On the tip of many tongues: apical vowels across Sino-Tibetan

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Abstract

Apical vowels[1] are known to play an important role in the phonologies of scores of languages throughout East and South East Asia. The nature and origin of such vowels, however, is still poorly understood; indeed, up to now they have usually been regarded as some sort of linguistic anomaly. We will argue to the contrary, that vowel apicalization is a well-motivated phenomenon having a natural explanation in terms of the phonotactic structure of the languages in which it occurs. Among other things, we will show that:

(1) Apicalization is a process which disturbs the physiological and perceptual balance of a particular vowel system in a remarkable way, triggering drag-chain type changes which tend to restore that balance.

(2) Like palatalization, apicalization may affect a given language at several different points in its phonological development. Interestingly enough, while palatalization and apicalization may appear to be competing changes over relatively short spans of time, examination of relatively longer spans reveals that almost invariably, the output of palatalization eventually feeds into apicalization.

Surface phonetic details of the development of apical vowels will be reconstructed "latitudinally" on the basis of synchronic evidence (cf. Chen 1973). To this end, we plan to cite data from a wide variety of Chinese dialects as well as from Lolo-Burmese.

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[1] Cf. the vocalic portions of Peking [sɿ 55] 'thought', [ʂɿ 55] 'poem', [35] 'son', etc.

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1. Introduction.

It has long been noted that hundreds of languages across East and Southeast Asia show striking similarities in their phonotactic structure - so striking, in fact, as to lead early linguists to posit genetic relationships where none actually existed. Nevertheless, the study of these structural similarities has yielded valuable insights into the diachronic phonology of such diverse groups as Chinese, Tibeto-Burman, Tai-Kadai, and Mon-Khmer, To cite a most obvious example, we are now increasingly able to make valid generalizations concerning tonogenesis in the above groups on the basis of certain characteristics of syllable-initial/final segmentals (cf. Matisoff 1973b); as a result, we have a fairly solid framework for examining any new tonal data that is likely to turn up. Now, it stands to reason that data on segmentals vis a vis segmentals in Chinese, Tibeto-Burman, etc. should provide as much an opportunity as does tonal data for the cross-linguistic study of diachronic phonology, yet we have not really taken advantage of what appears to be a wealth of readily available material. Large-scale treatments of specific processes such as the attrition of the nasal finals -m, -n, -ŋ (Chen 1972) are suggestive of what should be done for many more language families in the East-Southeast Asia area. Here we will be discussing another process which may be of areal linguistic relevance, namely, apicalization.

2. Synchronic description.

Informally defined, apical vowels (see Chart 1) are sounds which are similar to other vowels (e.g. i, u, a) in sonority and duration, but which are produced with the tongue in position as for the articulation of a consonant. In the case of the apico-alveolar vowel /ɿ/, the position is as for alveolar /s/; for the apico-retroflex /ʅ/, the position is as for /ʂ/ (the retroflex fricative). The position for /ʯ/ and apico-labio-dental /ʮ/ is as for /ɿ/, but in the former, the lips are rounded while in the latter, the teeth are pressed against the lower lip, with no lip-rounding. Apico-retroflex /ʯ/ is the rounded counterpart of /ʅ/. In all the above, the consonantal position of the tongue assures a fricative noise which is present the entire duration of the vowel, the total effect being that of a prolonged buzz. In the case of the proto-apical series, however, this noise appears only near the end of the vowel, when the tongue moves toward the position for /ɿ/ or /ʅ/ (with proto-apical /y/ lip-rounding may or may not continue during tongue movement, hence the four possible apical 'offglide' types). The syllabic sonorants /m̩, n̩, ŋ̩, l̩/ can be considered vocalic prolongations of corresponding homographic consonants.

Synchronic initial-final distributions and contrasts can be seen in Chart 2. Note that universal phonetic constraints (as expressed in the orthography) result in certain complementary pairings. Thus, /tɕ/ cannot co-ocur as such with /ɿ, ʅ, ʯ, ʯ/ finals nor /tʂ/ with /i/ and /y/ finals, since the tongue blade articulation required for /tɕ/, /i/, and /y/ and the apical articulation required for /tʂ/ and /ɿ, ʅ, ʯ, ʯ/ are almost impossible to produce in the sequences implied. The vowels /ʮ/ and /ʯ/ʯ/ are in complementary distribution phonologically and sometimes phonetically:

only /ɥ/, never /ɥ/ or /ʮ/, occurs with /tʂ/; /ɥ/ never seems to occur with /p, m, f, v, k, ŋ/; /ɥ/ and /ʮ/ can combine phonetically with /ts,l/ as /tsʮ, lʮ, tsɥ, lɥ/, but there is no contrast /tsɥ ≠ tsʮ/ or /lɥ ≠ lʮ/ in any one language. Initials other than dental or labio-dental (af)fricates tend to get pre-affricated before /ʮ/ or /ʅ/, cf. Lahu 'carry on back' /pu/ (> [pfʮ]), Hefei /tsʅ/ 'low' < MC *tiai may have had an earlier stage *tʅ.

