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INTRODUCTION

This volume of phonology papers, treating languages of the Otomanguean group, includes materials from three of its major families: Mixtecan, Popotecan, and Zapotecan.

The Mixtecan family is represented by two quite diverse approaches to Mixtec languages and a contrastive analysis of two Trique dialects. Daly provides an innovative and detailed discussion of a Mixtec tone problem for Peñoles Mixtec which challenges the kind of traditional interpretation that has dominated much of Mixtec phonological analysis. North and Shields, in contrast, present a traditional description, combining an analysis of segmental and tone phonemes with a few morphophonemic observations. Hollenbach takes a different tack altogether in her topological comparison of two Trique dialects by first inquiring into the details of the two phonological systems and then speculating upon the kinds of adjustments the speaker of one must make to understand a speaker of the other.

The Popotecan family is here represented by descriptions of both a Popolocan and a Mazatecan language. Stark and Machin highlight the roles of stress and tone in their description of the phonological word and phrase in a northern Popolocan language, while Jamieson provides a description--divided into two papers because of its thoroughness and careful attention to phonetic detail--of Chiquihuitlan Mazatec segments and tone.

Finally, the Zapotecan family is represented by two papers. Larry and Rosemary Lyman bring the fruits of several years of research to bear upon a hierarchical study of Coapan Zapotec phonology, dealing with phoneme through sentence levels, including a discussion of an extensive system of tone sandhi; and Jones collaborates with consultant Knudson to give us a first look at Guelavía Zapotec with a traditional analysis of segmental phonemes and tone, highlighting contrastive features and distribution.

Although two or three papers in this collection do address interesting theoretical questions or innovative approaches, the volume finds its major strength and usefulness in the presentation of a wide range of phonological facts which will stand us in good stead for many years to come as we seek a greater understanding of an important group of Meso-American languages.

William R. Merrifield

SILACAYOAPAN MIXTEC PHONOLOGY

Joanne North
Jăna Shields

1. Consonants
2. Vowels
3. Tones
4. Morphophonemics

In the Silacayoapan dialect of Mixtec,[1] as in other Mixtec languages thus far described, the couplet is the nucleus of the phonological word as well as the grammatical word (Pike 1948, Mak 1953, Longacre 1957). The couplet is significant in this dialect for at least three reasons: 1) It is the main unit of tone contrasts; 2) certain allophones are conditioned by placement in the couplet; and 3) certain phonemes occur in restricted environments in the couplet.

A couplet consists of two syllables, each with a nucleus of vowel plus tone. The nucleus is optionally preceded by a consonant or consonant followed by /y/, and may be followed by /ʔ/ when couplet medial. Syllable patterns therefore are V (word or couplet initial, this pattern is always preceded by [ʔ]), CV, or CyV, or any of these followed by /ʔ/. The couplet consists of any two of these syllable patterns with the exception that Vʔ, CVʔ, and CyVʔ occur only as the first syllable of the couplet.

CVV	ːàà	*man*	CVʔV	vàʔa	*good*
CVCV	hǐtà	*tortilla*	VʔCV	ɭʔnɽ	['ʔɭʔnɽ] *hot*
CyVCV	vyahá	*wet*	CyVʔCV	kyàʔva	*brother*

The phonological word, with the couplet as its basis, may have several syllables either preceding or following the couplet. Word stress is on the first syllable of the couplet. In examples, the couplet precedes space or hyphen (-).

káha *do*

káha-vaʔató *it (machine) does good*

kǫ̀nąkąląą-ñą́ *she didn't do it*

1. There are 21 consonant phonemes:

   voiceless stops: /p t č k kw ʔ/

   prenasalized stops: /mb nd nǰ ng/

   fricatives: /v s š ž h/

   nasals: /m n ñ/

liquids: /l r/

semiconsonant: /y/

1.1 The consonants may be described as follows:

Voiceless (unaspirated) stops are bilabial, alveolar, alveopalatal, velar, labio-velar, and glottal.

/p/ pą̀ą̀ *bread*
pəʔɨa *floppy*
čòpì *king*

/t/ tàà *man*
tʉtʉ *paper*

/č/ čʉ́ʔʉ *cook*
ndìčì *green beans*

/k/ kàà *metal*
ndíkì *horn*

/kw/ is considered a unit since it can be palatalized.

kwíi *green*
kwą́ą́ *yellow*
kwyàà *year*

/ʔ/ lʔnɪ́ *hot*
vàʔa *good*

/t/ may be slightly aspirated couplet initially. In post-couplet enclitic position, it is softened to [ɗ].

vàšɪ-tò ['vàšɪɗò] *it (rain) comes*

kíʔvì-ta ['kíʔvìɗa] *he is sick*

Because of the limited number of lexical forms that occur in enclitic position, the phone [ɗ] has been observed in only a few morphemes and only before /a/ or /o/.

