

CHINESE TONES FROM AUSTRONESIAN FINAL CONSONANTS

Laurent Sagart, C.N.R.S., Paris, France.

The question of the origin of Chinese tones has long been a matter of controversy among students of Chinese phonology. While some authors have argued that Chinese tones arose as a result of the loss of certain final consonants, others have related the emergence of tone to prosodic factors: but, whatever their assumptions concerning the genetic affiliation of Chinese may have been, none has been able to produce substantial etymological support for their interpretations. The present paper draws etymological and comparative support from reconstructed Austronesian, which this author believes to be genetically related to Chinese, to give a new account of the origin of Chinese tones.

1. The Chinese tone system and earlier accounts of its origin.

type	ex.	possible tones:			
		A	B	C	D
CV	pa	+	+	+	
CVW'	paw	+	+	+	
CVN	paŋ	+	+	+	
CVK	pak				+

Chart 1: Early Chinese tones and syllable types.

The structure of the Chinese tone system of the 4th-6th centuries AD is directly known to us through contemporary descriptions and lexicographical works. It consisted of three contrasting categories: 'Level' (tone A), 'Rising' (tone B), and 'Departing' (tone C), occurring with all syllable types, except those ending with an oral stop. Such syllables were not eligible for tonal

contrasts. For that reason they are said in the Chinese phonological tradition to carry a tone of their own: tone D, the 'Entering' tone. The resulting pattern, shown in chart 1, is shared with Vietnamese, Miao-Yao, and Thai. There is evidence from rhyming that Old Chinese (OC), a language spoken a millenium earlier, already possessed the A, B, and C categories, and that these categories had similar morpheme memberships. Rhyming, however, does not tell us whether the features which characterized these categories in OC were prosodic or segmental: if segmental, the fact that words in different tones had frequent contacts in the phonetic series suggests that these segments were probably laryngeals.

The first explanation of the origin of the arrangement in chart 1 was given by A.-G. Haudricourt (1954a) in an article dealing not with Chinese but with Vietnamese. He proposed that Vietnamese had been non-tonal until the first centuries AD, and that tone contrasts arose in it as a result of the effect of final laryngeal consonants, -ʔ and -h, lost since, but still preserved by related languages. Final -h itself was derived from earlier sibilants. According to Haudricourt, syllables ending with the glottal stop had a non-distinctive melodic rise, and syllables ending with -h had a non-distinctive fall; while syllables without a final laryngeal were characterized by a non-falling, non-rising melody. When the final laryngeals were lost, the accompanying melodies became three contrasting tones, as shown in chart 2:

-0 → tone A
 -ʔ → tone B
 -s → -h → tone C

Chart 2: Origin of Vietnamese tones according to Haudricourt (1954a).

Haudricourt assumed the same origin for tone contrasts in syllables with final nasals and semivowels, ie. -N, -W, → tone A, -Nʔ, -Wʔ → tone B, -Nh, -Wh → tone C, although he could only cite lexical comparisons to illustrate the development of tone contrasts in open syllables. The lack of tonal contrasts in syllables having oral stop endings was attributed to the impossibility for the final laryngeals to occur after stops.

In another article published the same year (1954b), and dealing with Chinese tones, Haudricourt took up the idea, first advanced by the Qing dynasty philologist Duan Yu-cai, of a late origin for tone C: arguing from the tonal correspondences in the earliest layer of Chinese loans into Vietnamese, he proposed that in Chinese also, tone C found its origin in final -s, later changing to -h, melodic fall, etc.; but while in Vietnamese the final consonants responsible for tone C were part of the stem, Haudricourt argued that final -s in Chinese was a suffix. Word stems originally in tones A or B

and suffixed with *-s* ended up with tone C in MC: and word-stems with stop endings lost their stop endings and also had tone C in MC. Although Haudricourt's proposals for Chinese were limited to tone C, they were treated by other authors as if the proposals made for Vietnamese tones A and B were applicable to Chinese.