Syllabic sonorants do not often occur with initial consonants, with the exception of Amoy and Yongan, both Min dialects. In the former, /ŋ̍/ forms syllableswith initial /h,t,s,k,ts/ as well as zero. The latter has an unusual group of finals /ĭm̩, ŭm̩, ŏm̩/, which Norman (1974:36) describes as "closed-mouth vowels ...articulated with the tongue in the position indicated by the vowel sign, but with the lips closed during the articulation". These could also be handled as syllabic /n̩, m̩, ŋ̩/ respectively, with simultaneous lip closure. Syllables composed of zero initial plus syllabic sonorants or other apical vowels as finals comprise a set with interesting properties. The onset for these types is glottalic, in the case of /ØZ/ accompanied by a prominent epenthetic vowel whose quality varies from dialect to dialect, cf. 'ear' Peking /ɻ214/ (→[ɔɻ214]), Lanzhou /ɸɹ/ (→[ɔr]). A somewhat lesss prominent vowel usually accompanies /ɸʅ/, /ɸu/, /ɸɿ/. Since these syllables are thus not really 'pure zero-initial' phonetically, one might propose to treat them instead by positing a glottalized consonant initial homorganic with the final apical, i.e. /ʔvv, ʔzʅ, ʔzɥ, ʔzɿ/. This approach is made quite explicit by Zhengzhang (1964:31) in her analysis of such Wenzhou (Yongzhong and nearby subdialects) oppositions as /ɸʮ44/ 烏 'crow' vs. /vʮ31/ 河 'river', /ɸʅ44/ 衣 'clothing' vs. /zʅ31/ 詞 'word' and /ɸɥ45/ 'to console' vs. /zɥ34/ 雨 'rain'. Such an analysis looks particularly advantageous in

the case of Wenzhou consonant sandhi, where it allows us to account for the fact that /ʔvɣ44, ʔzɻ44, and ʔzɥ45/ merge segmentally with /vɣ31, zɻ31, and zɥ34/, but retain their original tones, appropriate for syllables with voiceless initials. Likewise, we might find it useful to express the opposition between Peking [zɻ51] 'sun' vs. [ər51] 'two' and Leihu [zɻ] 'long' vs. [ɸɻ11] 'big' as /zɻ51/ vs. /ʔzɻ51/ and /zɻ/ vs. /ʔzɻ11/ respectively.

The primary syllable type to be discussed, then, will consist of an initial consonant plus a single apical vowel finally. Diphthong finals involving apical vowels are rather rare; occasionally, /ɣ/ will appear as an offglide, cf. Wenzhou [-aɣ, -eɣ, -əɣ]; or as an onglide, cf. Shangxian [-ɥo, -ɥei, -ɥɑ̃, -ɥɔŋ] (with dental (af)fricate initials only). In neither instance do the above finals contrast phonologically with [-u] on/offglide finals in the same dialect. The proto-apical vowels are at best a severely restricted case diphthongization; their distinctive phonologic roles will be treated later.

It should be rather clear by now why we have avoided referring to the sounds inventoried in Chart 1 as, say, syllabic consonants. We have already mentioned the segmental similarities between such sounds and vowels in terms of sonority and duration; moreover, as shown in Chart 2, apicals vowels or syllabic sonorants show prolific suprasegmental contrasts even where the initial is 'zero', something consonants are not capable of. In any case, we are merely recapitulating here the intuitions of post-Qie-Yun Chinese phonologists, who treated apicals just as they did other vowel(+consonant) sequences acting as yun, or syllable finals. We see no reason at present to doubt their judgment on this point.

