University of Pennsylvania Working Papers in Linguistics

Volume 14, *Issue* 1 2008 *Article* 21

PROCEEDINGS OF THE 31ST ANNUAL PENN LINGUISTICS COLLOQUIUM

Reconstruction of Proto-Trique phonemes

Kosuke Matsukawa*

*State University of New York

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Abstract

Trique languages are spoken in Oaxaca, Mexico and belong to the Mixtecan family of the Otomanguean stock. Trique languages are composed of three languages: San Andrés Chicahuaxtla Trique, San Juan Copala Trique and San Martín Itunyoso Trique. Based on the data on these three Trique languages, Proto-Trique has been reconstructed by Matsukawa (2005, 2006a, 2006b, 2007a, 2007b). This article is the refined version of my previous reconstruction of Proto-Trique.

In Proto-Trique, seven stop sounds (/*t/, /*d/, /*k/, /*g/, /*kw/, /*gw/, /*ʔ/), three fricative sounds (/*ß/, /*s/, /*ʃ/), three affricate sounds (/*ts/, /*tʃ/, /*tʂ/), five resonant sounds (*m/, /*n/, /*l/, /*r/, /*y/), seven oral vowels (/*i/, /*e/, /*ɨ/, /*ə/, /*a/, /*o/, /*u/) and four nasal vowels (/*ĩ/, /*ɨ̃/, /*ã/, /*ũ/) can be reconstructed as phonemes. Both oral and nasal vowels have four types: short vowels (V), long vowels (VV), glottalized vowels (Vʔ) and aspirated vowels (Vh).

Some of these reconstructed phonemes show very limited distributional constraints. All of the nasal vowels, long vowels, glottalized vowels and aspirated vowels occur only in a final syllable. In non-final syllables, only short oral vowels can occur. Although Proto-Trique has both voiced and voiceless stop sounds, voiced stop sounds can be reconstructed only in a final syllable. In non-final syllables, only voiceless stop sounds can occur.

In this article, I will show how these Proto-Trique phonemes were reconstructed and how these reconstructed Proto-Trique phonemes have undergone series of historical sound changes in the three modern Trique languages.

Reconstruction of Proto-Trique Phonemes

Kosuke Matsukawa*

1 Introduction

Trique languages (San Andrés Chicahuaxtla Trique, San Juan Copala Trique and San Martín Itunyoso Trique) are spoken in Oaxaca, Mexico and belong to the Mixtecan family of the Otomanguean stock. Based on the data on these three modern Trique languages, Proto-Trique has been reconstructed by Matsukawa (2005, 2006a, 2006b, 2007a, 2007b). This article is the refined version of my previous reconstruction of Proto-Trique phonemes. In this article, I will show how Proto-Trique phonemes were reconstructed and how the reconstructed Proto-Trique phonemes have undergone historical sound changes in the three modern Trique languages.

Among the three Trique languages, data on Copala Trique are the most extensive (e.g. Hollenbach 1984, 1992, 2004, 2005). Although data on Chicahuaxtla Trique are still limited, there is the small dictionary of Chicahuaxtla Trique (Good 1978) and there are some other articles on Chicahuaxtla Trique (e.g. Longacre 1952, 1957, 1959, 1966a, 1966b, Longacre et al. 2006). In addition to these published data sources, I have conducted fieldwork on Chicahuaxtla Trique since 2006 and Copala Trique since 2003. Itunyoso Trique has been hardly studied until recently. However, Christian DiCanio started fieldwork on Itunyoso Trique a few years ago and kindly gave me some of his fieldwork data including the preliminary dictionary of Itunyoso Trique. In this article, I will use my fieldwork data on Chicahuaxtla Trique and Copala Trique unless otherwise mentioned, and Itunyoso Trique data are from DiCanio's fieldwork data.