/k/ has an allophone [g] that fluctuates with [k] in a non-stressed position outside the couplet, and mostly in rapid speech.

àkʉ́šʉ-kandì [à'kʉ́šʉgandì ~ à'kʉ́šʉkandì] *we (excl.) won't eat more*

Prenasalized stops are bilabial, alveolar, alveopalatal, and velar. They tend to be voiced except couplet medially, when the stop may be voiceless. /mb ng nǰ/ are rare; /ng nǰ/ have been observed only couplet medially.

/mb/ mbàà *compadre*
lámbà ['lámbà ~ 'lámpà] *bladder*
mbòʔlà *dirt clod*

/nd/ ndɨ̀é *thick*

ɥ́ndó ['ʔɥndó ~ 'ʔɥ́ntó] *animal fat*

tovìʔndá *nopal cactus*

/nǰ/ lánǰí *sheep*

lénǰó *Lorenzo*

/ng/ ìngá *another*

kòžángí [kò'žángí ~ kò'žánkí] *rainbow*

Fricatives are voiced bilabial, voiceless grooved alveolar, voiceless grooved alveopalatal, voiced grooved alveopalatal, and voiceless glottal. The voiced grooved alveopalatal /ž/ alternates with /y/ in rapid speech in couplet-medial position.

/v/ veʔe *house*

hava *half*

kíʔvì *I'm sick*

/s/ sáko *possum*

ndɨ̀sa *sandal*

sɨ́ʔrį *to milk*

/š/ šòò *comal*

viši *cold*

ndɨšɨ́ *hen*

šɨʔę́ *with you (familiar)*

/ž/ žáʔà *chile*

káží (also káyí) *cough*

ndàʔžì (also ndàʔyì) *mud*

/h/ háà *fever*

vìhì *sweet*

hą̀ʔą *lard*

Nasals are bilabial, alveolar, and alveopalatal.

/m/ mą́ʔę̀ *raccoon*

kįmį *star*

hą́ʔmą̀ *clothes*

/n/ nąmę̀ *soap*

tįnę *dog*

ką́ʔrų *big (sg.)*

/ñ/ ñę́ʔą̀ *lady*

ñų̀ñų̀ *honey*

įñų̀ *injection*

Liquids are alveolar lateral and alveolar flap. With a few exceptions, /r/ occurs only in words of Spanish origin.

/l/ lìvi *pretty*
váĺí *small (pl.)*
lá?lá *mucus*

/r/ čiróní *crackling (Spanish chicharrón)*
aros *rice (Spanish arroz)*
čurú *leather lash*

The semiconsonant is alveopalatal. It has been observed alone in only two words thus far:

yàhá *day after tomorrow*
yáhà *young ear of corn*

It has a wider distribution as the second member of consonant clusters in couplet-initial position.

/ty/ tyà?va *witch*
/ky/ kyà?vų́ *your (fam.) brother*
/ndy/ ndyava *huaje (a certain leguminous fruit)*
/vy/ vyahá *wet*
/šy/ šyàà *spoiled*
/žy/ žyáà *tongue*
/my/ tl̀myą́?ą́ *demons*
/hy/ hyų̀?ų́ *money*

The only examples observed so far of /y/ as the second member of a cluster in couplet-medial position are:

ndà?žyà *peach*
vàžya žílì *squash flower*

1.2 Consonant contrasts are as follows:

At the bilabial position:

p/v	pą́ñų́	*shawl*	váĺí	*small (pl.)*
	lípé	*Felipe*	lìvi	*pretty*
	čòpì	*king*		

v/mb	vàá	*(a direction)*	mbàà	*compadre*
	hava	*half*	lámbà	*bladder*
m/mb	mą̀lʃ	*comadre*	mbàà	*compadre*
	nąmą̀	*soap*	lámbà	*bladder*
m/v	mą́ʔą̀	*raccoon*	và?a	*good*
	nąmą̀	*soap*	hava	*half*