We have tentatively set up diachronic stages on the basis of historical evidence from the Zhongyuan Yinyun (ZYYY) and synchronic evidence from a wide variety of modern dialects (cf. Chen's (1973) method of 'latitudinal reconstruction'). As shown in Chart 3, the first Middle Chinese (MC) syllable types to apicalize in all dialects were presumbly *tsi (精 series initials) and *tʃi (莊 series initials). In the ZYYY, which represents the pronunciation of a 14th century Mandarin dialect, about half the lexical items in MC *tɕi (章 series initials) had switched to ZYYY *tʂɿ, a shift that came to completion in the Shandong dialects of Huangxian and Anqiu. In these latter two, the remaining inventory of MC *palatal + i syllable types have retained their final -i, but have gone on to apicalize in the majority of other dialects of Mandarin (e.g. Peking, Chengdu, Hankou) and Wu (e.g. Shanghai, Suzhou, Wenzhou). At the time of ZYYY also, MC *ʈiai and MC * tɕiai had merged with MC *ʈi as ZYYY *tʃi, and generally followed the path outlined above, that is, apicalizing in most modern dialects but remaining palatalized in Anqiu and Huangxian. In the 'city' variety of Wenzhou (wu), however, the modern reflexes of these finals are best explained if we assume that at least MC *tsiai, *tɕiai, *ʈiai, if not *kiai remained distinct from MC *tsi, *tɕi, *ʈi, *tʃi, *ki until the latter had apicalized. Evidence to support this claim comes from Southern Wu dialects such as Yiwu and Jinhua, where the fromer MC *-iai set and the latter MC *-i set are kept separate as modern /-ie/ and /-ɿ/, respectively. This would enable us to account for the fact that in Wenzhou (city) MC *tsiai, tʃiai, ʈiai, > /tsei/ (<premodern /tsi/) instead of merging with MC *tsi , etc. as modern /tsɿ/. Wenzhou 'city' and 'Yongzhong' dialects

are also unusual in that in both, MC *ki and *kiai > /tsɿ/, presumably after palatalizing as pre-modern /tɕi/. Yongzhong goes on to apicalize pre-modern /tsi/ <MC *tsiai, *tɕiai, *ʈiai (cf. Wenzhou 'city' /tsei/); dialects in the near vicinity further undergo the rule MC *ʔi/*ɸi → /zɿ/. Thr process would seem to have reached its logical conclusion in the dialect of Wenshui and the dialects of Hefei and vicinity, where MC *pi, *piai, *mi, *miai, *ti, *tiei, *ni, *niai, *li, and *liai (cf. most Modern Mandarin and Wu /pi, ti, ni, li, mi/ are now/pɿ, mɿ, tɿ, nɿ, lɿ/in Wenshui and/pɿ, mɿ, tsɿ, nɿ, nɿ/, in Hefei. By now, however, MC *tsia, *ʔia, *ɦia (假开三) have yielded /tɕi, ɕi, i/ in both dialects, most likely through an intermediate stage /tɕie, ɕie, ie/ well attested elsewhere in Mandarin. In Wenshui also, a denasalization rule is beginning to diffuse through lexical items with MC finals in *ieŋ(曾梗开三), *iaŋ and *uaŋ (江开二宕开一三), yielding /-i,-ɔ,-iɔ,-uɔ/. The source of Ci# environments has thus been replenished, and just as surely, apicalization is applying anew: in Hefei, what once must have been /ɸie/ 'night' (MC<*ɸia) is now /zɿ/. Likewise, in Wenshui, apparently every MC *-i which denasalized apicalized to /-ɿ/ (cf. 'bright' 明 MC *mieŋ, Peking /miŋ35/, Wenshui / mɿll/ vs. 'chirp' 鳴 MC *mieŋ, Peking /miŋ35/, Wenshui /miŋll/), leaving not a single trace of what surely must have been an /i/ stage.

What we have witnessed thus far is, in a sense, a complex series of struggles between a series of competing sound changes. The most protracted of these struggles occurs between apicalization and palatalization, and herein lies a most interesting fact: where the two forces mentioned pete for lexical items, apicalization almost always wins out. Or, as the various

stages in Chart 3 show, whether the relevant palatalizing environment is present as far back as ZYYY, or else turns up closer to modern times, the output of palatalization seems to feed again and again into apicalization.

The development of MC *Cu#/*Cy# is far more complicated than that of *Ci#; nevertheless, the outcome shows parallels to what was discussed above. (*Cy# is a cover symbol for MC *Ciwo 遇合三 which yields, among others, modern reflexes in /-y/, whereas *Cu (≠ MC *Cuo 遇合一) almost never has -y reflexes). Where C is a dental or palatal (af)fricate, or velar, the major 'competing' rules are (a) *y# → i#/ $C_{\text{dental (af)fricate}}$———, (b) $C_{\text{palatal}}y \rightarrow C_{\text{retroflex}}$ u# (palatal dissimilation), (c) $C_{\text{velar}} \rightarrow C_{\text{palatal}}$ /——— i, y, (d) $C_{\text{retroflex}}$ u# → $C_{\text{retroflex}}$ ɥ#, (e) $C_{\text{retroflex}} \rightarrow C_{\text{dental (af)fricate}}$ /———V#. Sample outcomes of such rules (but not the diachronic stages involved) can be seen in Chart 4. Note that each MC type *Cu#/Cy# is apicalized in one or more dialects. While I have found no single dialect that apicalizes all the MC types in question, I think we have good reason to believe that this may simply be an accidental gap, and that what happened to MC *Ci# in Hefei and Wenshui will somewhere repeat itself with MC *Cu#/*Cy# in the conceivable future.

