The origin of Chinese tones

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1.   INTRODUCTION

The long literary tradition of Chinese opens for us a window on the early history of the language. A continuous tradition of old literary texts, the earliest of which date from the early years of the 1st millennium BCE, have been handed down to us more or less intact; in addition, epigraphy provides us with an increasingly large corpus of old inscriptions: oracular inscriptions on shells and bones, known as *Jiaguwen* 甲骨文, and dating from the second half of the 2nd millennium BCE, as well as inscriptions on bronze vessels (*Jinwen* 金文) dating from the 1st millennium BCE. That these texts and inscriptions provide us with ample opportunities to study the grammar and lexicon of the language is self-evident: but, given the non-alphabetic nature of the Chinese script, it may be necessary here to say a few words of the methods of Old Chinese reconstruction in the phonological domain.

Only limited attempts at applying the comparative method to the pronunciation of earlier stages of Chinese have so far been made: were a systematic reconstructive effort to be mounted on the basis of the diversity found in modern Chinese dialects, it would probably not lead to stages of the language nearly as old as the earliest texts and inscriptions: due to widespread language leveling in the North, most of the linguistic diversity is now found in southeast China, an area not settled by Chinese speakers before (and often much later than) the second century BCE.

The method of Old Chinese reconstruction is *sui generis*: it makes use of two independent, yet mutually supporting bodies of data: the poetic rhyme sequences in the *Shi Jing* 詩經 (Book of Odes), a compilation dating to the middle of the first millennium BCE, but known to us in a version crystallized towards the end of the 3rd century BCE; and the phonetic element in the Chinese script, which reflects the pronunciation of Chinese also in the latter half of the first millennium BCE. The basic principle (same phonetic graph in the script > same rhyme in the Odes) relating these two bodies of data was discovered by the eminent Chinese philologist Duan Yucai 段玉裁 (1735-1815).

A more recent stage of Chinese, corresponding to the reading pronunciation of the educated class in Nanjing towards the end of the 6th century CE, has been the target of reconstructive efforts of several scholars. This is called Early Middle Chinese: it is a mere sound system, rather than a full language. Its reconstruction relies on the systematic indications of pronunciation in the dictionary *Qie Yun*, compiled between 580 and 600 by Lu Fayan 陸法言 with the aid of other scholars.

Needless to say, reconstructed Early Middle Chinese is an essential ingredient in establishing the sounds of Old Chinese. Reconstructed OC phonology must then make sense of the rhymes in the book of Odes and the phonetics in the Chinese script, while having the look of a natural language, and evolving into Early Middle Chinese according to natural sound changes. Additional bodies of data are used to further constrain the exercise: early Chinese loan-words into neighboring languages; Chinese transcriptions of foreign personal names and place names; sound glosses by Chinese commentators, especially in the late Han period (1st and second centuries CE); and, last but not least, Chinese word families (since OC was richer than Modern Chinese in derivational morphology).

The stage being set, we now turn to the question of the origins of Chinese tones. There is growing agreement among scholars on what the most likely tonogenetic scenario is in Chinese. In this paper I will adopt a narrative format and recount the story of how that scenario was arrived at. It will be necessary first to present briefly the situation in modern dialects and in Early Middle Chinese (EMC)

2.   Tones in modern Chinese dialects

Most modern Chinese dialects have between 3 and 10 contrastive tones. There exists a rough cline between the northern and western dialects, which generally have 3-5 tones, and the south-eastern dialects which have around 6-10. From this point of view, Chinese dialects provide typological a transition between the nontonal Tungusic, Mongolian and Turkic languages in the north and the tone-rich languages of the Miao-Yao and Kam-Tai groups to the south.