While some of its aspects received support from Tibeto-Burman (TB) morphology (Forrest 1960), foreign transcriptions (Pulleyblank 1962, Yakhontov 1965) and Chinese dialects (Mei 1970, Sagart 1986), Haudricourt's theory was doubted by others on the grounds that it could not easily account for the origin of tones in syllables ending with nasals (Norman 1988), was insufficiently supported by Sino-Tibetan etymologies (Benedict 1975:191), or betrayed a Western bias for segmentals (Ballard 1988:23).

Other authors assigned tonogenetic role not to final consonants, but to prosodic features such as vowel length (Wang Li 1957), phonation type in vowels (Yuan Jiahua 1981), stress placement (Ballard 1985), or to a combination of vowel length and the effect of final laryngeals (Luo Meizhen 1988). No more than Haudricourt, these authors were able to produce substantial comparative support for their proposals.

A different tradition (Tong 1968, Benedict 1972), ultimately stemming from the early conception of an 'Indo-Chinese' language family, asserts that OC inherited its tones (and other features, such as monosyllabic morpheme structure) from a tonal ancestor. Benedict (1972) produced over 50 lexical comparisons supporting a correlation between the Chinese tones A and B (tone C being due in his view to sandhi) and a similar two-tone pattern within Tibeto-Karen. On this basis he reconstructed a two-tone system for Sino-Tibetan. However, comparing OC with TB languages, Coblin (1986) found numerous counterexamples to the proposed correlation; Mazaudon (1985) showed that even a tone correlation within Tibeto-Burman, had no been demonstrated; and Matisoff (1985:29) raised the possibility that tones arose separately in the different branches of TB.

2. Chinese tones from Austronesian final consonants.

An ongoing investigation is turning up regular sound correspondences, morphological parallels and a large set of shared lexical items between two reconstructed languages previously regarded as unrelated: OC (as reconstructed by Li 1971, 1976) and reconstructed Austronesian (RAN, as reconstructed by Dempwolff 1938 and Blust 1970, 1980, 1983-84, 1985, 1989). In the following, I will show that the hypothesis of a Sino-Austronesian genealogical relationship allows a simple and etymologically well-supported account of the origin of Chinese tones in most syllable types.

2.1. OC : RAN sound correspondences and morphological parallels.

Old Chinese morphemes are for the most part syllabic and correspond to the

final syllable of RAN words. The correspondences are summarized in charts 3 and 4.

Aside from sound correspondences, OC and RAN also have in common to possess infixal morphology. OC had two infixes: *-r-* and *-j-*. The *-r-* infix had an intensive or repetitive value in verbs and adjectives, thus paralleling the *la-*, *li-*, *lo-* (*ra-*, *ri-*, *ro-*, in some languages) infixes of the Central Philippines (Viray 1939). A common function of *-j-* was to attribute the semantic property in the word-base to a person, thing or location: if the word-base was a verb, the property was not assigned to its agent but to its patient, or to its instrument. In that function, *-j-* is similar to the *-in-* infix of Tagalog, which serves to focus a verb on its patient. As is normally the case in Austronesian languages, OC infixes were inserted before the first vowel of a word stem. Infixes should be disregarded in comparing OC with RAN.

RAN	OC (Li)
p	p
mp	ph
b	b
m	m
w	gw
t, T, c	t
nt, NT, nc	th
d, D, j	d
n, N, n	n
l	d, r (Pulleyblank, Yakhontov: l)
r	l (Pulleyblank, Yakhontov: r)
s	s
s	ts
z	dz
k	k, kw
ɲk	kh, kwɥ
g	g
R	g
q	?, ?w

Chart 3: initial correspondences.