The primacy of apicalization over palatalization in Chinese (and possibly Lolo-Burmese) is extremely surprising, since palatalization seems to be a well-motivated rule that applies in a much greater variety of languages than Chinese or Sinto-Tibetan in terms of phonotactic structure. We have little to say at present concerning <u>why</u> Chinese should favor this drastic shift from tongue-blade to tongue-tip articulation. The root of the problem is almost certainly the peculiar monosyllabic structure of the Sino-Tibetan

languages, which is in fact one of the most salient phonological features distinguishing them from languages which do not apicalize. There is, however, a certain amount of adata which suggests how apicalization might take place. Apparently, the presence of an initial consonant, or any sort of syllabic onset, induces the front part of the tongue either to unbunch and lower somewhat, or else to retract with the tongue tip slightly curled back against the palate. The result is what we have been calling 'proto-apical' vowels, which sound more or less heavily affricated, somewhere between apical vowels and palatal vowels in quality. WE do not know yet what factors condition the direction of tongue-shift; in any case, it looks as if /i_1 , i_2 / and /$ɣ_1$,$ɣ_2$,$ɣ_3$,$ɣ_4$/ will eventually yield /1 ,2/ and /ɿ ,ʅ/, their apical counterparts. It is also interesting to note that, however strange their phonological status may seem, proto-apical vowels form minimal or near-minimal contrasts with both apical vowels and/or pure non-apical vowels in quite a few dialects (see Chart 2). A parallel case of proto-apicalization occurs with *nasals before -u. There is ample evidence from Lahu (Matisoff 1973a:) and from Chinese dialects suchs as Chengdu, Amoy, and Suzhou that initial *m- can induce nasalization in a following open final either before or after apicalization has taken place. In Lahu, for instance, nasalization automatically accompanies apicalization in /mû-yè/ [mvû-yè] 'rain'; with some speakers, the vowel in apicalized [mvû] is swallowed up as a "syllabic nasal affricate", which Matisoff symbolizes as [m̩ᵛ]. In Amoy, we see a succession of stages of apicalization represented in such (colloquial) lexical items as 枝 /tsue/ 'strip', 每 /muĩi/ 'each', and 梅 /m/ 'plum' , all<MC *muei. Finally, compare the various Mandarin and Wu reflexes for 畝 'parcel of land' MC *mu: Chengdu has /mo /, Huaiyin has / mo/min/ as alternating forms, and Suzhou and other Wu dialects have /m/ or /ŋ/. A similar process may have taken

place duri-ng the derivation of /ŋ/ < MC *ŋu 'five' and *ŋiwo 'fish', a reflex which is widespread throughout Wu and also Yue (Cantonese) dialects. The syllabic nasal correlate of maximally apicalizing dialects such as Hefei and Wenshui is not to be found in Chinese, however, but in the Lolo-Burmese language Sani (Ma 1951), which manages to reduce such diverse Proto-Lolo-Burmese forms as *m-ran, *maw, *s-mut, *miy to /m̩/, and *hmut, *mim, *s-mik, * mi, *mwat, and *(s-)nok to /n̩/!

We have now examined a number of rule chains which imply a reduction to homophony of large numbers of morphemes which were once phonologically distinct. Whether this adversely affects the functional load on the lexicon of a given dialect is perhaps a moot question, since languages are not arbitrarily limited in the ways they choose to distribute functional load. Typically, a Sino-Tibetan language which has suffered irrevocable homophonization compensates by making extensive use of compounding, cf. Peking Mandarin, which retains only one-third of the distinctions keeping lexical items apart in MC. What can be adversely affected by apicalization, however, is the equilibrium of vowel space in a given language. As Liljencrantz and Lindblom (197) have shown, limitations on human speech production and perception capabilities restrict the types of possible vowel systems in specific ways. Perhaps the most basic restriction is that all languages must fill at least the corner slots (i.e. i, u, a) in their vowel space, regardless of the total number of distinct vowel phonemes present in the system. Apicalization, which tends to delete or displace -i and -u, can cause the above restriction to be violated, throwing the whole vowel system out of balance. In those languages where apicalization is especially active, one must assume that the supply of i's and u's is being continually replenished