Trique languages have very complicated tone systems. All of the three Trique languages have five levels of tones, numbered 1 to 5, from lowest to highest. The number of contour tones is different from language to language. Copala Trique has two falling tones (32, 31) and one rising tone (13). The number of contour tones in Chicahuaxtla Trique is still controversial (e.g. Good 1978, Longacre 1952, 1957, 1959, Longacre et al. 2006, Matsukawa

*I am grateful to José Fuentes (Copala Trique), Román L. V. López (Copala Trique) and Pablo Hernández Cruz (Chicahuaxtla Trique) for patiently teaching me Trique languages and to George A. Broadwell, John S. Justeson, Christian DiCanio, Robert E. Longacre, Terrence Kaufman, Jerold A. Edmondson, Inga McKendry, Thomas Smith-Stark and Michael Swanton for all of their useful advice, comments and help.

2006c). Although DiCanio (p.c.) hypothesizes three falling tones (43, 32, 31) and one rising tone (13) in Itunyoso Trique, the Itunyoso Trique tone system is still under analysis by DiCanio. Since tones do not affect the reconstruction of Proto-Trique phonemes, tones will not be marked in this article.

2 Reconstruction of Proto-Trique Obstruents

The three modern Trique languages have somewhat different obstruent systems as follows:

Chicahuaxtla:	t, d, k, g, k^w, g^w, ʔ, s, z, ʃ, ʒ, ts, tʃ, tʂ
Copala:	t, d, k, g, k^w, g^w, ʔ, ß, s, z, ʃ, ʒ, ʂ, ts, tʃ, tʂ
Itunyoso:	t, k, k^w, ʔ, ß, s, ʃ, ts, tʃ, tʂ

Figure 1: Obstruent Systems in Three Trique Languages

Based on the obstruent systems of the three modern Trique languages, seven stop sounds (/*t/, /*d/, /*k/, /*g/, /*k^w/, /*g^w/, /*ʔ/), three fricative sounds (/*ß/, /*s/, /*ʃ/) and three affricate sounds (/*ts/, /*tʃ/, /*tʂ/) can be reconstructed as Proto-Trique phonemes.

2.1 Proto-Trique Stops

In Proto-Trique, seven stop sounds (/*t/, /*d/, /*k/, /*g/, /*k^w/, /*g^w/, /*ʔ/) can be reconstructed as phonemes because of the following sound correspondences:

(1)

	Proto-Trique	Chicahuaxtla	Copala	Itunyoso	
a.	***t**o	**t**o	**t**o	**t**o	‘grindstone’
b.	*****d**oh	**d**oh	**d**oh	**t**oh	‘more’
c.	*****k**o	**k**o	**k**o	**k**o	‘twenty’
d.	*****g**ãʔ	**g**ãʔ	**g**ãʔ	**k**ãʔ	‘far’
e.	*****k^w**eh	**k^w**eh	**k^w**eh	**k^w**eh	‘pus’
f.	*****g^w**ii	**g^w**i	**g^w**ii	**k^w**i	‘day, sun’
g.	*ya**ʔ**ã	ya**ʔ**ã	ya**ʔ**ã	ya**ʔ**ã	‘fire, light’

Although Itunyoso Trique does not retain voiced stop sounds (/*d/, /*g/, /*g^w/), the voiced-voiceless contrast of stop sounds is retained in a final syl-

lable in Chicahuaxtla Trique and Copala Trique. However, the voicing contrast of stop sounds was lost in non-final syllables in all three Trique languages. Only voiced stop sounds occur in non-final syllables in Chicahuaxtla Trique and only voiceless stop sounds occur in non-final syllables in Copala Trique and Itunyoso Trique:

(2)

	Proto-Trique	Chicahuaxtla	Copala	Itunyoso	
a.	***t**akãã	**d**akã	**t**akãã	**t**akã	‘hill’
b.	***k**onoʔo	**g**onoʔo	**k**onoʔo	**k**onoʔo	‘medicine’
c.	***k**^{w}etãʔã	**g**^{w}etãʔã[1]	**k**^{w}etãʔ	**k**^{w}etãʔ	‘Saturday’

In other Mixtecan languages (Mixtec and Cuicatec languages), voiced stop sounds are very rare except Spanish loan words and prenasalized stop sounds. Furthermore, voiced stop sounds are not reconstructed as phonemes in Proto-Mixtecan (e.g. Kaufman 1983, Longacre 1957, Rensch 1976). Since it is almost impossible to know whether the voicing contrast of stop sounds existed in non-final syllables in Proto-Trique or not, I tentatively reconstructed only voiceless stop sounds in non-final syllables in Proto-Trique.