2.2. Origin of Chinese tones.

Tones in Li's OC system are a backward projection of Middle Chinese tones, and are noted by means of 'x' (tone B) or 'h' (tone C) following the ending. Tone A is unmarked. In Li's view OC had no open syllables: all words ended with a consonant. This could be a voiced stop (*-b*, *-d*, *-g*, *-gw*) or *-r*, a nasal (*-m*, *-n*, *-ŋ*) or a voiceless stop (*-p*, *-t*, *-k*, *-kw*). Many students of OC phonology believe Li's final voiced stops to be spurious, and reconstruct open syllables

instead. In the following examples, OC reconstructions follow Li (1971, 1976). Where required, alternative reconstructions for initial consonants, following Yakhontov (1976), are provided between parentheses after Li's reconstructions. RAN words preceded by the symbol 'D' are from Dempwolff (1938); R. Blust's reconstructions are preceded by '1' when assigned to his Austronesian level, by '2' when assigned to his Malayo-Polynesian, and by '3' when assigned to his Western Malayo-Polynesian (Blust 1980:11). Reconstructions preceded by 'B' are from Blust's earlier work (1970) in which no distinction of reconstruction level was made. Finally, reconstructions preceded by 'R' are roots, drawn from Blust (1988). Since syllables ending with voiceless stops were not eligible for tonal contrasts, we will not discuss them here. We first discuss the origin of tone contrasts in words reconstructed with final voiced stops and -r- by Li.

RAN final consonant	RAN main vowel			
	a	i	u	e
-0	ag	æg	ug	
-q	ag	æg	ug	id
-s	ag	æg	ug	id
-š	ad			
-ʔ	ag			
-y	id			
-w	agw			
-R	ar		əd	
-l	an		ən	
-r	an		ən	
-m	am			əm
-n	an		ən	
-ŋ	aŋ	iŋ	uŋ	əŋ
-b	am			əm
-d	an		ən	ən
-D	an		ən	
-j			ən	
-g	aŋ	iŋ	uŋ	
-p	ap			əp
-t	at	it	ət	
-k	ak	ik	uk	ək

Chart 4: final correspondences.

2.2.1. Tones in OC words with voiced stop and -r- endings.

2.2.1.1. Tone A.

Tone A corresponds to RAN words ending with a vowel, a semi-vowel, with -R, or in a few instances, with - ?:

red	2 siRa	霞 g-r-ag
large snake	2 anipa	巴 p-r-ag
hilt	3 saŋca	胡 gaŋ
older sib./father's sister	D kaKa	姑 kaŋ
eat/have a free meal	D ka	餽 gaŋ
mortar, cement/mud, plaster	D gaLa	塗 daŋ (l-)
split open	D tela	茶 daŋ (l-)
husk	D qempa	麩 ph-j-ag
palm of hand, sole of foot	3 Da(m)pa	扶 phaŋ
come (v.)	1 ari	徠 laŋ (r-)
a cord	D se(n)tagi	綫 g-j-aŋ
that, there/then, now, this	2 idi	時 d-j-aŋ
there/3rd pers. demonstrative	3 ati	之 t-j-aŋ
curved	D Deku	句 kuŋ
stupid	B duŋu	愚 ŋ-j-uŋ
rheumatic pain/suffering	D ŋilu	痲 ruŋ (l-j-)
pass, pass by/pass over to	D laLu	逾 ruŋ (l-j-)
ashamed/despise	D maLu	媮 thuŋ (hl-)
high, tall	R -kaw	高 kaŋw
kind of crab	2 qali-maŋaw	蟹 ŋaŋw
bright light	2 niLaw	姚 raŋw (l-j-)
tiger	D qarimaŋ	貓 m-r-aŋw
confusion	3 siGaŋ	覈 g-r-aŋw
weed (v.)	D babaw	蔗 b-r-aŋw
look	D qi(N)Tay	視 tid
kind of grain-bearing plant	D zelay	莢 did (l-)
light/sunlight	D siPaR	曦 ho-j-ar
snake	D ulaR	蛇 d-j-ar (l-j-)
roast (v.)	2 tuquR	煨 ?wəd
dove	1 tuRtuR	佳 t-j-əd
carbuncle	3 pi(R)sa?	疽 tsh-j-ag
ear pendants/earrings	3 tiŋga?	簪 g-j-ag
gums/jaw, gills	1 gusi(?)	鯉 saŋ