so as to keep vowel space more or less at equilibrium at any point in time. Previously, we have implied that such changes as MC *ia(i) →i, *iəŋ→i, etc. were purely independently motivated, and only incidentally fed such rules as palatalization and apicalization. In the light of our discussion above, however, we must consider the possibility that these changes were at least partially motivated by pressure to fill an -i slot emptied by apicalization. The most convincing evidence for this comes from Wenshui. Here, as we mentioned earlier, MC *tsia, ʔia, and ɦia→/tɕi, ɕi, i/; however, the total number of lexical items in these categories is relatively small. Actually, a much more significant source for Ci# in modern Wenshui comes from MC *Ciau (效开三). A shift such as this, occurring as it does in all initial consonant environments except MC *tʂ, *tɕ, and *tʃ, seems hardly motivated within the context of Northern Mandarin phonology, let alone on more independent grounds. It does make more sense if we view it as a drag-chain type change triggered solely as a result of the effect apicalization had on Wenshui vowel space.

CHART I

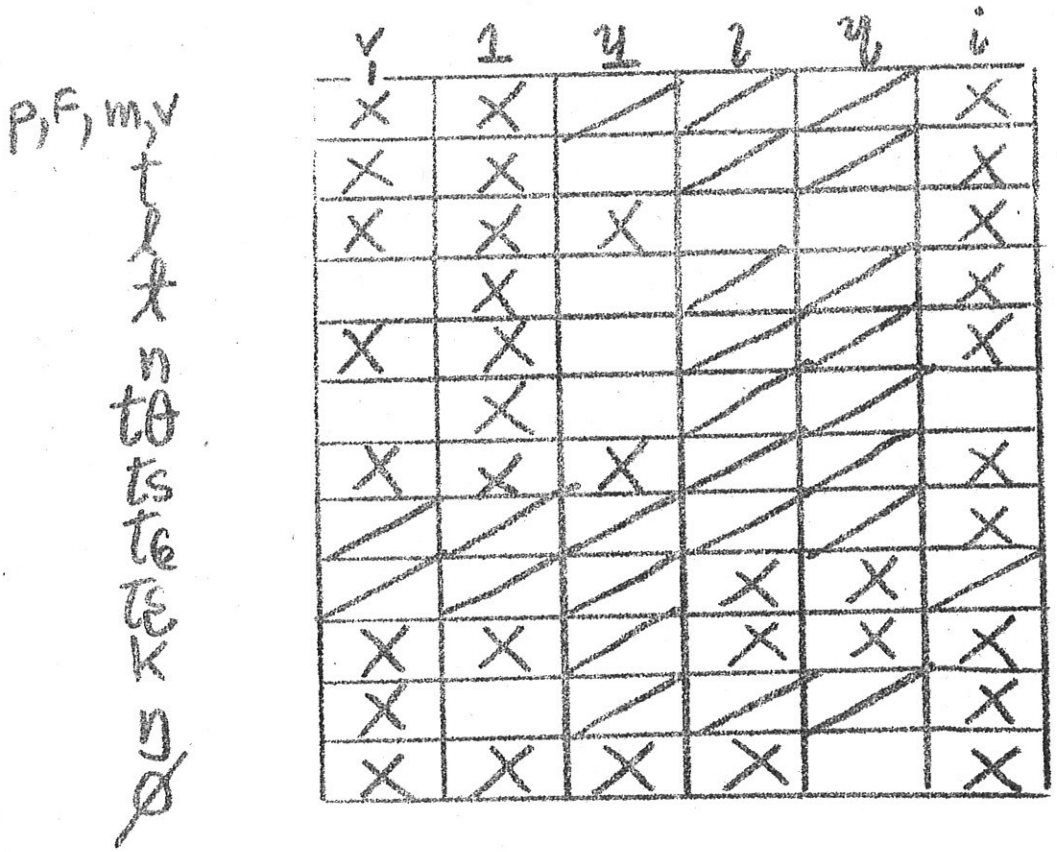
APICAL VOWEL TYPES

	[−round]	[+round]
apico-labiodental	ʏ	
apico-alveolar	ɿ	y
apico-retroflex	ɻ	ʯ
proto-apical	i_1/i_2	y_1/y_2 y_1/y_2

Sonorants m n ŋ l

CHART II

INITIAL - FINAL DISTRIBUTION



SYMBOLS USED

ts - RETROFLEX AFFRICATE
tɕ - PREPALATAL "
tθ - INTERDENTAL "
ø - ZERO INITIAL
ɬ - LATERAL FRICATIVE
X - COMBINATION ATTESTED IN DATA
□ - POSSIBLE ACCIDENTAL GAP " "
/ - IMPERMISSIBLE COMBINATION