Chinese tones are complex suprasegmental events distinguishing (otherwise) homophonous syllables, which are often –but not always– meaning-bearing units, or morphemes. Thus a four-fold tonal contrast in Modern Standard Chinese is the following 5in these examples, subscript numerals are tone marks):

ma_1 'mother'
ma_2 'hemp'
ma_3 'horse'
ma_4 'to scold'

At the phonetic level, Chinese tones are defined by characteristic evolutions of pitch and amplitude, sometimes accompanied by specific voice qualities such as breathiness, creak, whisper or ventricular voice. The tones of Beijing were shown by Howie (1974) to be a property of the syllable *rhyme* (that is, the main vowel and any following segment) rather than of the final (the rhyme plus a preceding semivowel) or of the entire voiced part of a syllable.

A phonetic notation for the pitch component of Chinese tones devised by Y.R. Chao (1930) is commonly used in the Chinese literature on tone. It consists of a 5-degree scale dividing an ideal speaker's voice range, from 1-low to 5-high. Unidirectional tones –level, rising or falling– are noted by two digits, which represent the beginning and end pitch of the tone respectively. Using Chao's scale, the isolation contours of the four Beijing tones are the following:

tone 1 is [55] high level
tone 2 is [35] mid to high rising
tone 3 is [214] mid-low to low falling, then rising to mid-high
tone 4 is [51] high to low falling

3. The Early Middle Chinese tones and their discovery

Chinese scholars have long been aware of the tonal distinctions in their language. The term $sheng_1$ 聲 in the meaning 'tone' has been in use since the 5th century CE. The *Nan Shi* 南史 – the official history of the Southern Dynasties– credits Shen Yue 沈約 (441-513) and Zhou Yong with the theory that Chinese had four tones (named by them $ping_2$ 平 'Level', $shang_3$ 上 'Rising', qu_4 去 'Departing' and ru_4 入 'Entering'. These terms are still widely used). As Emperor Wu Di 武帝 (*reg.* 561-578) asked Zhou Yong's son Zhou She 周捨 what the four tones were about, he replied "天子聖哲" [the Son of Heaven is holy and wise], a four-syllable string in which each character is an example of one of the four tones. The same Shen Yue is said to be the author of a lost lexicographical work, the *Si Sheng Pu* 四聲譜, in which Chinese characters were classified according to tone. The 'four tones' proved an efficient way of arranging dictionaries, and later rhyme dictionaries (among which our principal source of information on Early Middle Chinese: Lu Fayan's 陸法言 *Qie Yun* 切韻, published in 601 CE) followed it.

All the evidence indicates that the 'four tone' categories were quite stable in the Southern Dynasties period, which was drawing to a close in the late 6th century, when Lu Fayan was compiling the *Qie Yun*. The *Qie Yun*, then, is representative of the situation of Chinese tones over a century after the Chinese scholarly tradition became conscious of them.

Of particular interest are the phonotactics of Early Middle Chinese tones as observed in the *Qie Yun*. The situation is summarized in Table 1:

syllable ending	Level	Rising	Departing	Entering
vowel	+	+	+	-
semivowel	+	+	+	-
nasal	+	+	+	-
oral stop	-	-	-	+

Table 1: phonotactics of EMC tones

Table 1 shows a difference in the phonotactic associations of sonorant endings (vowels, semivowels, nasals) and stop endings: syllables ending in sonorants may have either of three tones: Level, Rising or Departing, examples (MC reconstructions following Baxter 1992. Rising tone is marked with -X, Departing tone with -H. Level and Entering are without marks):

	Level	Rising	Departing
vowel ending	鵝 nga	我 ngaX	餓 ngaH
semivowel ending	桃 daw	道 dawX	導 dawH
nasal ending	容 yowng	涌 yowngX	用 yowngH

Table 2: triple tone contrast on Early Middle Chinee syllables ending in sonorants

No tonal contrast ever obtains in syllables ending in oral stops: these are always in the Entering tone. In other words, there were only three contrastive tones in Middle Chinese: the Entering 'tone' consisted of all the syllables ending in oral stops, on which no tonal contrasts occurred.