2.2.1.2. Tone B.

OC tone B corresponds to RAN words ending in -q:

earth	2 bu(R)taq	土 thaŋx
vomit (v.)	D u(n)taq	吐 thaŋx,h
bow	D panaq	弩 naŋx

oppose	D gagaq	戶	gagx
wet/dripping	D basaq	滑	s-j-agx
shell/shield	D karaq	槽	laqx (r-)
salt	D siraq	鹵	laqx (r-)
grandfather/father	B embaq	父	b-j-agx
house/big house	D Rumaq	廡	m-j-agx
there (close)/you, this	2 inaq	汝	n-j-agx
wash	3 biseq	洗	sidx
cause	D daliaq	以	raex (l-j-)
able to (using)/using	D uliq	以	raex (l-j-)
root shoot/bamboo shoot	D suliq	莖	raex (l-j-)
dog, puppy	2 u(ŋ)kuq	狗	kuex
curve/curved (feathers, etc.)	2 pekuq	棋	k-j-ux

2.2.1.3. Tone C.

Two sets may be distinguished among OC words noted with -h in Li's reconstructions. The first set corresponds to RAN -s:

satiate	2 puqas	餓	?-j-agh
cloth	D kapas	布	paqh
radicle/interlaced roots	D tunas	茹	n-j-agh
raw energy, furious/angry	2 ganas	怒	nagh
hard/strong, firm	D makas	固	kagh
unveil/lift up clothes	3 bu(ŋ)kas	揭	kh-j-adh
ruined	3 rebas	敗	b-r-adh
cut through/cut out	R -tas	制	t-j-adh
shake (trans.)	D paspas	澀	phadh
stench of spoiled food	2 baŋ(e)qes	醜	?-j-idh
press, squeeze, press tightly	D tiNDes	緘	d-r-j-idh
break wind	3 ke(m)pes	屁	ph-j-idh
to scratch/engrave	D garus	鏤	lugh (r-)

In this set, OC shows two distinct correspondences for RAN -as: one to -agh, and another to -adh. These two OC finals have highly divergent behaviours in the phonetic series: -agh has frequent contacts to -ag and -agx, and occasional contacts to -ak; while -adh lacks tone A and B counterparts *-ad and *-adx, and has frequent contacts to -at. Furthermore OC words in -adh were used in transcriptions to represent foreign sibilant endings as late as the first centuries AD (Pulleyblank 1962), while words in -agh did not. This suggests that the final consonant in OC -adh was a sibilant, perhaps -ts. That would explain the lack of tone A and B counterparts, the frequent contacts to -at, and the correspondence to foreign sibilants. In contrast, OC -agh would have ended in -h, as suggested by Li's notation, and would have formed the original core of the tone C category. OC -adh would have joined the tone C category much later, after the loss of its final sibilant, perhaps as a result of different phonetic processes.

As in Haudricourt's theory, OC -h (as in -agh) would reflect an earlier -s, preserved in RAN. Original -ts, preserved by Chinese, would have merged with -s in RAN. That two distinct sibilants are required to account for the correspondences of RAN -s with OC, is supported by the parallel situation among initial consonants: RAN initial s- also has two correspondences in OC, one to s-, and another to ts-. Indeed, some students of Austronesian phonology have argued for splitting RAN *s into two proto-phonemes, mainly on the basis of distinctions present in Formosan languages: the new phonemes are noted as *s1 and *s2 by Dyen, or *s and *θ by Tsuchida (1976). However, since the Formosan witnesses are essential in disambiguating proto-forms hitherto reconstructed with *s, only words with cognates in the relevant languages can be plausibly determined: their number being small, and our list being short, we cannot ascertain whether the distinction recognized by Dyen and Tsuchida coincides with ours.

