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STUDIES IN

**OTOMANGUEAN
PHONOLOGY**

William R. Merrifield, editor

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INTRODUCTION

This volume of phonology papers, treating languages of the Otomanguan 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 Guelavfa 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

GUELAVIA ZAPOTEC PHONEMES

Ted E. Jones
Lyle M. Knudson

1. Consonants
2. Semivowels
3. Vowels
4. Distribution
5. Tone

This paper describes the basic phonemic structure of Guelavía Zapotec (GZ),¹ leaving certain interesting morphophonemic matters for a later study. The presentation begins with a brief introduction to the structure of the (phonological) word and then focuses on the elements which combine to form syllables.

A word consists of one or more syllables, only one of which is stressed. Stress affects a syllable in a variety of ways, tending to raise the pitch of the syllable, to lengthen fortis consonants, and to lengthen or cause rearticulation of vowels. In the majority of words, stress tends to be in the penultimate syllable and is left unmarked in illustrations when so occurring.

A syllable has an optional onset of from one to three consonants, an optional semivowel, a nuclear vowel which may be oral or laryngeal and open or checked by glottal, and an optional coda of one or two consonants and/or optional semivowel. The optional character of onset and coda permits two vowels to occur contiguously across a syllable boundary. Such a sequence of vowels may occur anywhere within the word, except that none is attested word-initially.

1. A consonant is fortis or lenis. Every fortis consonant has a corresponding lenis consonant, with the exception of fortis retroflex /ʒ/. Conversely, only lenis /r/ has no fortis counterpart. A fortis consonant is more tense and generally longer than a lenis consonant. All fortis obstruents are voiceless. A lenis consonant is more lax, with stops tending towards fricative articulation. A lenis consonant also has a voiceless release before pause (with the exception of the nasals /m n/). Lenis consonants also cause preceding stressed oral vowels to be lengthened.

The consonants of GZ are:

Obstruents:

Fortis:	p	t	k
Stops:			
Lenis:	b	d	g

Affricates:	Fortis:	c č ǰ
	Lenis:	ʒ j
Fricatives:	Fortis:	s š ʃ
	Lenis:	z ʒ ʒ̣
Sonorants:		
Nasals:	Fortis:	<u>m</u> <u>n</u>
	Lenis:	m n
Lat. & Flap:	Fortis:	<u>l</u>
	Lenis:	l r

/p b m m/ are labial.

pap	<i>potato</i>	<u>lam</u>	<i>boss</i>
špala?	<i>my bullet</i>	<u>ma<u>m</u></u>	<i>grandmother</i>
běl	<i>meat</i>	lam	<i>animal (pronoun)</i>
nislób	<i>teardrop</i>	ma <u>m</u>	<i>mother</i>

/t d c ʒ s z n n l l r/ are alveolar.

wetípy	<i>wasp</i>	lnáz	<i>to grab</i>
tu	<i>who</i>	<u>na</u> na?	<i>I know</i>
dů	<i>rope</i>	č <u>on</u>	<i>three</i>
bed	<i>(he) came</i>	rson	<i>message</i>
cí?	<i>ten</i>	š <u>na</u> na?	<i>my mother</i>
decpéngw	<i>hunchback</i>	pkwel	<i>cornhusk</i>
ʒít	<i>bone</i>	š <u>li</u> ?a	<i>type of scrambled eggs</i>
biaž	<i>plum</i>	gel	<i>cornfield</i>
sap	<i>toad</i>	ške <u>l</u> a?	<i>my cornfield</i>
tas	<i>a glass</i>	rapa?	<i>I have</i>
za	<i>lard</i>	besér	<i>bee</i>

/č j š ʒ/ are palatal.