At the alveolar position:

t/nd	tʉ̀čʉ	*nerves, wire*	ndʉ́čʉ̀	*beans*
	kotó	*shirt*	kúndó	*toad*
n/nd	nąʔą	*come!*	ndáʔà	*hand*
	ų̀nà	*eight*	úndó	*fat*
l/t	láʔva	*frog*	táʔndá	*torn*
	kolo	*turkey*	kotó	*shirt*
l/n	lálá	*urine*	nąnąᷤ	*mother*
s/l	są́ʔnų	*old person*	laʔlá	*mucus*
	lásá	*bone*	lálá	*urine*

At the alveopalatal position:

č/nǰ	čìčì	*knee*	línǰí	*cricket*
č/š	číká	*over there*	šíká	*far*
	čìčì	*knee*	vìšì	*cold*
š/ž	šíká	*far*	žìvì	*people*
	vašì	*is coming*	kàží	*cough*
č/ž	čʉ́ʔʉ	*cook*	žʉ́ʔʉ̀	*mouth*
	ndʉ́čʉ̀	*beans*	ndʉžʉ	*chilacayote*

At the velar position:

k/ng	tìká	*grasshopper*	íngá	*another*
	tìžàká	*fish*	kožángí	*rainbow*

k/kw	kàčì	*cotton*	kwàčí	*change*
	kàží	*cough*	kwážì	*horse*

At the glottal position:

?/h	?ává	*last year*	hava	*half*
	ndó?ò	*tail*	ndóhò	*breast*

Within articulatory classes:

s/š	tìsą?ą̀	*bowl*	ñą̀kąšą́?ą	*things to eat*
	ndù̀sà	*sandals*	šíši	*eat*
n/ñ	ną?ą	*come!*	ñą́?ą̀	*lady*
	ñų́nù̀	*hammock*	ñù̀ñù̀	*honey*

There is no contrast between n/ñ before /i/.

m/my	mą́?ą̀	*raccoon*	tì̀myą́?ą́	*demons*
v/vy	válí	*small (pl.)*	vyahá	*wet*
t/ty	nà̀tą̀?vì-a	*broken*	tya?ví	*I know how*
nd/ndy	ndàva	*poles in house*	ndyava	*huaje*
	ndó?ò	*tail*	tìndyó?ó	*Puebla*
k/ky	ndìkava	*fell down*	tikyàva	*butterfly*
h/hy	hókó	*ant hill*	hyókò	*San Andres (a town)*
	hą̀?ą	*lard*	tíhyą?ą	*hawk*
ty/č	tya?ví	*I know how*	ča?ví	*charge*
ky/č	kyà?vų́	*your brother*	ča?ví	*I charge*

1.3 The distribution of consonants is as follows:

The following consonants and consonant clusters have been found in couplet-initial position only: /kw y ty ky ndy vy hy my/. The following consonants have been found in couplet-medial position only: /nǰ ng/.

Consonant clusters are rare and occur only with /y/ and /?/. Across syllable boundaries, /?/ followed by consonant occurs couplet medially with /nd v ž m ñ n l/. There may or may not be a vowel release after the /?/ and before the consonant in these clusters. The vowel release is the same quality as the vowel preced-

ing the glottal stop. This release is most noticeable in the cluster /ʔnd/ and when the preceding vowel is /a/ or /ɥ/.

są́ʔndá [ˈsą́ʔą́ndá] *cutting* ɪ́ʃʔmą́ *scorpion*

nątą̀ʔndà [nąˈtą̀ʔą̀ndà] *cut* ką́ʔnɥ *big*

kɥʔndo [kɥʔɥndo] *knuckle* ɻʔñɥ *third day hence*

ɪáʔvà *frog* ɪeʔɪe *dried beans*

kòʔžó *Mexico City*

Consonant clusters (other than the above mentioned) have been found only in rapid speech alternating with the pattern CV in a pre-couplet position.

štoʔoɪ̀ ~ šɪ̀toʔoɪ̀ *my boss*

skwaá ~ sə̀kwaá *night time*

2. There are nine vowel phonemes:

	ɻ		ʉ	ɥ
o	ę	a	ą	o

2.1 The vowels may be described as follows:

Front vowels are high close unrounded and mid open unrounded. /e/ has a close allophone that occurs in the second syllable of the couplet after consonants other than /ʔ/.

kɪ̀vɪ̀ *name* veʔe [ˈveʔe] *house*

čʃɻ *fingernail* čéɪe [ˈčéɪɛ] *rooster*

/a ą/ are low open unrounded.