The second set consists of words originally in tone A or B, having shifted to tone C as a result of a highly productive morphological process in OC, see Schuessler (1985) and references therein. The original tone may sometimes be recovered with the help of doublets as in the case of 'vomit'; in other cases, it can only be inferred from comparison with RAN:

appear/let appear	D tara	露 lagh (r-)
anxious	3 dura	慮 l-j-agh (r-)
slip or slide down/fall down	3 lu(n)cuR	隊 d-rj-ədh
walk (v.)	3 lamba?	步 bagh
vomit (v.)	D u(n)taq	吐 thaxq,h

2.2.2. Tones in OC words with nasal endings.

2.2.2.1. Tone A.

Tone A words with nasal endings correspond to RAN words with nasal endings and perhaps -l:

deep	D Dalem	潭 dām (l-)
hold in fist or mouth	2 gem	含 gām
darkness of hue/black	B [dD]iRem	黔 g-j-əm
plait, braid, weave	2 anem	紆 n-j-əm
think	1 nemnem	恁 n-j-əm
contain	D kemkem	龕 khəm
path/path into a grave	D zalan	延 ran (l-j-)
gather/bring together	2 pudun	屯 dən
cover with earth, heap/tumulus	R -bun	墳 b-j-ən
atm. turbulence/sleet and snow	D Ra(m)bun	雰 b-j-ən
cloud, dew, mist/vapour, mist	D e(m)bun	氛 b-j-ən
back (bodypart)/spine	D balakaŋ	岡 kaŋ
expanse of water	3 bawaq	潢 gwaŋ

howl, bellow/resound, cry	2 uwaŋ	嗥	gwaŋ
space between/center, middle	D Ruqaŋ	央	?-j-aŋ
shine (v.)	D giLaŋ	陽	raŋ (l-j-)
throw into the air/winnow	B [CtT]alaŋ	揚	raŋ (l-j-)
adult, grown up	D guDaŋ	長	d-r-j-aŋ
mat; plaitwork (bed)/bed	D kazaŋ	床	dz-r-j-aŋ
mother	B inaŋ	娘	n-r-j-aŋ
sound of clashing, clacking	3 raŋ	琅	laŋ (r-)
title of respect	2 puwaŋ	王	gw-j-aŋ
wide	D baŋbaŋ	旁	baŋ
obstruction/obstacle	D eŋpaŋ	妨	ph-j-aŋ
embankment	3 baŋbaŋ	防	b-j-aŋ
stare (v.)/look towards	3 maŋmaŋ	望	m-j-aŋ, h
loose outer skin/husk	3 le(ŋ)kaŋ	糠	kaŋ
weighing instrument	D Riwaŋ	衡	gw-r-aŋ
tenacious	3 pegeŋ	恆	gəŋ
body	D daŋiŋ	形	giŋ
screen	B [Ct]ebiŋ	屏	biŋ
hop on one leg	3 kiŋkiŋ	鑿	kh-j-iŋ
alarm instrument/bell	D TuŋTuŋ	鐘	t-j-uŋ
concave, hollow/hollow, empty	D le(ŋ)kuŋ	空	kuŋ
duplicate, double	3 baŋDuŋ	重	d-r-j-uŋ
heap/mound	D kiŋpaŋ	播	phaŋ
oppose, contradict/disobey	D baŋkaŋ	奸	kaŋ