Whether /VʔV/ in Trique languages has one nucleus or two nuclei might be controversial. If /VʔV/ should be treated as one nucleus, a voiceless glottal stop /*ʔ/ might not be treated as a phonemic consonant in Proto-Trique. However, the voicing of stop sounds in non-final syllables in Chicahuaxtla Trique supports treating /VʔV/ as two nuclei:

(3)

	Proto-Trique	Chicahuaxtla	Copala	Itunyoso	
a.	***t**aʔaa	**d**aʔa	**t**aʔaa	**t**aʔa	‘to grab’
b.	***k**oʔoo	**g**oʔo	**k**oʔoo	**k**oʔo	‘plate’
c.	***k**aʔã(h)	**g**aʔã	**k**aʔãh	**k**aʔã	‘four’

The voiced-voiceless contrast of stop sounds always corresponds in a final syllable between Chicahuaxtla Trique and Copala Trique and all of the stop sounds became voiced in non-final syllables in Chicahuaxtla Trique.

[1]Sometimes, Chicahuaxtla Trique words have an extra harmonic vowel after a laryngealized vowel (either a glottalized vowel (Vʔ) or an aspirated vowel (Vh)). However, this extra harmonic vowel seems to be an innovation in Chicahuaxtla Trique and should not be reconstructed in Proto-Trique (Matsukawa 2006a, 2007a/b).

Since all of the stop sounds before /*V?V/ became voiced in Chicahuaxtla Trique and they remain voiceless in Copala Trique and Itunyoso Trique, /V?V/ seems to be treated as two nuclei in Trique languages. Therefore, it seems better to treat /*?/ as a phonemic consonant in Proto-Trique.

2.2 Proto-Trique Fricatives

In Proto-Trique, three fricative sounds (/*ß/, /*s/, /*ʃ/) can be reconstructed as phonemes because of the following sound correspondences:

(4)

	Proto-Trique	Chicahuaxtla	Copala	Itunyoso	
a.	***ß**ah	**w**ah	**ß**ah	**ß**ah	‘to grind’
b.	*ra**s**ũũ	ra**z**ũ	ra**z**ũũ	ra**s**ũ	‘thing’
c.	***ʃ**i(h)	**ʃ**i	**ʃ**ih	**ʃ**i	‘big, large’

Although Chicahuaxtla Trique has /w/ instead of /ß/ as a phoneme, I tentatively reconstructed /*ß/ as a Proto-Trique phoneme. The main reason why I reconstructed /*ß/ rather than /*w/ is that other Mixtecan languages tend to have /ß/ rather than /w/ as a phoneme:

(5)

	‘two’	
Chicahuaxtla Trique	**w**i	
Copala Trique	**ß**ih	
Itunyoso Trique	**ß**i	(DiCanio p.c.)
Alacatlatzala Mixtec	o**ß**i	(Zylstra 1991)
Ayutla Mixtec	u**ß**i	(Hills 1990)
Coatzospan Mixtec	u**ß**i	(Small 1990)
Jamiltepec Mixtec	u**ß**i	(Johnson 1988)
San Juan Colorado Mixtec	u**ß**i	(Campbell et al. 1986)
Concepción Pápalo Cuicatec	**ß**i	(Bradley 1991)
Santa María Pápalo Cuicatec	**ß**i	(Anderson and Roque 1983)

Although /*ß/ was obviously /**w/ before[2], when and how /**w/ shifted to /*ß/ in Mixtecan languages is still uncertain (Matsukawa 2006a, 2007b).

[2]Only resonant sounds or /*ß/ can occur after a voiceless glottal stop /*?/ in Proto-Trique. Besides, /*y/ cannot occur before a front vowel and /*ß/ cannot occur before a back vowel. These distributional constraints imply that /*ß/ was originally /**w/.