CHART II (CONTINUED)

APICAL VOWEL CONTRASTS

Peking: sɿ55 'silk' ≠ ɕi55 'west' ≠ ʂɿ55 'poem'

Suzhou: sɿ44 'silk' ≠ si 44 'west' ≠ sɥ44 'poem'

Changshu sɿ53 'silk' ≠ si 53 'west' ≠ sɥ53 'poem'

Jintan sɿ 'thought' ≠ ɕi1 'west' ≠ ɕir 'first'

Nantong tɕyz 42 'hammer' ≠ tɕy42 'rescue'
(also Hangzhou, Danyang)

Wujiang kʻɥ1 'empty' ≠ sɥ1 'necessary' ≠ kʻɥ2 'ghost' ≠ si2 'west' ≠ ɕi2 'hope' ≠ sɿ 'thought' ≠ sɥ 'poem'

(kʻɥ1 ≠ kʻɥ2 also in Yixing, Shaoxing)

CHART II (CONTINUED)

APICAL VOWEL CONTRASTS

Wenshui

t'ɿ 312 'substitute' ≠ t'i 312 'jump'

p'ɿ 11 'skin' ≠ p'i 11 'float'

lɿ 44 'reason' ≠ li 44 'finish'

mɿ 44 'rice' ≠ mi 44 'second (time measure)'

mɿ 312 'oppose' ≠ mi 312 'urine'

zɿ 312 'meaning' ≠ i 312 'want'

sɿ 11 'silk' ≠ syɿ 11 'necessary'