2.2.2.2. Tone B.

Tone B words correspond to RAN words with voiced stop endings, or -r:

burn/set fire to	3 sirab	燒	laŋx (r-)
intermittent radiance	2 kilab	焰	raŋx (l-j-)
support, handle, staff	3 tu(ŋ)kad	桿	kaŋx
cleared area	B na[Ct]aD	埤	d-j-aŋx
flat	2 Da(m)paD	垸	phaŋx
spread out/unfold, open	B bi(n)[CtT]aD	展	t-r-j-aŋx
dive, disappear under water	3 leneb	沁	hn-j-aŋx
constriction around neck	B cekig	頸	kiŋx
firm, stable	D [t]uquD	穩	?waŋx
pulverise/dust, flour	D buDbuD	坊	b-j-aŋx
labial circle/corner of lips	3 simuŋ	吻	m-j-aŋx
curve	R -kuŋ	拱	k-j-uŋx
level	2 pa(n)tar	坦	thaŋx
difficulty	D su(ŋ)ka[r]	蹇	k-j-aŋx
regulate	D qatur	準	t-j-aŋx

2.2.2.3. Tone C.

There is no specific RAN correspondence for OC tone C in words with nasal endings. This suggests that in such words, tone C always results from the morphological process referred to in section 2.2.1.3. As previously, the original tone of the word-base is only occasionally recoverable from a doublet (eg. 'stare'), or a dialect word (original tone B in the word-base for OC kh-j-amh 'yawn' is reflected by Hakka khem3 'cough').

trunk, raw material	D bakal	幹 kanh
resist/ward off	D galgal	扞 ganh
ringing sound/musical stones	1 kipkip	磬 khing
stare (v.)/look towards	3 maŋmaŋ	望 m-j-aŋ,h
go/let go	2 lampaŋ	放 p-j-aŋ
wooden cross-piece	3 ataŋ	檔 taŋ
striped/veined	D belaaŋ	碭 daŋ (l-)
stiff, rigid, rigor mortis	R -kaŋ3	僵 k-j-aŋ
clear, of water	2 nignig	淨 nih
dull, blunt	D pu(n)dul	鈍 danh
blunt, dull	2 tultul	頓 tanh
carry, accompany/escort (v.)	D usun	送 sunh
open (the mouth)/yawn	D uŋkab	欠 kh-j-amh
energetic/strong	3 sikaD	健 k-j-anh
kind of matting rush	3 sedsed	薦 tsianh
walking stick/stick	R -kud	棍 kwanh
brave/violent, fierce	2 gagar	悍 ganh
shiver, tremble/shake (fear)	R -ter	振 t-j-ianh

3. Discussion.

Unlike previous interpretations, the present account assigns different origins to tones in different syllable types: RAN endings provide the basis for a three-tone contrast in open syllables (ie. Li's voiced stop endings class), but only for a two-tone contrast in words ending in nasals. Tone C in combination with nasal endings is a creation of OC morphology.

In open syllables, the emergence of tone contrasts occurred more or less along the lines of Haudricourt's scheme for Vietnamese: the OC correspondents of RAN -ŋ and -s whose micromelodic effects resulted in contrasting tones were very plausibly - ? and -h.

In OC syllables with nasal endings, the A:B contrast arose in connection with the merger of the final voiced stops with the nasals. That change is exemplified by northern Batak, an Austronesian language of Sumatra (Adelaar 1981). That RAN -r has the same reflection as -d, -D and -j in OC suggests it had merged with one of these sounds before the change to nasals occurred. The alignment of tone A(open) with tone A(nasal) is clearly based on the sonorant nature of endings in both syllable types. The alignment of tone B(open) with

tone B(nasal) can be understood if we assume that (a) tone B(open) was characterized by a final glottal stop, and (b) that the final voiced stops changed not to plain nasals but to some kind of glottalized nasals.