Fricative sounds ([s], [z], [ʃ], [ʒ]) in Chicahuaxtla Trique and Copala Trique show somewhat varied distribution in a final syllable. In Chicahuaxtla Trique and Copala Trique, fricative sounds are usually voiced in a final syllable (6a). However, sometimes the voicing of fricative sounds is in free variation in a final syllable (6b) and, very rarely, fricative sounds are voiceless in a final syllable (6c):

(6)	Proto-Trique	Chicahuaxtla	Copala	
a.	*ʃii	**ʒ**i	**ʒ**ii	‘grandfather’
b.	***s**oʔ	**s**oʔ/**z**oʔ	**s**oʔ/**z**oʔ	‘he’
c.	*ʃi(h)	**ʃ**i	**ʃ**ih	‘big, large’

In non-final syllables, all of the fricative sounds became voiced in Chicahuaxtla Trique and all of the fricative sounds except /*ß/ became voiceless in Copala Trique. In Itunyoso Trique, all of the fricative sounds except /*ß/ became voiceless and /*ʃ/ shifted to /tʃ/ except in a few words:

(7)	Proto-Trique	Chicahuaxtla	Copala	Itunyoso	
a.	***s**ikaʔ	**z**ikaʔa	**s**kaʔ	**s**ikaʔ	‘hard’
b.	***s**igəʔ	**z**igəʔə	**s**igiʔ	**s**ikeʔ	‘mud’
c.	*ʃukuu	**ʒ**uku	**ʃ**kuu	**tʃ**uku	‘animal’
d.	*ʃutah	**ʒ**utah	**ʃ**tah	**tʃ**utah	‘deer’

Since voiced fricative sounds are not reconstructed in Proto-Mixtecan (e.g. Kaufman 1983, Longacre 1957, Rensch 1976) and voiced obstruent sounds are very rare in Mixtecan languages, I reconstructed only voiceless fricative sounds in non-final syllables in Proto-Trique. In a final syllable, I also tentatively reconstructed only voiceless fricatives. Since only a few words have [s] or [ʃ] in a final syllable in Chicahuaxtla Trique and Copala Trique and sometimes the voicing of fricative sounds is in free variation, fricative sounds seem to allophonically become voiced in a final syllable in Chicahuaxtla Trique and Copala Trique.

Although Copala Trique has a voiceless retroflex fricative /ʂ/ as a phoneme, /ʂ/ is a phonologically derived phoneme in Copala Trique and /ʂ/ cannot be reconstructed as a Proto-Trique phoneme. In Copala Trique, a vowel was lost between two particular consonants (*V > ø / *s, *ʃ or *r _ *t, *k, *k^w, *m, *n or *l):

(8)

	Proto-Trique	Chicahuaxtla	Copala	Itunyoso	
a.	*s**i**kaʔ	z**i**kaʔa	skaʔ	s**i**kaʔ	‘hard’
b.	*ʃ**u**tah	ʒ**u**tah	ʃtah	tʃ**u**tah	‘deer’

/*r/ was also spirantized and became a voiceless retroflex fricative /ʂ/:

(9)

	Proto-Trique	Chicahuaxtla	Copala			
a.	*r**u**mii	r**u**mi	rmii	→	**ʂ**mii	‘ball’
b.	*r**u**nee	r**u**ne	rnee	→	**ʂ**nee	‘bean’

In addition to this environment, /ʂ/ was also derived from a /*ʃ/ + /*tʂ/ cluster. In Copala Trique, a vowel was lost between /*ʃ/ and /*tʂ/ and then a /*ʃ/ + /*tʂ/ cluster became /ʂ/:

(10)

	Proto-Trique	Chicahuaxtla	Copala			
a.	*ʃ**i**tʂaa	ʒ**i**tʂa	ʃtʂaa	→	**ʂ**aa	‘back’
b.	*ʃ**i**tʂuu	ʒ**i**tʂu	ʃtʂuu	→	**ʂ**uu	‘cheek’

These two phonological environments are the most common environments where /ʂ/ was derived in Copala Trique. Therefore, /ʂ/ is a derived phoneme in Copala Trique and /*ʂ/ cannot be reconstructed as a Proto-Trique phoneme.

