstep in African languages or by vowel harmony phenomena such as that of reciprocal and verb in GAOPO Hmong (Section 2.3.2.). There are many more problems with Sprigg's analysis as well:

(1) The fact that the reflexes of tone category A1 and A2 are high in pitch (at the outset) in White Hmong may be accidental. A glance at the chart of the phonetic values for West Hmongic tone categories given in Section 3.3. below shows, for category A1, values of 53, 43, 55, 24 and 32. These A1 reflexes trigger tone sandhi in their respective dialects as well. An analysis that fails to account for the obviously related systems of near neighbors is not as good as one that does.

(2) The *-b* tone (55) and the *-j* tone (52) do not constitute a "high" class when we consider the endpoints of the two tones. It is this endpoint pitch, decidedly low in the case of *-j*, which should be expected to influence the pitch of the following syllable in a purely phonetic perturbation.

(3) Downer (p. 593) writes "... any attempt to treat this process of tone-shift as an automatically occurrent feature of present-day WM will be defeated by the overwhelming number of exceptions turning up, far outnumbering the cases of tone-shift." Sprigg simply ignores the chief characteristic of tone sandhi in White Hmong: it is sporadic, inconsistent, and idiosyncratic. This fact is elaborated at length in Downer's article and is at the heart of his argument about the nature of such cyclically rising and falling systems in the histories of Asian languages. Sprigg makes no mention of these exceptions to his system of "pitch harmony," despite the fact that Downer's article was the only source he used for his White Hmong data.

(4) It makes sense to retain the distinction between "basic tones" and "sandhi tones" since the sandhi tones represent a neutralization of the number of contrasts embodied in the basic tone inventory. In White Hmong there are seven basic tones (two of which never undergo tone sandhi), but only three sandhi tones.

(5) It also makes sense to say that one tone "changes into" another when it can be proved through comparative study, as Downer has done, that discrete tonal categories and their discrete reflexes are involved as counters in the same way in a number of different dialects, sometimes as basic tones and sometimes as sandhi tones. Although probably originally due to phonetic perturbation (see Section 3.3. below), there is no denying the role of these discrete categories at some intermediate stage of West Hmongic.

This is not a system that can be reconstructed all the way back to Proto-Hmong, however. Meng Chaoji has shown that in MEIZHU and LONGMO Bunu sandhi tones developed out of the phonetic matter of tones A1, A2, B1, and, in LONGMO, B2 (Mao, Meng, and Zheng 1982; Meng 1983). The sandhi tones are in contour identical to the basic tones from which they arose, differing only in being one step higher than the corresponding basic tones. The sandhi tones do not correspond to any of the basic tones of the language. The triggering environment is the presence of a preceding word with a category A1 or A2 tone, as in the other West Hmongic dialects. "Pitch harmony" can be used to explain tone sandhi in these Bunu dialects, but it cannot be used for White Hmong or for the dialects closely related to White Hmong.

3.3. Benedict 1985

Following a presentation I made on the topic of White Hmong tone sandhi at the Southeast Asian Studies Summer Institute Conference in Ann Arbor, Michigan (August 1985), Paul Benedict, in discussion, gave me an alternate explanation for the development of the system. I reproduce his explanation here exactly as it was given to me, but add the following caveat: this theory concerns the distant past, and many difficult questions, such as the role of stress in a tone language, are not addressed.