CHART III(a): SELECTED SYNCHRONIC REFLEXES

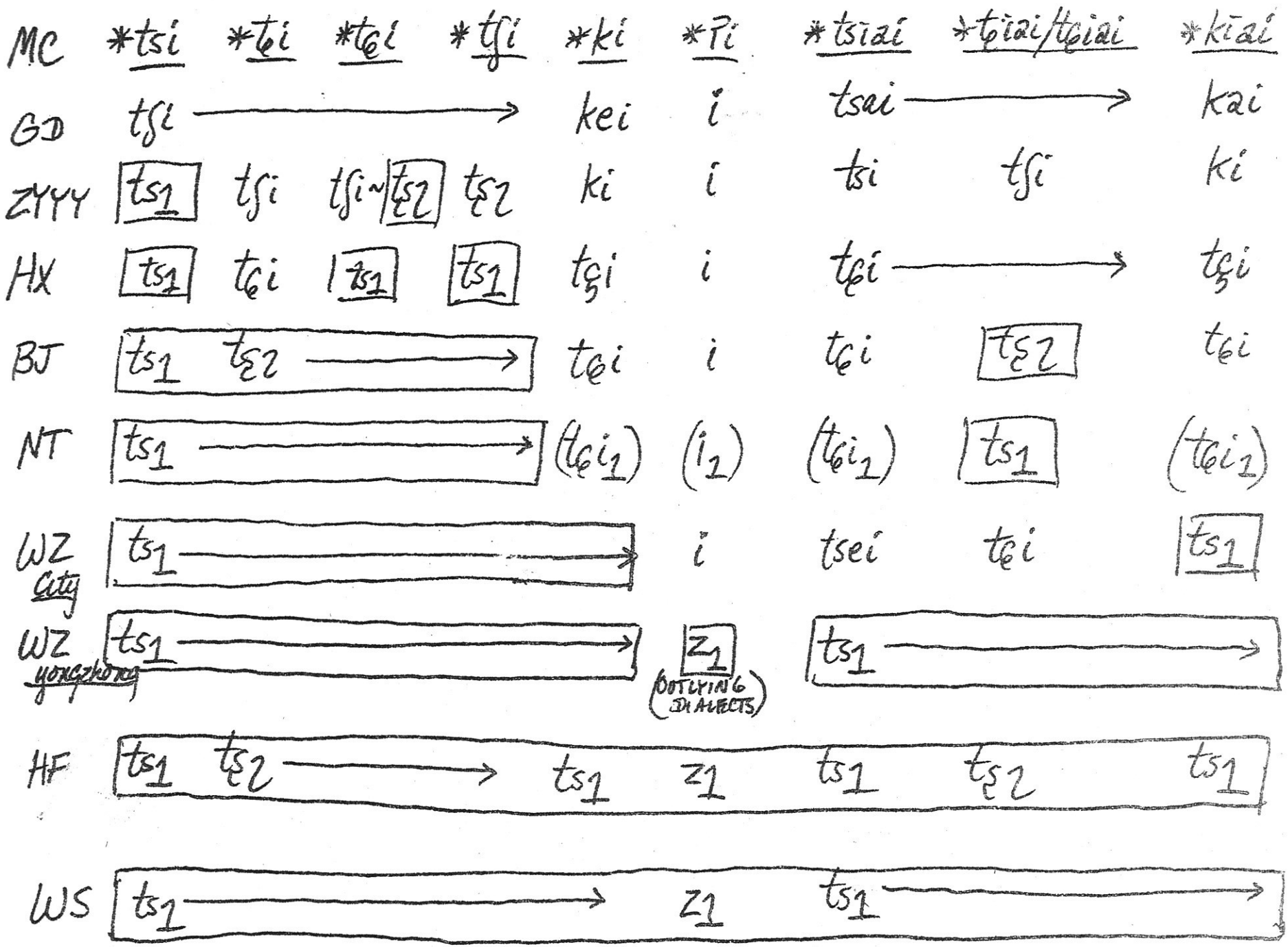


CHART III (a): SELECTED SYNCHRONIC REFLEXES (CONTINUED)

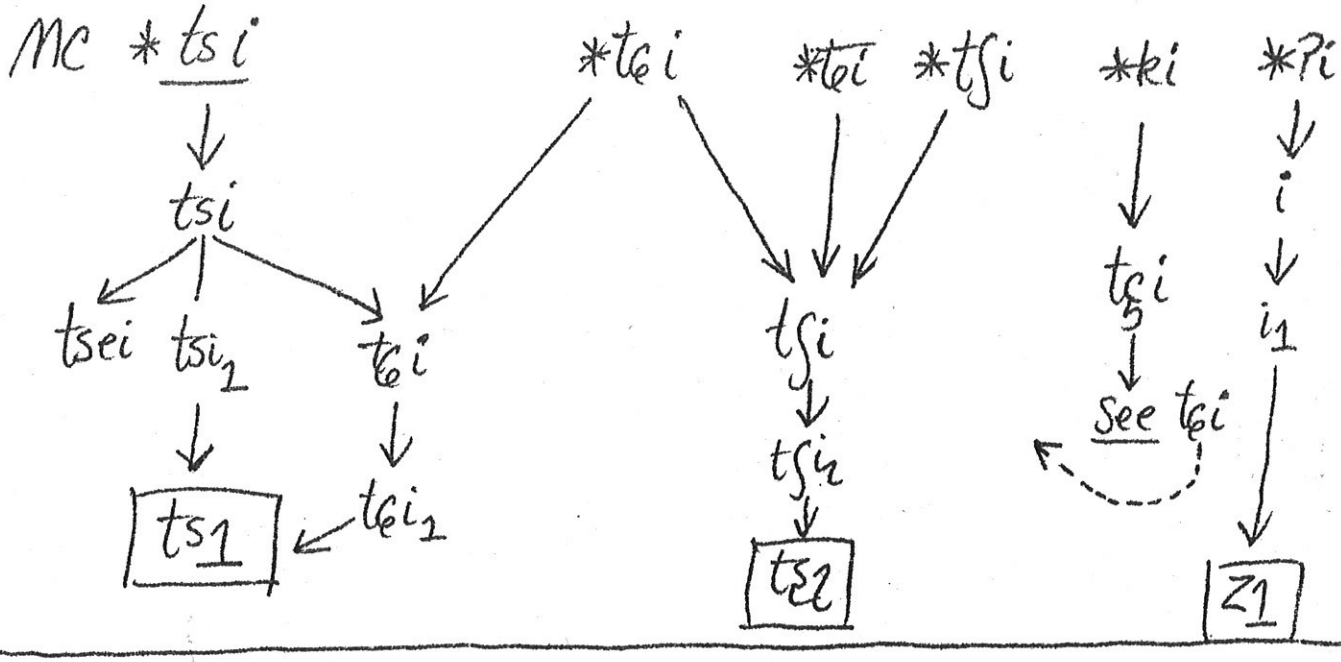
MC	*pi	*piai	*mi	*miai	*tiai	*li	*liai	*ni	*niai	*tsia *ia	*Cian
GZ	pei	pai	mei	mai	tai	lei	lai	nei	nai	tsia~e	Cin
ZYYY, HX	pi →		mi →		ti	li →		ni →		tsia	Cin
										HX tɕie	
BJ	pi~pei	pi~pei	mi~mei	mi~mei	ti	li	li	ni		tɕie	Cin
NT	pi_1 →		mi_1 →		ti	li →		ni →		tɕie	Cin
WZ	pei~pai	pei	mei~mai	mei	tei	lei →		nei →		tsei~hi	Cian
HF	p_1 →		m_1 →		ts_1	n_1 →				tɕi~[ts_1]	Ciõ
WS	p_1~pei →		m_1 →		t_1	l_1 →		n_1 →		tɕi	Cin~
											[C] [1]