2.3 Proto-Trique Affricates

In Proto-Trique, three affricate sounds (/*ts/, /*tʃ/, /*tʂ/) can be reconstructed as phonemes because of the following sound correspondences:

(11)

	Proto-Trique	Chicahuaxtla	Copala	Itunyoso	
a.	***ts**iʔ	**ts**iʔ	**ts**iʔ	**ts**iʔ	‘sweet’
b.	***tʃ**ih	**tʃ**ih	**tʃ**ih	**tʃ**ih	‘seven’
c.	***tʂ**ũũ	**tʂ**ũ	**tʂ**ũũ	**tʂ**ũ	‘tree’

In Chicahuaxtla Trique, /*tʃ/ is retained only before a front vowel in a final syllable and /*tʃ/ shifted to [ʒ] in non-final syllables and before a non-front vowel in a final syllable:

(12)	Proto-Trique	Chicahuaxtla	Copala	Itunyoso	
a.	***tʃ**a	**ʒ**a	**tʃ**a	**tʃ**a	‘to eat’
b.	***tʃ**ana	**ʒ**ana	**tʃ**ana	**tʃ**ana	‘woman’
c.	***tʃ**ußee	**ʒ**uwe	**tʃ**ußee	**tʃ**uße	‘dog’

3 Reconstruction of Proto-Trique Resonants

Although Chicahuaxtla Trique has an additional resonant sound /w/, the three Trique languages have basically the same resonant system as follows:

Chicahuaxtla:	m, n, l, r, w, y
Copala:	m, n, l, r, y
Itunyoso:	m, n, l, r, y

Figure 2: Resonant Systems in Three Trique Languages

Since the sound correspondence of resonant sounds among the three Trique languages is very consistent, the reconstruction of Proto-Trique resonant sounds is straightforward. In Proto-Trique, five resonant sounds (*m/, /*n/, /*l/, /*r/, /*y/) can be reconstructed as phonemes because of the following sound correspondences:

(13)	Proto-Trique	Chicahuaxtla	Copala	Itunyoso	
a.	***m**ãh	**m**ãh	**m**ãh	**m**ãh	‘thick’
b.	***n**ee	**n**e	**n**ee	**n**e	‘plow’
c.	*ʃi**l**uu	ʒi**l**u	(ʃ)**l**uu	tʃi**l**u	‘cat’
d.	***r**aʔa	**r**aʔa	**r**aʔa	**r**aʔa	‘hand’
e.	***y**ah	**y**ah	**y**ah	**y**ah	‘now’

Among these reconstructed Proto-Trique resonant sounds, /*l/ has very limited distribution and only a few cognates have /*l/. However, /l/ shows consistent sound correspondence among the three Trique languages and /*l/ can be reconstructed in Proto-Trique. Although Chicahuaxtla Trique has /w/ as a phoneme instead of /ß/, I reconstructed /*ß/ as a Proto-Trique phoneme (see section 2.2). Therefore, /*w/ cannot be reconstructed as a Proto-Trique phoneme.

4 Reconstruction of Proto-Trique Vowels

The three Trique languages have somewhat different vowel systems as follows:

Chicahuaxtla:	i, e, ɨ, ə, a, o, u, ĩ, ɨ̃, ã, ũ
Copala:	i, e, a, o, u, ĩ, ẽ, ã, õ, ũ
Itunyoso:	i, e, a, o, u, ĩ, ã, ũ

Figure 3: Vowel Systems in Three Trique Languages

There are only two differences among the vowel inventories of the three Trique languages. Chicahuaxtla Trique has three more central vowels (ɨ, ə, ɨ̃) than other Trique languages and Copala Trique has two more nasal vowels (ẽ, õ) than other Trique languages. Although the vowel systems among the three Trique languages show these two differences, the sound correspondences of vowels among the three Trique languages are very consistent.

Based on the vowel systems of the three Trique languages, seven oral vowels (/*i/, /*e/, /*ɨ/, /*ə/, /*a/, /*o/, /*u/) and four nasal vowels (/*ĩ/, /*ɨ̃/, /*ã/, /*ũ/) can be reconstructed as Proto-Trique phonemes. These eleven Proto-Trique vowels have four types: short vowels (V), long vowels (VV), glottalized vowels (V?) and aspirated vowels (Vh).

