The Prosodic Influence on the Old Chinese Tonogenesis

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Abstract: This paper examines the mainstream explanation of the origin of Old Chinese tone system. There has been solid evidence showing the correspondence between certain codas assumed occurring in Old Chinese and tones in Middle Chinese. However, there is also inconsistency in evidence from loanwords, cognates and traditional rhyming practice in *Odes*. To solve the problem, we are proposing in this paper that prosodic factors also play important roles in Old Chinese tonogenesis.

Keywords: Old Chinese, Tonogenesis, Prosody

1 Haudircourt's Hypothesis

Haudricourt (1954) proposed that the tonal system in Old Chinese could derive from the compensation for segmental losses that has also been proved in the tonogenesis in Vietnamese languages.

a) Ping tone   <   *-∅/*-N
b) Shang tone   <   *-ʔ or *-q
c) Qu tone   <   *-s，
d) Ru tone   <   *-p *-t *-k or *-b *-d *-g

Pulleyblank (1962) has offered a lot of solid evidence in the transcriptions from Later Han (25-220) and the Three Kingdoms (220-280) period to support Haudricourt's hypothesis.

"都赖" Talas,

"对马" Tusima＞Tsushia

"对马" is an excellent example which shows the reanalysis in the structure of syllables. The name of the island was also recorded in the later historical text as "都斯麻". Sima > shima in Japanese is the word for "island". The first syllable in this Japanese word had been absorbed into the first character "对" in the Chinese transcription to correspond the consonantal coda in Old Chinese.

對 *[t]ˤ[u]p-s＞ *[t]ˤ[u]t-s＞ *[t]ˤ[u]-s[1]

Though there has been some criticisms on Pulleyblank's examples, we consider "对马" cannot be simply overthrown.

Haudricourt's theory has gradually been accepted by the main stream of Old Chinese study. The advantage of this theory is eminent in explaining some tricky problems in Old Chinese.

- It reveals the phonetic nature of the rhyming between Qu and Ru:
    -ks/-ts/*-ps 与*-k/*-t/*-p
- It explains some unsolved 通假 cases, e.g.
    "廢丘"＜＞"瀍丘"
    瀍   *[p.k]ap＞*pjop*
    廢   *[p-k]ap-s＞*pat-s＞*pjojH*

- It makes the research of tracing Old Chinese morphology possible

2 What does the Rhyming Practice in *Odes* tell us?

The rhyming pattern among the tones is an important argument in the traditional study of Chinese historical phonology. It has been argued that in Old Chinse the rhyming pattern differentiating tones has also been kept just as what happened in the Middle Chinese regular verse 律诗. The most common case is still the characters in the same tone category rhyme with each other. However, the tone differentiation in *Odes* rhyming was not exactly as strict as in Middle Chinese poetry. Rhyming crossing tone categories exists. According to 董同龢 (1968), there lies a clear pattern in the rhyming practice:

1）Ping usually does not rhyme with Ru；
2）Rhyming between Ping, Shang, or Qu is possible
3） Qu and Ru often rhyme with each other

陈新雄（1999：751－759）counted the rhyming in 之 and 職部. The rhyming between the different tones is only about ¼ count of rhyming in the same tone. In the case of the tone-crossing rhyming:

- Ping and Shang is closer than others 平上多混用
- Qu and Ru is closer than others 去入多混用
- The cases of Ping-Ru, Ping-Qu, Shang-Qu, Shang-Ru are relatively rare.

This kind of pattern then raises a question: Why is there a difference between *-ks/*-ts/*-ps：*-k/*-t/*-p VS *-N：*-Ns, *-∅：*-∅s, -ʔ: -ʔs. Putting in words, the stop endings hold more close relation with glottal or -s codas than nasal and zero endings.

3. An Old Problem: Did Qu tone exist in Old Chinese?

It's useful to review some traditional point of views in Old Chinese tonal system that have different ideas with Houdricourt's. Qing phonologists commonly accepted 段玉裁's claim that Qu tone did not exsist, or had not fully develop in pre-Qin period. 王力（1958）proposed two origins for Middle Chinese Qu tone: 长入 for those often rhyme with Ru tone; the others derive from the original Ping and Shang tone. Wang Li's strongest argument is some Qu Sheng characters never rhymes with Qu or Ru tone in *Odes*. Instead, they always rhyme with Ping tone. The most famous example is the word "慶"：

- 《小雅 楚茨》二章：蹌羊嘗亨將祊明皇饗慶疆
- 《小雅 楚茨》末章：將慶
- 《小雅 甫田》二章：明羊方臧慶
- 《小雅 甫田》末章：梁京倉箱梁慶疆
- 《小雅 裳裳者华》二章：黄章章慶
- 《大雅 皇矣》三章：兄慶光喪方
- 《鲁颂 閟宫》四章：嘗衡剛將羹房洋慶昌臧方常

Above are all the stanzas that contain "慶". It is very convincing in a couple of fairly long stanzas that "慶" is the only character in Middle Chinese Qu tone. It's reasonable to doubt whether this character is originally in Qu tone or with a *-s coda? If not, why it would develop into Qu tone category in the later period?