ɪaa *bird* tąą *forehead*

/ʉ ɥ/ are high close rounded; but while /ʉ/ is central, /ɥ/ is back.

tʉtʉ *paper* tɥ̀ʔɥ *word*

žákʉ̀ *mountain* čɥɥ *work*

žásɥ̀ *your (fam.) gourd*

/o/ is back mid close rounded and has no nasal counterpart.

ndòò *cane* kotó *shirt*

tɪ̀ndyóʔó *Puebla*

2.2 Vowel contrasts are as follows:

Oral:	ndìžìì	*badger*	žʉ́ʔʉ̀	*mouth*
	žèʔè	*I*	žóʔò	*palm rope*
	žáʔà	*chile*		
Nasal:	tą̀ą	*forehead*	tį̀į́	*mouse*
	tę̀ę̀	*sweat*	tų̀ų́	*black*
Oral/Nasal	kwíì	*green*	kwį́į	*thin*
	kwéé	*slow*	kwę̀ę̀	*I will buy*
	tàà	*man*	tą̀ą	*forehead*
	čʉ́ʔʉ	*cook*	čųų	*work*

2.3 The distribution of vowels is as follows:

Back and central vowels /o ʉ ų/ do not follow the labialized consonant /kw/. Front vowels /e ę ì į/ do not follow the consonant clusters with /y/. Consonant clusters are rare and have been found mostly with the vowel /a/, which has the widest distribution.

Only nasal vowels precede and follow the nasal consonants /m n ñ/ within the phonological word. Though they occur with non-nasal consonants as well, they are perceived as more strongly nasal when occurring with non-nasal consonants. In monomorphemic words, nasal vowels mostly follow voiceless consonants. Only one example has been found of a nasal vowel following a voiced consonant in a monomorphemic word: vìtì žų́ų̀ *large glass jug*. Nasal vowels not preceding and following /m n ñ/ are restricted in their distribution in the couplet. In patterns CVV and CVʔV, if the first vowel is a nasal, the second one is always nasal also.

čį́į̀ *fingernail*

The second vowel may be a nasal, even though the first one is not, but only in bimorphemic couplets.

ndáʔų́ *your hand*

Very few nasal vowels have been found in CVCV and CVʔCV patterns, except when a nasal consonant is also present.

3. There are three tones, high (marked ´), mid (unmarked), and low (marked `).

á[ļ tátá	*Is the father here?*
á[ļ tata	*Is there seed?*
á[ļ tàtà	*Is there medicine?*
và?a čá tátá-ndó	*Your father is good.*
và?a čá tata	*The seed is good.*
và?a čá tàtà	*The medicine is good.*

3.1 The tones may be described as follows:

High tone is a high level tone, except that it glides downward before a low within the morpheme.

nąñą̀ ['nę^{13}ñę^{3}] *chayote* kwážĭ [kwa^{13}žĭ^{3}] *horse*

One or more high tones at the end of a phonological phrase may be lowered.

žúžú váĭ[['žu^{1}žu^{1} 'va^{1-}ĭ[$^{1-}$] *small bottles*

Mid tone is a medium-height level tone. It is lower in height following a low tone within the morpheme than in other contexts, and pronouncedly so when followed by at least one bisyllabic morpheme in the phonological phrase.

žūta ['žu^{3}ta^{2-}] *river*

va?a ['va^{3}?a^{2-}] *good*

ndò?o váĭ[['ndo^{3}?o^{3+} va^{1}ĭ[$^{1-}$] *small adobes*

Low tone is a level low tone. One or more low tones at the end of a phonological phrase may be lowered.

kàà ['ka^{3}a^{3-}] *metal*

nų̀nĭ *corn*

žúžú ndàà *straight bottle*

3.2 Tone contrasts are as follows:

High and Mid:	tĭvĭ-ta *he is blowing*	tĭvi-ta *he will blow*
	tĭ?vĭ-ñą́ *she is sweeping*	tĭ?vį-ñą́ *she is sucking*
High and Low:	žúkú *yoke*	žūkù *weeds*
	ndá?žĭ *black*	ndà?žĭ *mud*
	táká *woodpecker*	tákà *nest*

	ǰčǰ	*dry*	ǰčì	*road*
	ndó?ò	*tail*	ndò?ò	*straw basket*
Mid and Low:	sati	*muslin pants*	sàtì	*picante*
	žoo	*clay water jug*	žòò	*moon, month*
	hǐko	*twenty*	hìkò	*neck*
	žó?o	*here*	žó?ò	*rope*
	čéle	*rooster*	čélò	*calf*

4. In this final section of the paper, a few morphophonemic observations are made regarding vowels, stress placement, and tone.