4.1 Proto-Trique Oral Vowels

In Proto-Trique, seven oral vowels (/*i/, /*e/, /*ɨ/, /*ə/, /*a/, /*o/, /*u/) can be reconstructed as phonemes:

(14)	Proto-Trique	Chicahuaxtla	Copala	Itunyoso	
a.	*g^{w}**ii**	g^{w}**i**	g^{w}**ii**	k^{w}**i**	‘day, sun’
b.	*n**ee**	n**e**	n**ee**	n**e**	‘plow’
c.	*k**ɨ**h	k**ɨ**hɨ	k**i**h	k**i**h	‘mountain’
d.	*y**ə**h	y**ə**h	y**i**h	y**e**h	‘stone’
e.	*tʂ**aa**	tʂ**a**	tʂ**aa**	tʂ**a**	‘tortilla’
f.	*t**oo**	t**o**	t**oo**	t**o**	‘milk’
g.	*y**uu**	y**u**	y**uu**	y**u**	‘sour’

Among these seven Proto-Trique oral vowels, two central vowels (/*ɨ/, /*ə/) are retained only in Chicahuaxtla Trique, having undergone a series of

historical sound changes in Copala Trique and Itunyoso Trique. In Copala Trique, both /*ɨ/ and /*ə/ became /i/. In Itunyoso Trique, /*ɨ/ became /i/ and /*ə/ became /e/:

(15)	Proto-Trique	Chicahuaxtla	Copala	Itunyoso	
a.	*k**ɨ**h	k**ɨ**h**ɨ**	k**i**h	k**i**h	‘mountain’
b.	*(ku)k**ɨɨ**	guk**ɨ**	k**ii**	kuk**i**	‘yesterday’
c.	*yəh	yəh	y**i**h[3]	y**e**h	‘stone’
d.	*sigəʔ	zigəʔə	sig**i**ʔ	sik**e**ʔ	‘mud’

4.2 Proto-Trique Nasal Vowels

Four nasal vowels (/*ĩ/, /*ɨ̃/, /*ã/, /*ũ/) can be reconstructed as Proto-Trique phonemes and these nasal vowels occur only in a final syllable:

(16)	Proto-Trique	Chicahuaxtla	Copala	Itunyoso	
a.	*(k)atʂ**ĩ**h	atʂ**ĩ**h	atʂ**ĩ**h	katʂ**ĩ**h	‘to cough’
b.	*g**ɨ̃ɨ̃**	g**ɨ̃**	g**ũũ**	k**ĩ**	‘tepid’
c.	*k**ãã**	k**ã**	k**ãã**	k**ã**	‘seed’
d.	*tʂ**ũũ**	tʂ**ũ**	tʂ**ũũ**	tʂ**ũ**	‘tree’

Although /*ɨ̃/ is retained only in Chicahuaxtla Trique, /*ɨ̃/ should be reconstructed as a Proto-Trique phoneme. /*ɨ̃/ became /ũ/ (or [õ]) in Copala Trique and /*ɨ̃/ became /ĩ/ in Itunyoso Trique. In Copala Trique, /ũ/ becomes [õ] only when /ũ/ is a short vowel in a final syllable. The same allophonic rule applies to the other high vowels (/i/, /u/, /ĩ/) too and they become mid vowels ([e], [o], [ẽ]) when they are short vowels in a final syllable:

(17)	Proto-Trique	Chicahuaxtla	Copala	Itunyoso	
a.	*nik**i**	nik**i**	nik**e**	nik**i**	‘poor’
b.	*tuk**u**	duk**u**	tuk**o**	tuk**u**	‘to play’
c.	*(k)atʃ**ĩ**	atʃ**ĩ**	atʃ**ẽ**	katʃ**ĩ**	‘to pass’
d.	*t**ũ**	t**ũ**	t**õ**	t**ũ**	‘blood’

[3]In Copala Trique, the sequence /yi/ is basically prohibited and *yih* (‘stone’) is the only exception. This irregularity appeared because of the historical sound change (*ə > i) in Copal Trique.