ča?a I will go jãp young girl
 g+č thorn g+j town
 šaga? my tree žaga? my grandchild
 yaš avocado g!ž field grass

/č ʒ ʒ/ are retroflexed palatal.

gičú cough gaš near
 pčuž disguised žajfmy bottom of the basket
 šaga? my jaw gičguž needle

/k g/ are velar.

kald broth
 guk when?
 gald twenty
 gũg turtledove

1.1 The consonants of GZ contrast as follows:

STOPS

/p/	pap	[pap:h]	potato	sop	[sop:h]	soup
/b/	bal	[ba:ɪL]	bullet	nɪs ob	[nɪs o:bɔ]	teardrop
/t/	tu	[tu]	who	aret	[aʔet:h]	earring
/d/	dũ	[dũʔ]	rope	ared	[aʔe:dt]	ox cart
/k/	kald	[ka:ɪdt]	broth	guk	[guk:h]	when?
/g/	gald	[ga:ɪdt]	twenty	gũg	[gũgɔ]	turtledove

AFFRICATES

/c/	ci?	[tsɪʔ]	ten	rac	[ʔat:s]	ripe
/z/	zɪt	[dzɪt:h]	bone	biaž	[bi:adzɔ]	plum
/č/	gičú	[giʔ:šú:]	cough			
/č/	kaličú?	[ka:ɪtšúʔ]	where are you (fam.) going?			
	ča?	[tša?a]	I will go	g+č	[git:š]	thorn
/j/	jãp	[dža?ap:h]	young girl	g+j	[g+:džš]	town

FRICATIVES

/s/	saʔ	[saʔa]	wedding	tas	[tas:]	a glass
/š/	šagaʔ	[ša:gaʔ]	my tree	yaš	[yaš:]	avocado
/ṣ̌/	ṣ̌agaʔ	[ṣ̌a:gaʔ]	my jaw	gaṣ̌	[gaṣ̌:]	near
/z/	za	[za:]	lard	ináz	[i:názs]	I will grab
/ž/	žagaʔ	[ža:gaʔ]	my grandchild	yuž	[y:žš]	sand
/ẓ̌/	ẓ̌ajfmy	[ẓ̌ajfmi]	seat of the basket			
	g+čgúẓ̌	[g+čgú:ẓ̌ṣ̌]	needle			

SONORANTS

/m/	lam	[lɛm:]	boss	mam	[mɛm:]	grandmother
/m/	lam	[la:m]	it (animal)	mam	[mam:]	mother
/n/	čon	[tšon:]	three	nanaʔ	[nan:aʔ]	I know
/n/	rson	[řso:n]	message	šnanaʔ	[šna:naʔ]	my mother
/l/	pkwel	[pkwel:]	cornhusk	belak	[bɛl:ak:h]	how much?
/l/	gel	[gɛlL]	cornfield	škelaʔ	[ške:laʔ]	my cornfield

1.2 All fortis consonants are long when occurring intervocalically following a stressed vowel, or before pause. Fortis stops and nasals are also long following a stressed vowel when preceding a semivowel or voiced consonant.² In addition to length, the fortis stops /p t k/ are aspirated before pause.

[p:]	rapaʔ	[řap:aʔ]	I have
	rapyuʔ	[řap:yuʔ]	you (form.) have
	rjapnř	[řjap:ɛnř]	we have

[p:h]	tap	[tap:h]	four
	sop	[sop:h]	soup

[t:]	žyiteʔe	[žyít:eʔe]	kitten
	šityaʔ	[šít:yaʔ]	my onion
	bátřn	[bát:řn]	it is a skunk

[t:h]	nit	[nit:h]	sugar cane
-------	-----	---------	------------

[k:]	špakaʔ	[špak:aʔ]	my tadpole
	šákyaʔ	[šák:yaʔ]	my cage

- špakni [špak:eni] *our tadpole*
- [k:h] hak [bak:h] *tadpole*
guk [guk:h] *when*
- [t:s]³ deca? [det:sa?] *my back*
rac [řat:s] *ripe*
- [t:š] gič [git:š] ~ [xit:š] *hair*
škiča? [škít:ša?] *my thorn*
- [s:] rsesa? [Řsɛ?ɛs:a?] *I shake*
nas [nas:] *day before yesterday*
- [š:] našín [naš:iŋ] *it is sweet*
vaš [yaš:] *avocado*
- [š:] kušaš [kúš:aš:] *maggie*
boš [boš:] *cocoon*
- [m:] šlama? [šlam:a?] *my boss*
šlamní [šlám:eni] *our boss*
ščimya? [štšim:ya?] *my basket*
mam [mam:] *grandmother*
- [n:] šapína? [šapín:a?] *my pine tree*
ginyu [gín:yu?] ~ [xín:yu?] *your throat*
gínbi [gín:ɛb+] ~ [xín:ɛb+] *his throat*
čon [tšon:] *three*
- [l:] vuľay [yu:l:äy] *town hall*
šilja? [šíl:ya?] *my sheep*
pkweľ [pkwe:l:] *cornhusk*

Voiceless bilabial /p/ is fricative before a voiceless consonant.