4. Remaining problems.

Our model provides no explanation for the origin of the A:B tone contrast in OC syllables with correspondences to RAN -w, -y, -R: in particular, tone B in all OC words ending with -gwɣ is unaccounted for. It may be observed, in that connection, that OC -ngw and -ngwɣ have no -ngwɣ counterpart: it is thus conceivable that OC -gwɣ reflects an earlier -ngwɣ, but the evidence, so far, is missing. Likewise, tone B in all the OC words in which -dx, -ɾx corresponds to RAN -y or -R, is unaccounted for. Some such words occur in our data:

rice	D imay	米 midɣ
water	D aluR	水 h-rj-adx (hl-j-)

Irregular tone correspondences also occur in other categories. Some words have tone B instead of expected tone A:

mother	D ina	女 n-rj-agɣ
grandparent/grandmother	D nin[i]	奶 nɛgɣ
weak-tasting, insipid	D lamlam	淡 dɛmɣ (l-)
tall/big	D anzaɣ	柴 dzɛɣ

Words having tone A instead of expected tone B are less common:

heel	2 tiked	跟 kan
------	---------	-------

The word for 'insipid' has a little-used doublet in tone A: *dam* (l-) 'weak-tasting, of vinegar or wine' (Ji Yun). Alternation between final nasals and voiced stops is common in RAN roots (Blust 1988): it is possible that unrecorded alternations of that kind are paralleled by the #*dam*, #*dɛmɣ* doublet for 'insipid'. In other cases, analogical change may be responsible for sporadic tone shifts: for instance analogy with 父 b-j-agɣ 'father' may have caused the word for 'mother' to shift to tone B.

5. Conclusion.

In spite of remaining problems, which do not seem unsurmountable, comparison between OC and RAN has produced a solution to Chinese tonogenesis. That solution has confirmed Haudricourt's theory, but from unexpected quarters, and only for open syllables. A new explanation, also involving final consonants, has been provided for syllables with nasal endings. Our explanation, while it accounts for the origin of tone B in closed syllables, simultaneously brings the final consonant system of RAN in line with OC by reducing the 'unwanted' series of final voiced stops. Whether a similar explanation is available for those mainland languages which share the Chinese tonal pattern remains to be seen.

REFERENCES

- Adelaar, K.A. (1981) Reconstruction of Proto-Batak phonology. in R. Blust (ed) *Historical linguistics in Indonesia part 1*, 1-20. NUSA, vol 10. Jakarta: Universitas Atma Jaya.
- Ballard, W.L. (1985) *Mother Soup: A South Chinese Recipe for Tonometamorphogenesis. Computational Analyses of Asian and African Languages* 22: 43-64.
- Ballard, L.W. (1988) *The history and development of tonal systems and tone alternations in south China. Study of languages and cultures of Asia and Africa monograph series No.22.* Tokyo: Institute for the study of languages and cultures of Asia
- Benedict, P.K. (1972) 'The Sino-Tibetan tonal system'. In Thomas, Bernot (eds.) *Langues et techniques, nature et société*, Vol. 1.: 25-36.
- Benedict, P.K. (1975) *Austro-Thai: language and culture.* HRAF Press. 490 p.
- Blust, R. (1970) Proto-Austronesian addenda. *Oceanic Linguistics* Vol. IX, 104-62.
- Blust, R. (1980) Austronesian Etymologies. *Oceanic Linguistics* Vol. XIX numbers 1 and 2, 1-181.
- Blust, R. (1983-84) Austronesian Etymologies II. *Oceanic Linguistics* Vol. XXII-XXIII numbers 1 and 2, 29-149.
- Blust, R. (1985) Austronesian Etymologies III. *Oceanic Linguistics* Vol. XXV numbers 1 and 2, 1-123.
- Blust, R. (1988) *Austronesian root theory.* Amsterdam: John Benjamins.
- Blust, R. (1989) Austronesian Etymologies IV. *Oceanic Linguistics* Vol. XXVIII number 2, 111-80.
- Coblin, S. (1986) *A Sinologist's handlist of Sino-Tibetan Lexical Comparisons.* Monumenta Serica Monograph Series XVIII (Roman Malek, ed.). Nettetal: Steyler Verlag. 186 p.
- Dempwolff, O. (1938) *Vergleichende Lautlehre des Austronesischen Wortschatzes.* Band 3: Woerterverzeichnis. Beihefte zur Zeitschrift für Eingeborenensprachen, 19.
- Forrest, R.A.D. (1960) Les occlusives finales en chinois archaïque. *Bulletin de la Société de linguistique de Paris* 55: 228-39.
- Haudricourt, A.-G. (1954a) "De l'origine des tons du vietnamien". *Journal Asiatique* 1954, 242: 69-82.
- Haudricourt, A.-G. (1954b) "Comment reconstruire le chinois archaïque" *Word* 10, 2-3: 351-64.
- Li Fang-kui (1971) Shang-ku In Yen-chiu. *Tsinghua Journal of Chinese Studies, New Series* IX, numbers 1 and 2: 1-61.
- Li Fang-kui (1976) Chi-ke Shang-ku Sheng-mu Wen-ti. In Szu Ch'i-liang et al. (eds), *Tsung-tung Chiang Kung Shih-shih Chou-nien Chi-nien*