Although Copala Trique has two mid nasal vowels ([ẽ], [õ]), they are allophones of /ĩ/ and /ũ/ respectively, and these two mid nasal vowels cannot be reconstructed as Proto-Trique phonemes.

4.3 Four Types of Vowels in Proto-Trique

In Proto-Trique, four types of vowels can be reconstructed: short vowels (V), long vowels (VV), glottalized vowels (V?) and aspirated vowels (Vh):

(18)	Proto-Trique	Chicahuaxtla	Copala	Itunyoso	
a.	*n**e**	n**e**	n**e**	n**e**	‘to sit’
b.	*n**ee**	n**e**	n**ee**	n**e**	‘plow’
c.	*n**eʔ**	n**eʔ**e	n**eʔ**	n**eʔ**	‘rope’
d.	*n**eh**	n**eh**e	n**eh**		‘dream’[4]

Both oral and nasal vowels have these four types of vowels. Although contrastive vowel length was lost in Chicahuaxtla Trique and Itunyoso Trique, the short-long contrast of vowels is retained in Copala Trique. Furthermore, only Proto-Trique short high vowels became mid in a final syllable in Copala Trique (see section 4.2). Therefore, the short-long contrast of Proto-Trique vowels should be reconstructed. Among these four types of vowels, long vowels, glottalized vowels and aspirated vowels occur only in a final syllable. In non-final syllables, only short oral vowels can occur.

5 Conclusion

Based on the data on the three Trique languages, seven stop sounds (/*t/, /*d/, /*k/, /*g/, /*k^{w}/, /*g^{w}/, /*ʔ/), three fricative sounds (/*ß/, /*s/, /*ʃ/), three affricate sounds (/*ts/, /*tʃ/, /*tʂ/), five resonant sounds (*m/, /*n/, /*l/, /*r/, /*y/), seven oral vowels (/*i/, /*e/, /*ɨ/, /*ə/, /*a/, /*o/, /*u/) and four nasal vowels (/*ĩ/, /*ɨ̃/, /*ã/, /*ũ/) were reconstructed as Proto-Trique phonemes:

[4]Itunyoso Trique data for ‘dream’ are unavailable.

	Lab	Alv	Pal	Ret	Vel	L-Vel	Glot
Stops		t, d			k, g	k^w, g^w	ʔ
Fricatives	ß	s	ʃ				
Affricates		ts	tʃ	tʂ			
Nasals	m	n					
Liquids		l, r					
Glide			y				

	Front	Central	Back
High	i, ĩ	ɨ, ɨ̃	u, ũ
Mid	e	ə	o
Low		a, ã	

Figure 4: Reconstructed Proto-Trique Phonemes

In addition, both oral and nasal vowels have four types: short vowels (V), long vowels (VV), glottalized vowels (Vʔ) and aspirated vowels (Vh). Some of these reconstructed phonemes have a very limited distribution. For example, nasal vowels, long vowels, glottalized vowels and aspirated vowels can occur only in a final syllable. In non-final syllables, only short oral vowels can occur.

Although both voiced and voiceless stop sounds can be reconstructed in Proto-Trique, the three modern Trique languages lost the voicing contrast of stop sounds in non-final syllables. Stop sounds are always voiced in non-final syllables in Chicahuaxtla Trique and always voiceless in Copala Trique and Itunyoso Trique in non-final syllables. Since voiced stop sounds are very rare in other Mixtecan languages and voiced stop sounds are not reconstructed in Proto-Mixtecan (e.g. Kaufman 1983, Longacre 1957, Rensch 1976), I tentatively reconstructed only voiceless stop sounds in non-final syllables.

In the three modern Trique languages, these reconstructed Proto-Trique phonemes have undergone a series of historical sound changes. In this paper, I presented most of the identified historical sound changes that happened in the three modern Trique languages.

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Department of Anthropology
State University of New York at Albany
1400 Washington Av.
Albany, NY 12222
km7470@albany.edu