- pkuz [pkuzs] *spark*
bapslo [bapslo:] *pupil (of the eye)*
ptáza? [ptáza?] *I hit (with an instrument)*

1.3 All lenis stops tend to occur predominantly fricative. Each has a full stop allophone, however, occurring after a homorganic consonant.

- [b] rsánbyu? [ʀsámbyu?] *you leave (it)*
 runbí [ʀumbí] *he does/makes (it)*
- [d] ldu?a [ldu?a] *Oaxaca City*
 nde [nde:] *that*
 rdeda? [ʀde:ða?] *I give*
- [g] ngu! [ŋgu:l] *male*
 decpéngw [detspeungW] *hunchback*

Word initially, [d] fluctuates with [d̥]. [d̥] is more frequent initially when prevoicing occurs.

- dub [du:b̥] ~ [ədu:b̥] *maguey cactus*
 deca? [d̥et:sa?] ~ [əd̥et:sa?] *my back*

[g] fluctuates word initially with [h] and ∅ before [u], and with [x] before [y], [i], and [+].

- gúg [gúgx] ~ [húgx] ~ [úgx] *turtledove*
 gyit [gyit:h] ~ [xyit:h] *squash*
 giny [ginI] ~ [xinI] *steamer trunk*
 gíč [git:š] ~ [xít:š] *thorn*

All lenis consonants except nasals have a voiceless release before pause.

- [b̥] žub [žub̥] *corn*
 tēb [tēb̥] *crooked*
- [d̥] zed [z̥e:dt] *salt*
 gald [ga:ld̥] *twenty*
- [g̥] yag [y̥a:gx] *tree*
 žig [ž̥i:gx] *gourd cup*
- [dz̥] bžž [bdz̥t:dz̥] *squirrel*
 biaž [bi:adz̥] *plum*

- [dʒʒ] dičgíj [ditʒgí:dʒʒ] *argument*
 bɫj [bɫ:dʒʒ] *wide reed*
- [zs] iz [i:zs] *year*
 mandúz [mandúzs] *spider*
- [ʒʒ] yɫʒ [y:ʒʒ] *sand*
 glʒ [gl:ʒʒ] ~ [xɫ:ʒʒ] *field grass*
- [ʒʒ] nɔʒ [nɔʒʒ] *do you see?*
- [ɪL] gɫ [gɫɪL] ~ [hɫɪL] ~ [ʊɪL] *egg yolk*
 baɪ [baɪL] *flame*
- [ʒʒ] bəsér [bəsé:ʒʒ] *bee*
 pɫalór [pɫaló:ʒʒ] *type of bird*

Lenis flap /r/ is voiceless preceding a voiceless consonant.

- rkó [ʒkóʒ] *you (fam.) throw out*
 rson [ʒsɔŋ] *message*
 rtoʒo [ʒtoʒo] *you (fam.) sell*

When /r/ combines with itself in a cluster, it becomes a trill [ʒ]. Phonetic [ʒ] in any Spanish loanword is also treated as a phonemic cluster /rr/.

- rragelaʒ [ʒragelaʒ] *I awaken*
 rrú [ʒúʒ] *you (fam.) cough*
 arréd [aʒé:dt] *ox cart (Spanish: carrete)*

Lenis nasal /n/ is [m] preceding a bilabial non-nasal consonant, and [ŋ] preceding a velar consonant and following [ɪ] before pause.

- [m] bânɔɫ [bâmbɫ] *he made/did*
 rsaɫbɫ [ʒsaɫbɫ] *he leaves (it)*
- [ŋ] ŋgul [ŋgu:ɪL] *male*
 wenɫɫ [weŋkɫɫ] *it's good*
 cɫn [tsɫ:ŋ] *there are ten (inanimate objects)*
 naʒɫn [naʒ:ɫŋ] *it's sweet*

2. The semivowels of GZ are palatal /y/ and labial /w/. Both are fricative word initially and before pause. In word-initial position, [w̥] fluctuates with [ɣw], and [y̥] fluctuates with [ɣy] and [xy].