Why, then, does the Chinese tradition refer to 'four tones' ? this is undoubtedly because of the very precise one-to-one correspondence existing in Early Middle Chinese between the inventories of rhymes ending in oral stops and in nasal consonants: am/ap, an/at, ang/ak, im/ip, in/it, ing/ik, etc.: since every rhyme ending in an oral stop has a nasal-ending counterpart (though the reverse is not true), it is possible to interpret stop-ending syllables as underlying nasal-ending syllables, whose endings have been changed to stops in the context of the Entering tone. That interpretation, which suppresses stop endings from the phonological inventory at the cost of an additional tone, is in essence the traditional Chinese account.

The Chinese terms for the four tones: *ping₂* 平 'Level', *shang₃* 上 'Rising', *qu₄* 去 'Departing' and *ru₄* 入 'Entering' are at the same time examples of the very same categories: moreover from a lexical-semantic point of view, they form two couples: Level/Rising and Departing/Entering. The choice of these labels has fuelled numerous speculations concerning the phonetic nature of Early Middle Chinese tones: thus it is often assumed that the Level tone was level in pitch, and that the Rising tone was rising. Beyond these rather plausible assumptions, however, it s difficult to go with certainty.

4. The Early Middle Chinese tones as the source of modern tones

4.1. conditioning by initial manner.

In many modern dialects, the correspondence with Early Middle Chinese tones is remarkably regular. Evolution from the EMC tone system into the modern systems consists of tone splits, with or without subsequent tone mergers. In Chinese dialects most phonetically-conditioned tone splits are conditioned by initial manner of articulation. The traditional tool-kit for handling tone correspondences with EMC includes four initial manner labels:

- *quan₂ qing₁* 全清 "fully clear", a term referring to voiceless unaspirated obstruents –stops, affricates and fricatives-,
- *ci₄ qing₄* 次清 "secondary clear", a term referring to voiceless *aspirated* stops,

- *quan₂ zhuo₂* 全濁 "fully muddy", referring to voiced obstruents –stops, affricates and fricatives-, and
- *ci₄ zhuo₂* 次濁, referring to (voiced) sonorants –semivowels, nasals and [l-]–.

These suffice in most cases to account adequately for the development from Early Middle Chinese into modern dialects. As an illustration, we give below the development of Beijing tones:

MC initials	MC tones	Level	Rising	Departing	Entering
fully clear		1	3	4	1,2,3,4
secondary clear		1	3	4	1,2,3,4
fully muddy		2	4	4	2
secondary muddy		2	3	4	4

Table 3: the development of Beijing tones

The random reflection of the MC Entering tone with voiceless ('clear') initials is in part due to dialect contact. For other examples of tone correspondences between Middle Chinese and modern dialects see Table 6 p. 9 and Table 8 p. 10.

The main mechanism –in fact perhaps the *only* mechanism– for tone splits in Chinese dialects is tone lowering after voiced initial consonants. This process, which has a universal basis in laryngeal function (Ohala 1978), starts out as a low-level phonetic process, resulting in high and low allotones conditioned by initial voicing: the distinction becomes phonemic after devoicing takes place or after the parallelism in tonal contours between high and low allophones is disrupted by other phonetic processes.

5.   The situation in Old Chinese

We now examine the status in OC of the MC tone categories, form the point of view of the script, rhyming and word families.

5.1.   *what the Chinese script tells us*

It is well known that a majority of Chinese characters include a graphic element which gives important indications of the pronunciation of the character. Following standard practice I will refer to these graphic elements as "phonetics". From the point of view of tones, one finds in OC characters two types of these phonetics:

- those serving for characters in Level and/or Rising tones in Early Middle Chinese
- those serving for characters in Entering tone in Early Middle Chinese

Normally phonetics of the first type do not serve for characters in the Entering tone, and phonetics of the second type do not serve for characters in Level and/or Rising. There are some counterexamples but they are not numerous. It is remarkable, then, that phonetics of *both* types often serve for characters in the Departing tone.