Benedict believes that the Proto-West-Hmongic tone sandhi system developed out of a "transphonologization of tonal close-juncture phrase" wherein initial stress on the two word phrase was realized as high initial pitch which fell throughout the phrase. The triggering mechanism was not only a high pitch on the initial word, but a lower pitch on the second word. Coupled with this analysis of the prosodic structure of Proto-West-Hmongic compounds is Benedict's reconstruction of the Proto-Hmong-Mien tonal shapes:²⁶

**A: falling²⁷

**B: rising

**C: mid level

Benedict does not reconstruct the D tone at this stage since it corresponds to syllables that ended in a stop consonant in Proto-Hmong-Mien. He considers the early checked syllables "tonally undifferentiated" (personal communication). When the general bipartition of these tones took place upon loss of contrastive voicing in the initial consonants, high and low allotones of the Proto-Hmong-Mien tones became distinctive:

**A1: high falling

**A2: low falling

**B1: high rising

**B2: low rising

**C1: high level

**C2: low level

Upon loss of the final consonants in proto-Hmong, the old checked syllables developed distinctive tones, also with a high-low bipartition based on the feature of voicing in the initial:

*D1: high level (+ ?)

*D2: low level (+ ?)

Benedict feels that White Hmong is remarkable in its conservation, in large part, of these original tonal values:

A1: high level (with a raised ending, as in the
Cantonese A1 reflex)

A2: *high falling*

B1: *mid rising*

B2: low level (with a lowered ending)

²⁶ These are the same as Benedict's reconstructed tonal shapes for Old Chinese (c. 500 B.C.).

²⁷ Two stars are used to represent proto-Hmong-Mien in this section; one star is used to indicate Proto-Hmongic.

	**A Falling		**B Rising		**C Mid Level	
	1	2	1	2	1	2
WHITE	55	52	24	22	33	4̣2̣
GREEN	55	52	24	4̣2̣	33	4̣2̣
XUYONG	53	21	51	11	55	33
XIANJIN	43	31	55	2̣1̣	44	1̣3̣
SHIMEN	55	3̣5̣	55	33/1̣1̣	33	53/31
QINGYAN	55	54	13	3̣2̣	43	21/2̣1̣
GAOPO	24	55	13	31	43	2̣2̣
ZONGDI	32/22	53	42/232	1̣1̣	55/35	33/1̣3̣

(2) Assuming that this system developed after the loss of the initial voicing contrast in most dialects and the consequent bipartition of tones, why could C1 not have changed to C2 (33 > *11), too? Why is there a strict division of possible changes according to the feature of voicing in the Proto-Hmong initial (type 1 > type 1; type 2 > type 2)?

(3) According to this theory, why did D2 change? It was originally *11?, maximally low. This was what was supposed to have kept C2 (*11) from changing.

(4) On the basis of the data presented in Li, Ch'en, and Ch'en 1959 and Wang 1979, I had supposed that the merger of tones B2 and D1 went the opposite way, i.e., that 22 reflects the original value of D1 rather than B2. This is because in many Hmongic dialects both B2 and C2 (and, to a lesser extent, A2 and D2) are characterized by what Chinese linguists analyze as "voiced aspiration" or by what western linguists analyze as "breathy voice" (which both would derive, in this case, from the original voiced character of the initial). Since the White Hmong B2/D1 tone is low level, clear voice, I had thought that it was more likely to have reflected an original voiceless initial, and that the original breathy voiced B2 value had been subsumed.

3.4. Conclusions

From the many problems a purely synchronic account of White Hmong tone sandhi presents, such as the ones mentioned in Section 3.2. above, I would conclude that a description of tone sandhi as a system-relic is the only sensible and revealing kind of description possible. Even in a synchronic grammar, historical relics can best be described in terms of history. Both Downer and Benedict do that, and I find their explanations nicely complementary. Downer is describing the system at a more recent time (at a stage when the Sichuan-Guizhou-Yunnan sub-*fangyan* and the Northeast Yunnan sub-*fangyan* had not yet divided). He can prove his assertions about the tone categories involved, and can

support his ideas about the extent of the erosion of the system in White Hmong on the basis of comparative evidence. Benedict, typically, is comfortable speculating about an earlier state of affairs (Proto-West-Hmongic, Proto-Hmongic, and Proto-Hmong-Mien). Although his ideas cannot be proven directly, he has a plausible theory about the phonetic basis of the system.

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