[w̥]	wetúb	[w̥etú:b̥p̥] ~ [ɣwetú:b̥p̥]	<i>ox beetle</i>
	wetípy	[w̥etíp:I] ~ [ɣwetíp:I]	<i>wasp</i>
	becpaw	[betspaw]	<i>woodpecker</i>
[y̥]	yu?	[y̥u?u] ~ [xyu?u] ~ [ɣyu?u]	<i>house</i>
	yaš	[yaš:] ~ [xyaš:] ~ [ɣyaš:]	<i>avocado</i>
	bliley	[bliley]	<i>type of tree</i>

Both semivowels are voiceless when following a consonant and preceding pause, or when interconsonantal. In these same environments, prelabialization in the case of /w/ and prepalatalization in the case of /y/ occur before the preceding consonant or consonant cluster.

[U]	běkw	[b̥ě?ěukU]	<i>dog</i>
	dešpekwt†	[dešp̥ě?ěukUt†]	<i>your (pl.) dogs</i>
[I]	ziny	[dz†:InI]	<i>honey</i>
	kwăkyt†	[kwă?ăikIt†]	<i>you (pl.) will plant</i>

In the above cases, we have interpreted /w/ and /y/ as semivowels rather than the vowels /u/ and /i/ because of their fricative quality (/i/ and /u/ and other vowels are not fricative), and because of the prelabialization and prepalatalization occurring before preceding consonants, which does not occur before /i/ or /u/.

3. There are six vowels /i ɨ a u o/, each of which may occur plain, laryngealized, or checked by glottal closure. Plain and checked vowels contrast phonemically, while laryngeal open and checked vowels occur in complementary distribution with one another.

The vowels of GZ in chart form are:

	Plain	Laryngeal	Checked
High:	i ɨ u	i̥ ɨ̥ u̥	i? ɨ? u?
Low:	e a o	ě â ô	e? a? o?

/i i i?/ are high front.

giny *steamer trunk*

giny *chili pepper*

pkI?n *we roasted (it)*

/e e e?/ are mid front.

gel *cornfield*

bêl *meat*

be?ld *snake*

/ɨ ɨ ɨ?/ are high central.

ɨt *bcne*

ɨny *work*

tɨ?y *body*

/a a a?/ are low central.

yan *tc sting*

yân *ccrncob*

ya?n *to remain*

/u u u?/ are high back.

gun *tc do*

gûn *tc cry*

gu?n *bull*

/o o o?/ are mid back.

do *corn tassel*

rldo *you (fam.) loosen*

rldo? *you (fam.) break*

3.1 The six oral vowels /i e a ɨ u o/ contrast as follows:

/i/ bidy [bi:dI] *plant shoot*

/e/ bed [be:dt] *Peter*

/a/ bad [ba:dt] *duck*

/ɨ/ bɨdy [bɨ:dI] *chicken*

/u/ kudy [ku:dI] *thigh*

/o/ mod [mo:dt] way

Each of the six oral vowels contrasts with its corresponding checked and laryngeal vowels as follows:

/i/	giny	[gi:nI] ~ [xi:nI]	ear wax
/ĩ/	giny	[gĩnI] ~ [xĩnI]	chili pepper
/iʔ/	pkɪʔn	[pkiʔin]	we roasted (it)
/e/	gei	[ge:iL]	cornfield
/ẽ/	bẽi	[bẽiL]	meat
/eʔ/	beʔid	[bẽʔeidt]	snake
/a/	yan	[ya:n]	to sting
/ã/	yã	[yã]	corncob
/aʔ/	yaʔn	[yaʔan]	to remain
/i/	zɪny	[dzi:inI]	honey
/ĩ/	zɪny	[dziĩinI]	work
/iʔ/	tɪʔʒy	[tiʔiʒI]	body
/u/	gun	[gun:] ~ [hun:]	to do
/ũ/	gũ	[gũ] ~ [hũ]	to cry
/uʔ/	guʔn	[guʔun:] ~ [huʔun:]	bull
/o/	do	[do:]	corn tassel
/õ/	riđõ	[ʃidõʔ]	you (fam.) loosen
/oʔ/	riđoʔ	[ʃidoʔo]	you (fam.) break

3.2 The oral open vowels /i e ɪ a u o/ are long when stressed preceding a lenis consonant or pause. In the case of /i/, its long variant also occurs when stressed preceding another vowel. Long [e:] is restricted to open syllables in the above environments, while long open [ɛ:] occurs in closed syllables.