When the enclitic person marker ǔ *second singular (familiar)* is postposed to a couplet, the last vowel of the couplet is elided, and its tone is actualized together with that of the enclitic as a glide.

čélē	*rooster*	čélǔ	*your (fam.) rooster*
nu̯nǐ	*corn*	nu̯nu̯	*your (fam.) corn*

This loss of vowel may be characterized as in Rule 1.

Rule 1. Vowel → ∅ / ___u̯ + [2]

When the enclitic person marker à *third person (respect)* is postposed to a couplet with final vowel /ʉ/, a /y/ is introduced as a transition between the vowels.

žʉ?ʉ	*month*	žú?ʉ-yà	*her (resp.) month*

This intrusion of /y/ may be characterized as in Rule 2.

Rule 2. ∅ → y / ʉ___a +

When the enclitic person marker i *first singular* is postposed to a couplet with final vowel /e/, the vowel of the suffix assimilates to that of the couplet.

ve?e	*house*	ve?éè	*my house*

This assimilation may be characterized as in Rule 3.

Rule 3. i → e / e___ +

These three rules have the effect of avoiding certain sequences of vowels. A few sequences of different vowels do occur, however. There are two examples of such a sequence in what are apparently

monomorphemic words.

kèá *is* ñąų *eagle*

All other examples involve the postposing of an enclitic person marker. In such contexts /a ɯ ų o/ are attested before /i/, and /i e o/ are attested before /a/.

One further morphophonemic process takes place when /i/ or /e/ are postposed to a nonverbal couplet. When these vowel clusters are formed by the postposing of single-vowel enclitic person markers, the stress of the couplet is shifted to the syllable immediatly preceding that of the enclitic, and the tone of the syllable receiving the stress becomes high.

This has the effect of reformulating the last syllable of the original couplet as the first syllable of a new couplet with the enclitic as its second syllable.

hàtà	*back*	hàtáĭ	*my back*
hà?žĭ	*offspring*	hà?žíĭ	*my offspring*
hé?è	*ring*	he?éè	*my ring*

This shift of stress and tone change may be characterized as in Rule 4.

Rule 4. $'V_1V_2V_3 + \rightarrow V_1'\acute{V}_2V_3 +$

Because of the limitation mentioned above that the second vowel is always nasal following a nasal first vowel in CVV couplets, an enclitic vowel becomes nasal after a nasal vowel in the context of Rule 4.

čį̆į̆ *fingernail* čį̆į̆ę̀ *her (resp.) fingernail*

A further kind of tone morphophonemics appears to be limited to certain syntactic contexts. Specifically, a low tone on the last syllable of a noun becomes low-high when preceding a low tone on the first syllable of a following noun or adjective.

žɯ́čɯ̀	*knife*	tàà	*man*	žɯ́čɯ̀ tàà	*man's knife*
kĭtĭ̀	*animal*	sàá	*new*	kĭtĭ̌ sàá	*new animal*
nų̀nĭ̀	*corn*	sàá	*new*	nų̀nĭ̌ sàá	*new corn*

This change is optional when the tones on the second couplet are high-low, mid-mid, or mid-high.

kʃtì *animal*

ɨoʔo *little*

kʃtǐ ɨoʔo or kʃtì ɨoʔo *little animal*

When the first couplet is a verb rather than a noun, however, there is no change.

kwɐ̀ɐ̀ *will buy* kwɐ̀ɐ̀ tàà *the man will buy*

A sequence high low-high that results from the above contexts (where low becomes low-high before a low) may undergo some further change in fast speech, causing the sequence to be perceived as mid tones.

žʃtò *tree* ndàà *straight* žɨto ndàà *straight tree*

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NOTES

1

The data upon which this analysis is based were collected from May 1972, through April 1973, in the town of San Jerónimo Progreso (population ca. 1100), Municipio of Silacayoapan, Oaxaca. Various informants were used, but the principal ones have been Ricardo Durán Zarate and Lorenzo Martínez Ramírez. We gratefully acknowledge the counsel of Ruth Brend at a linguistic workshop held in the spring of 1973 at the Centro de Estudios Manuel Gamio, Ixmiquilpan, Hidalgo, Mexico, and the help of John Daly, who helped work out the final detail of tone allophonics and morphophonemics.

2

The symbol + is here used to indicate phonological word boundary.