4. Tonal correspondence in Cognates and Loanwords

4.1 Sino-Vietnamese

丁邦新（1981) criticized that Haudricourt's hypothesis of Old Chinese tonogenesis only built on the inadequate evidence from various unclear historical stages. Other than the 20 plus words in Haudricourt's paper, there lacks clear correspondence in tone categories between Sino-Vietnamese and Chinese

4.2 Loanwords in Proto-Hmong-Mien

Ratliff (2010) argued that PHM had the same developing process in tonogenesis as Old Chinese. Based on this argument, Ratliff explains the regular correspondence in tones between Hmong-Mien languages and Chinese. However, we found the loanwords from Old Chinese period in PHM are not always consistent with the tone corresponding pattern.

Rime	Initial	Chinese Word	Chinese Morpheme	Old Chinese	Middle Chinese	PHM (by Ratliff)	PHM (by Wang)
2	40	野貓	貍	(m-)rɯ	lɨA	pljɨD	pl̥euC
8	113	布穀鳥	鳩	ku	kɨuA	ɢʉB	ɢuB
16	114	鴿子	鴿	ku̯b	kəpD	ɴquA	ɴqɔuA
16	74	兔	兔	la̯s	tʰuoC	ʔljuB	ʔl̥ɔuB
	113	鴨	鴨	qra̯b	ʔɻæpD	ɢṳaC	
5	59	繩子	索	sre̯g	ʂɻɛkD	hlæC	l̥ɑC
5	7	含一口水	哺	ba̯s	buoC	mpæC	mpɑB
3	102	路	路	(g-)ra̯gs	luoC	kləuX	kæB
24	117	鷹	鷹	qɯŋ	ʔɨŋA	qlaŋx	qleŋB
21	118	野蒜	蒜	slo̯ns	sʷɑnC	ɢləŋB	ɢlɔnB
11	6	眼睛	目	mug	miukD	mṳɛjH	maiC
12	40	毛	髮	pod	pʷiɤtD	pljei	pl̥oiA
10	95	舔	餂	ɢljeʔ	ʑiɛB	-jep	ʑeiD
3	49	答	答	k-lu̯b	təpD	tau	tæA
29	27	聽	聞	mɯn	miunA	（S-）mr ṳ̯ɔŋH	mzṳŋC
16	86	九	九	kuʔ	kɨuB	N-ɟuə	dʑɔuA
12	33	四	四	pʰ-ljids	siC	plei	ploiA
2	129	一	一	qlig	ʔitD	ʔɨ	ʔeA
9	70	六	六	rug	liukD	kruk	tl̥əC
5	115	渴	渴	grad	ɡɻiɛtD	ɴKhæj	ɴqhɑA

9	59	鐵	鐵	lig	tʰetD	hluwC	l̥əC

Ratliff considers some words in the list belong to Middle Chinese loanwords, thus she gives the tonal category markers such as A\B\C\D\X at the end. Some of them actually should be borrowed from Old Chinese period, i.e. "路" still conserves the cluster consonant initial which did not exist in Middle Chinese

4.3 Cognates from Tibeto-Burmese

The examples are collected from Gong's serial comparative studies in Sino-Tibetan languages. Some researchers believe that there exists comparative evidence between Wring Tibetan/Writing Burmese –s and Old Chinese *-s coda. In the following table are the cognates that do not keep the correspondence in -s ending.

Serial No.	Chinese	Old Chinese	WT/WB	Glossary
11	樺	*gwrags	WT gro-go	'birch tree or its bark'
26	麝	*C-gljiags>*gljags	WT gla	'musk deer'
27	射	*m-ljiags>*m-djags>OC*djags	WT mda<*mla	'arrow'
28	賁	*gljags	WT gla	'pay, wages, fee'
35	迓	*ngrags	WB ŋra	'meet with'
36	夜	*rags	WT zla; WB la	'moon'
38	芋	*gwjags	WT gro-ma	'yam'
52	鞕	*ngrangs	WT mkrang~khrang	'hard, solid, firm'
89	縊	*ʔjiks	WB *ʔac<*ik	'to squeeze, clench (the throat), throttle'
108	梦	*mləngs	WB rmang-lam	'a dream'
120	逗	*dugs	WT 'dug	'to remain, to stay, to live, to sit'
123	叩	*khugx/*khugs	WB khauk<*khuk	'to knock, rap'
124	寇	*khugs	WT rkul; WB khuwC	'to steal'
134	嘴咮	*tugs	WT mchu<*mthyu	'lip, beak or bill of birds'
139	颂	*gljungs	WT glu	'song, tune'
189	姁	*pjidx~*pjids	WT phyi-mo	'grandmother'
191	畀	*pjids<*s-pjids<*s-bjids	WT s-byin	'to give, to bestow, to hand'
200	四	*sjids	WT bzhi<*blyi;WB leC<liy	'four'
203	细	*sids	WB seC<*siy	'small, fine, slender'
204	至	*tjids	WT mchi<*mtshyi	'to come, to go , to