Some examples of phonetics including words in the Level and Rising tones:

- phonetics ending in vowels and semivowels (the phonetics are here referred to by their number in Karlgren's *Grammata Serica Recensa*, or GSR, cf. Karlgren 1964): GSR 1 可, 2 我, 3 多, 4 也, 5 左, 6 羅, 7 戈, 8 禾, 11 隋 etc. Among these, GSR 1, 2, 3, 4, 5, 7 also include words in the Departing tone. None includes any word in the Entering tone.
- phonetics ending in nasals: GSR 140 干, 141侃 ,123 寒, 144 漢, 146 安, 147 單, 148 亶, 149 且. etc. Among these, GSR 140, 141, 143, 144, 146, 147, 148 and 149 also include words in the Departing tone. There is only one example of a word in the Entering tone: GSR 149g 怛, MC tat 'grieved'.

Examples of phonetics including words in the Entering tone:

GSR 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279 etc. Among these, GSR 272, 273, 274, 275, 276, 277, 279 also include words in the Departing tone, but none includes words in the Level and Rising tones.

The situation is summarized in Table 4:

Qie Yun tone:	Level	Rising	Departing	Entering
ending in sonorants	▓▓▓▓	▓▓▓▓	▓▓▓▓	
ending in oral stops			▓▓▓▓	▓▓▓▓

Table 4: two types of phonetics in the Chinese script

5.2.   what the Shi Jing rhymes tell us

In the Old Chinese poetry, a necessary condition of rhyming was the identity of the main vowel and any segment following it in the syllable. Naturally Chinese scholars were interested early on in discovering whether the Middle Chinese tones had anything to do with Old Chinese rhyming.

Duan Yucai 段玉裁 (1735-1815) investigated the *Shi Jing* rhymes and observed that rhyme sequences in the Level tone could be isolated; likewise for the Rising and Entering tones: however, the rhyming of Departing-tone words appeared to be random. He concluded with the famous dictum 古無去聲 "there was no Departing tone in Old Chinese".

Duan's observations are reliable. In effect, when they are classified from the point of view of their Middle Chinese tones, rhyme sequences in the *Shi Jing* show a pattern similar to the phonetics in the script. There are three types of rhyme sequences:
- sequences basically in the Level tone, in which Rising or Entering-tone intruders are rare, but Departing-tone members are common;
- sequences basically in the Rising tone, in which Level or Entering-tone intruders are rare, but Departing-tone members are common;
- sequences basically in the Entering tone, in which Level or Rising -tone intruders are rare, but Departing-tone members are common

This is summarized in Table 5:

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	Level	Rising	Departing	Entering
Level-tone sequences	▓▓▓	rare	▓▓▓	rare
Rising-tone sequences	rare	▒▒▒	▓▓▓	rare
Entering-tone sequences	rare	rare	▓▓▓	▓▓▓

Table 5: tone sequences in *Shi Jing* rhymes

Thus, if we set aside Middle Chinese words in the Departing tone, there is a marked tendency for the three remaining tones to form pure rhyming sequence in Old Chinese poetry. In this, the pattern in Table 5 is similar to that in Table 4. Moreover, those Departing-tone words which occur in Entering-tone rhyme sequences usually have Entering-tone phonetics, while those Departing-tone words which fit into Level- or Rising-tone rhyme sequences have non-Entering-tone phonetics. This indicates that in Old Chinese, categories corresponding to the Early Middle Chinese Level-, Rising- and Entering- tones already existed, and that the Departing tone arose in the period between Old and Middle Chinese, out of words from other tones.