Lun-wen-chi. Taipei: Academia Sinica.

- Luo Meizhen (1988) Dui Hanyu he Dong-Tai yu shengdiao qiyuan de yi zhong jiashe. *Zhongguo Yuwen* 1988, 3:212-8.
- Matisoff, J. (1985) New directions in East and Southeast Asian Linguistics. In Thurgood, Matisoff and Bradley (eds.) *Linguistics of the Sino-Tibetan area: the state of the art*. Pacific Linguistics series C-No.87, 21-35. Canberra, 1985.
- Mazaudon, M. (1985) Proto-Tibeto-Burman as a two-tone language? Some evidence from Proto-Tamang and Proto-Karen. In Thurgood, Matisoff and Bradley (eds.) *Linguistics of the Sino-Tibetan area: the state of the art*. Pacific Linguistics series C-No.87, 201-229. Canberra, 1985.
- Mei, Tsu-lin (1970) Tones and prosody in Middle Chinese and the origin of the Rising tone. *Harvard Journal of Asian Studies* 30, 86-110.
- Norman, J. (1988) Chinese. Cambridge language surveys. Cambridge: Cambridge University Press. 291 p.
- Pulleyblank, E. (1962) The consonantal system of Old Chinese. *Asia Major* 9:58-144; 206-65.
- Sagart, L. (1986a) "On the Departing tone". *Journal of Chinese Linguistics* 14, 1: 91-112. Traduction chinoise dans "Yuwen Yanjiu" 1988, 3: 55-64.
- Schüssler, A. (1985) The function of Qusheng in early Zhou Chinese. in Thurgood, Matisoff and Bradley (eds.) *Linguistics of the Sino-Tibetan area: the state of the art*. Pacific Linguistics series C-No.87, 344-362. Canberra, 1985.
- Tong, T'ong-ho (1968) *Han-Yu Yin-Yün-Hsiieh*. Taipei: Kwang-Wen.
- Tsuchida, S. (1976) Reconstruction of Proto-Tsouic phonology. Study of languages and cultures of Asia and Africa monograph series 5. Tokyo.
- Viray, F. (1939) The Infixes la, li, lo and al in Philippine languages. Manila: Publications of the Institute of National Language, Bulletin No 3 (October 1939)3-21.
- Wang Li (1957) *Hanyu Shi Gao*. Beijing: Kexue Chubanshe.
- Yakhontov, S. E. (1965) Shanggu Hanyu. In Tang Zuofan, Hu Shuangbao (eds.) *Hanyu Shi Lun Ji*, 197-224. Beijing University Press, 1986.
- Yakhontov, S. E. (1976) Shanggu Hanyu de Qishou Fuyin l- he r-. in Tang Zuofan, Hu Shuangbao (eds.) *Hanyu Shi Lun Ji*, 156-65. Beijing University Press, 1986.
- Yuan, Jiahua (1981) Han-Zang Yu Shengdiao de Qiyuan he Yanbian. *Yuwen Yanjiu* 2.