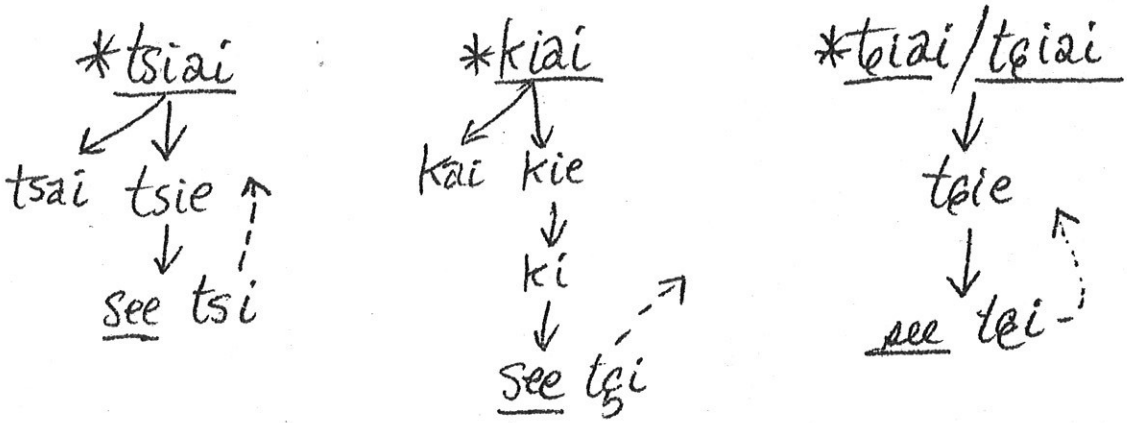
ABBREVIATIONS:

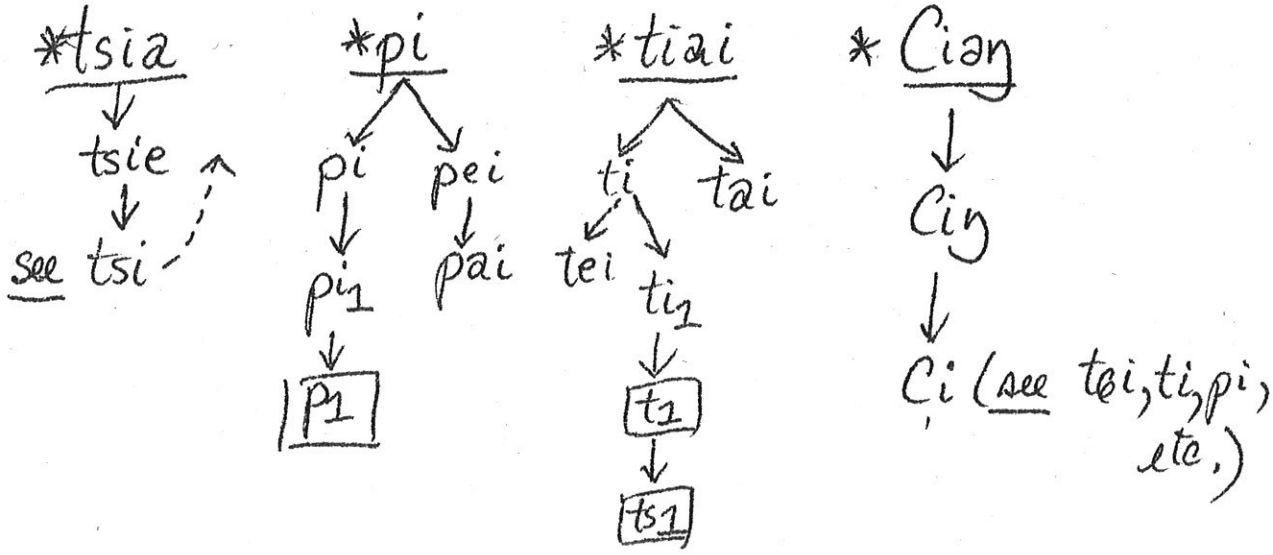
~ = INCOMPLETE DEVELOPMENT

GZ = GUANGZHOU
ZYYY = ZHONGYUAN YINYUN
HX = HWANGXIAN
BJ = BEIJING
NT = NANTONG
WZ = WENZHOU
WS = WENSHUI
HF = HEFEI
[ ] = apicalization stage reached

CHART III (b) COMPOSITE OF SELECTED RULE CHAINS







□ indicates apicalization end-stage

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