5.3.   The Middle Chinese Departing tone as a secondary tone.

Following Duan Yucai's proposal that the EMC Departing tone was secondary, 20th-century scholars (Downer 1959, Mei Tsu-lin 1980, Schuessler 1985) investigated its involvement in morphology. A summary of their findings would be beyond the scope of this paper: suffice it to say here that several derivational types were identified:

stative verb > transitive verb

hao_3 好 xawX 'good'   : hao_4 好 xawH 'to love'

e_4 惡 ?ak 'bad'   : wu_4 惡 ?uH 'to dislike'

verb > noun

ru_4 入 nyip 'to enter'   : nei_4 內 nwojH 'inside'

lie_4 列 ljet 'to arrange'   : li_4 例 ljejH 'rule, usage'

ze_2 責 tsreak 'to demand payment' : $zhai_4$ 債 tsreajH 'debt'

endoactive verb > exoactive verb

wen_2 聞 mjun 'hear'   : wen_4 問 mjunH 'ask'

$shou_3$ 受 dzyuwX 'receive'   : $shou_4$ 授   dzyuwH 'transmit'

mai_3 賣 meaïX 'buy'   : mai_4 買 meaïH 'sell'

xue_2 學 haewk 'study'   : $xiao_4$ 學 haewH 'teach'

te_4 貣 thok 'beg, demand'   : tai_4 貸 thojH 'lend'

qi_3 乞 khjït 'beg'   : qi_4 乞 khjïjH 'give alms'

6.   The origin of Old Chinese tones

6.1.   The origin of the Departing tone

6.1.1.   Haudricourt on the Departing tone

A first decisive step in the understanding of the phonetic processes underlying the origin of Chinese tones was accomplished by Haudricourt. Haudricourt had just presented his famous

explanation of the origin of Vietnamese tones (Haudricourt 1954a) from laryngeal endings -h and -ʔ:

Mon-Khmer	Old VN	Modern VN tone
-s, -h	-h	hoi-nga
-ʔ	-ʔ	sac-nang
-0	-0	ngang-huyen

In a second article (Haudricourt 1954b) –a critique of Karlgren's reconstruction system for Old Chinese–, Haudricourt pointed out that in the oldest layer of Chinese loan-words into Vietnamese (beginning of the Common Era), words in the Chinese Departing tone correspond to Vietnamese words in the *hoi-nga* tone. This suggested to him that the origin of the Chinese Departing tone might be similar to that of the Vietnamese *hoi-nga* tone. He thus proposed that the Departing tone arose under the effect of a derivational suffix -s, whose loss was compensated for by the rise of the Departing tone, shortly before Middle Chinese times. Haudricourt's -s could be added to words of the Level, Rising or Entering categories, causing a final stop to be lost: --ks, -ts, -ps > -ws, -ys, -s. Thus, in his reconstructions:

好 xâu 'good'   : 好 xâu-s 'to love'
惡 âk 'bad'   : 惡 âk-s 'to dislike'

Support for Haudricourt's suffixed -s came various quarters:

- early Chinese transcriptions of foreign words sometimes show the Departing tone corresponding to foreign -s. For instance the Japanese place name *Tusima* (modern Tsushima), transcribed as 對馬 (MC twojH maeX) in the 3rd century CE: the first character 對 must have been *tus at the time. For more evidence, see Pulleyblank (1962);

- some early Chinese loan-words into Korean have -s for Middle Chinese Departing tone (Zhengzhang 1995):

篦 MC pjijH, Korean *pis* 'comb';

芥 MC kaejH, Korean *kas* 'mustard plant';

蓋 MC kajH, Korean *kas* 'cover, bamboo hat'.

- Forrest (1960) connected Haudricourt's -s with the -s suffix of Written Tibetan.

This converging evidence makes Haudricourt's theory of the origin of the Departing tone increasingly well accepted. Alternative views will be discussed in section 8.