				appear'
206	尽	*dzjins	WT zin	'to be consumed'
242	太	*tads	PTB *tay	'big'
250	半	*pans	WT bar	'intermediate apace'
251	遍徧	*pians	WT spel-pa	'to spread, to propagate'
255	粲燦	*tshans	WT mtshar	'bright, shinning, of metals, fine'
262	贩	*pjans	PTB *par	'trade, buy, sale'
276	缮	*gljans	WT glan	'to patch, mend'
282	霰	*sians	WT ser	'hail'
315	胃	*grjəts	WT grod	'belly, stomach'
317	佑	*gwrjəgs	WT grogs	'assistant'
326	馑	*grjəns	WT bkren	'poor, hungry'
336	训	*xwjəns	WT skul	'to exhort, admonish'
362	浸	*tsjəms	WT sib; WB cim[A]	'to soak in'; 'to soak in liquor'
371	妊	*mrjəms	WT *s-mrum >s-brum	'pregnant'

Let's take the word "goose" as an example showing the reconstruction of *-s coda in Old Chinese is a bit redundant. In Old Chinese, "鵝"and "鴈" are paired words:

鵝　*ŋˤa[r]
鴈　* C.[ŋ]ˤrar-s

In Old Chinese, "鴈" often refers to "domestic goose" in multiple contexts. Actually, "鵝" What's the point to reconstruct a *-s ending for a word without change in morphology and meaning? Mattisoff (2004) reconstructs the Proto-TB form for "goose" based on the comparative evidence from TB languages: *ŋɑn. No -s ending is ever found in this language family for the word "goose".

5. Tonal Preference in Old Chinese Interjections and Modal Particles
Interjection and Modal particle might be considered less relevant to word morphology for they are even commonly independent from the rules of syntax, lexicon even phonology:

"[感叹词]The fact that interjections may disregard the phonological and phonotactic rules of a language – another salient feature – continuously fuels the debate on their linguistic status。"（Stange 2016:6）

Thus we do not need to concern if there would be any morphological meaning in the tonal alternation. For example, there are two different readings in tone for the interjection "吁" in Middle Chinese rhyme book 集韵:

吁　　况于反　*qʷʰ(r)a　　　往付反　*Gʷ(r)a-s

According to 经典释文, we are able to locate the contexts in which the different readings occur respectively.

往付反	帝曰：吁！嚚訟可乎？	《尚书 尧典》
况于反	益曰：吁！戒哉！儆戒無虞。	《尚书 大禹谟》

We can hardly say any difference in the function for the usage of 吁 in the two pieces with different sound glossary. But we know for sure that the different tonal appearance for interjection is not random in Old Chinese.

何乐士 et.（1985）collects all the interjections and modal particles appeared in Pre-Qin period. We find a clear pattern in the tonal preference for these two groups. We should also keep in mind that interjection appears at the beginning of a sentence, or serves as an independent clause. While modal particle is always found at the end of a sentence.

	Ping	Shang	Qu	Ru
Interjection	嘻（譆熙憘）噫意懿 唉 嗟 呼 皋 嗚（於）恶吁、猗歟、猗嗟、咨（訾）	夥	哑嚇（吁懿唉）	咄嘆
Modal Particle	乎 哉 夫 兮 焉 耶（邪）歟而居来为诸些思休胥猗员	也矣耳尔已者且许止只咠	忌	

Interjections shows clear tendency to avoid Shang tone, while modal particles avoid Qu and Ru tone. The only exception in the table can be easily ruled out by textual studies on the original contexts. Since Qu and Ru are closely related in *Odes* rhyming, it is not odd for us to treat them as one category here. Most modal particles in Shang tone belonging to Old Chinese rhyme group 之 *-ɯ seems to reflect a type of reduced vowel quality, which confirms with the common sense that sentence end is the position easily causes weakening effect. Li Rong (1956), Ting (1975) noticed that Shang tone usually is accompanied with shorter syllable duration in Middle Chinese. This phenomenon should be able to be projected back to Old Chinese if we follow Haudricourt's glottal reconstruction for the origin of Shang tone. Thus we are going to propose that the contrast of the tonal preference for interjections and modal particles is actually the contrast between intensified and weakened syllables.

Ping tone can occur in both groups. Therefore, we will consider Ping tone in Old Chinese is the modal status whatever in tone or in syllable. Compared with Ping tone, Shang tone in modal particles is the weakened one, Qu/Ru tone in interjection is the intensified.

Some Qu tones words in the table have alternative reading in Ping tone. This phenomenon sheds light to understanding the odd rhyming scheme for "慶"in *Odes*. The change in tone is likely to be caused by the swift in prosodic factors such as intonation or even poetic metre, even though the knowledge in Old Chinese poetry is still extremely limited.

6. Short conclusion
The hypothesis of ending consonants deriving into tones is still well established. But challenges do exist, not only from the rhyming practice. The develop of tonal system in Chinese may have

different stages in history in which there could be a long-term transiting period from atonal to tonal.

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