6.2. The origin of the Rising tone

6.2.1. Mei on the Rising tone

Pursuing the line of enquiry opened by Haudricourt, and drawing upon ideas of J. Norman, Mei (1970) applied to Chinese Haudricourt's view of the origin of the Vietnamese tone sac-

nang. Specifically, Mei proposed that the Chinese Rising tone developed out of an earlier glottal stop ending, like the Vietnamese sac-nang in Haudricourt's theory. Mei pointed out that his proposal helped account for the correspondence between the Chinese Rising and the Vietnamese sac-nang in the early layer of Chinese loan-words into Vietnamese. In support of his proposal, he cited the fact that the Chinese Rising tone served preferentially to note Sanskrit short vowels in Han-time Buddhist transcriptions: this can be explained if it is assumed that the Rising tone was shortened by a final glottal stop. Mei also noted that several modern Chinese dialects, north and south of China, have a final glottal stop in the Rising tone.

For instance the tones of Wenzhou 溫州 in Zhejiang province are the following:

EMC Tone	Level	Rising	Departing	Entering
voiceless initial:	44	45$^{?}$	42	323
voiced initial:	31	34$^{?}$	22	212

Table 6: the tones of Wenzhou dialect

The view that the Rising tone had a final glottal stop helps make sense of the development of tone 3 in Beijing. From Table 3 on p. 5 it can be seen that the MC Rising tone in syllables with sonorant initials develops to tone 3, while with voiced obstruent initials it develops to tone 6. With voiceless initials the development is the same as with sonorants, to tone 3. This developmental pattern is specific of the Rising tone. It has been proposed by Zhengzhang (1995) that the final glottal stop in the Rising tone caused sonorant initials in this tone to become glottalized, and to behave tonally like voiceless initials.

In Sagart (1991) I presented evidence correlating the final glottal stop of Old Chinese and final -q in Proto-Austronesian, perhaps a uvular stop:

gloss	PAn	OC	MC
'earth'	-taq (Blust, root)	土 $*^{a}$thaʔ	thuX
'vomit/spit'	u(n)taq	吐 $*^{a}$thaʔ	thuX
'shoot/crossbow'	panaq	弩 $*^{a}$naʔ	nuX
'brain'	punuq	腦 $*^{a}$nuʔ	nawX

Table 7: correspondence of PAn final -q and Old Chinese -ʔ (Rising tone)

7. remaining problems with Haudricourt's theory

7.1. Rising tone in words ending in sonorants

One theoretical problem concerns the origins of the Rising tone in words ending in sonorants, especially nasals: word-final clusters of nasal-plus-glottal stop must be assumed: -m$^{?}$, -n$^{?}$,-ŋ$^{?}$. Haudricourt was aware of the problem: he assumed (1954a) that such clusters were the source of the Vietnamese tone *sac-nang* in words with nasal endings, for example VN *bon* (*sac-nang*) '4', even though other Mon-Khmer languages do not show a final glottal stop in this word: he observed that such clusters are not unnatural since they occur in Lushai.

For Chinese, I have suggested that the source of the glottal stop in words of the nasal-ending series is to be found in an old series of voiced stop endings, developing to nasal plus glottal stop: -b, -d, -g > $-m^{ʔ}$, $-n^{ʔ}$, $-ŋ^{ʔ}$ (Sagart 1991). This change has taken place in Karo Batak (Adelaar 1981).

7.2. paucity of dialects having -h

Another problem relates to the traces left in Chinese dialects by Haudricourt's -s. Judging from the relatively high number of Chinese dialects which have a glottal stop or some form of glottalization in the Rising tone (Mei 1970), one might expect a similarly high number of dialects with a $-^h$ in the Departing tone. However, that is not the case. The most common type of glottal accident found in Departing tone reflexes is glottalization or creak (Sagart 1986). I know of only one Chinese dialect with $-^h$ in the Departing tone: Xiaoyi 孝義 in central Shanxi (Guo Jianrong 1989: 13). The correspondence of Xiaoyi tones is as follows:

MC tones	Level	Rising	Departing	Entering
voiceless obstruents	11	$31^{ʔ}12$	53^h	$2^{ʔ}$
voiced obstruents	11	53^h	53^h	$312^{ʔ}$
sonorants	11	$31^{ʔ}12$	53^h	$312^{ʔ}$

Table 8: correspondence of Xiaoyi tones (after Guo 1989)

Xiaoyi is extremely important in that it is, so far, the only dialect which directly supports an $-^h$ stage in the development of the Chinese Departing tone. It is significant that a glottal stop occurs in the middle of the main Rising tone reflex: $31^{ʔ}12$. The lack of a voicing split in the Level tone is also a very archaic feature of Xiaoyi. It remains to be explained, nevertheless, why the most common glottal accident in Departing tone reflexes across Chinese dialects (and corresponding tones in neighboring languages) is creak. One must suppose that the $-^h$ stage was brief, and that $-^h$ changed to creak before the Middle Chinese period.

8. alternative views on Chinese tone

Alternative views are cited here for completeness.

8.1. Wang Li's theory of the origin of Chinese tones

Wang Li's theory (Wang 1957, vol. 2: 102), which has been, and may still be, influential in China, accounts for Chinese tones on the basis of a quantity distinction in Old Chinese. In his view, Old Chinese had long and short syllables: that contrast was bisected by a contrast of checked vs. unchecked (ending in a stop vs. ending in a sonorant). The proposed development into Middle Chinese tones is presented in Table 9:

	long	short
unchecked	Level	Rising
checked	Departing	Entering

Table 9: Wang Li's theory of the origin of Chinese tones

The lack of stop endings in the Departing tone in Early Middle Chinese is explained by Wang Li as due to the loss of these endings after long vowels. This phonological process accounts for all types of contacts (rhyming, graphic, word-family) between Departing-tone and Entering-tone words; but Wang Li ascribes contacts between Departing and either Rising or

Level tones to an entirely different process, one changing the tones of individual Level- or Rising-tone words to Departing. Thus there are two different sources, and two distinct formation processes, for the Middle Chinese Departing tone in Wang Li's theory. However, the evidence listed in section 5.3 on p. 7 above shows conclusively that one and the same morphological process accounts for contacts between Departing tone on the one hand, and Level/Rising or Entering on the other hand. Thus Wang Li's theory must be rejected.

8.2.   Benedict

Benedict (1972: 104, footnote 494) presented an interpretation of the Departing tone as a sandhi form of the two basic tones, Level and Rising, when followed in close juncture by another syllable. For instance 騎 'to ride (a horse)' is in the Level tone in isolation, but in the Departing tone in the expression 騎賊 'mounted bandits'. Benedict further assumes that the same sandhi also occurred before derivational suffixes of the kind found in Written Tibetan (-ba, -bo, -mo), thereby providing a means of dealing with the morphological role played by the Departing tone within his theory. However no direct evidence for these suffixes has ever been produced, even though the date of appearance of the Departing tone is well within the historical period. Moreover, Benedict does not address the question of Departing tone contacts with the Entering tone.

9.   Conclusion

Old Chinese was a toneless language. Tones arose between Old Chinese and Early Middle Chinese (that is between 500 BCE and 500 CE) as a result of the loss of final laryngeals. The emergence of tones in Chinese was very similar to the process supposed by Haudricourt for Vietnamese: final -s (a suffix in Old Chinese) developed to -^{h}. Another set of syllables ended in -$^?$; syllables ending in these laryngeals formed two parallel series. A third series, parallel to these two, consisted of syllables ending in plain vowels or other sonorants. When the two laryngeals were lost, their micromelodic effects became phonologized, this resulting in a three-tone contrast on syllables ending in sonorants, and no tone contrasts on syllables ending in stops. The main difference between the Chinese and Vietnamese situations is that the Chinese Departing tone has a morphological origin.

It is noteworthy that Vietnamese, a Mon-Khmer language, has developed tones –on the Chinese model–, while most other Mon-Khmer languages have not. The obvious explanation to this is that Vietnam was conquered and durably occupied by China, starting in the 2nd century BCE.: the tonogenetic events in progress in Chinese were transmitted to Vietnamese through the bilingual parts of the Vietnamese population.

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