[i:] bidy [bi:dI] plant shoot
 bi [bi:] air/wind
 biaʒ [bi:adz] plum

[e:] webyuʔ [we:byuʔ] you (form.) went
 nde [nde:] that

- [ɛ:] bɛsér [bɛsɛ:ʔ̥R̥] *bee*
 bred [bʔ̥ɛ:dt] *board*
- [ɪ:] bɪj [bɪ:dʒʒ] *wide reed*
 yɛbʒʔ̥ [yɛbɛdʒʔ̥:] *organ cactus*
- [a:] gɛʒ [gɛ:dʒs] *seven*
 zɛ [zɛ:] *lard*
- [u:] yɪʒ [yɪ:ʒʒ] *sand*
 bɛu [bɛgu:] *knot*
- [o:] gɛzmɪ [gɛ:zmɪ] *sickle*
 dɛ [dɛ:] *corn tassel*

The above six oral open vowels are short when unstressed preceding a lenis consonant or pause, and preceding a fortis consonant either stressed or unstressed. Unchecked, unstressed /a o/ do not occur before pause in our limited corpus. Here again, as with the long variant of /e/, short [ɛ] occurs only in open syllables, and short open [ɛ] occurs in these environments only in closed syllables.

- [ɪ] nis [nis:] *water*
 bɪdɪŋúɪ [bɪdɪŋú:ɪL] *male turkey*
- [e] bɛgɪdy [bɛgɪ:dɪ] *butterfly*
 rɪkwabede [Rɪkwabɛ:ɛ] *it is spicy*
- [ɛ] gɛɪgɪj [gɛɪgɪ:dʒʒ] *illness*
 gɛt [gɛt:h] *tortilla*
 bɛcgɪdy [bɛtsɪf:dɪ] *field rodent*
- [ɪ] bɪdɪŋúɪ [bɪdɪŋú:ɪL] *male turkey*
 gɛzmɪ [gɛ:zmɪ] *sickle*
 ʒɪt [dzɪt:h] *bone*
 gɪʒgúʒ [gɪtʒgú:ʒʒ] *needle*

[a] fluctuates with [ɛ] before fortis consonants, predominantly fortis nasals.

- dagɪz [dagɪ:ʒʒ] *straw raincape*

- tap [tap:h] *four*
 datmám [datmám] ~ [datmám] *grandfather*
- [u]⁴ gubá [gubá:] *vapor*
 btyu [btyu] *moon*
 ptyúš [ptyúš] *tomato*
 škuliza? [škuli:za?] *my daughter-in-law*
- [o] todad [toda:dt] *deceased grandfather*
 mos [mos:] *a kiss*
 boše'n [boše'en] *little cocoon*

In addition to its short variant [ɪ], /i/ has a short open variant [ɪ] which occurs following /y/ preceding a fortis consonant.

- žyit [žyit:h] *cat*
 gyit [gyit:h] *squash*

3.3 The six oral checked vowels are rearticulated when stressed. In the case of /e[?]/, open [ɛ[?]] occurs in stressed closed syllables, while [e²e] is restricted to stressed open syllables.

- [ɪ?ɪ] ri? [ři?ɪ] *water jug*
 pki?n [pki?in] *we roasted it*
- [e²e] rkište?byu? [Řkište²ebyu?] *you advise*
 ze? [ze²e] *green bean*
- [ɛ²ɛ] be?ld [be²ɛldt] *meat*
 bwe?n [bwe²ɛn] *moon*
- [ɪ?ɪ] tɪ?šy [tɪ?ɪšɪ] *body*
 rɪ?ni [řɪ?ɪnɪ] *tender*
- [a²a] ya?n [ɣa²an] *to remain*
 ča? [tša²a] *I will go*
- [u²u] gu?n [gu²un] *bull*
 yu? [ɣu²u] *house*

[o'o] tyo'n [byo'on] *we went*
to? [bo'o] *charcoal*

A short checked variant occurs when unstressed before pause for /i? a? o? u?/. It is possible that these variants exist for /i? e?/; however, these have not been attested in the data.

[i?] ci? [tsi?] *ten*
[a?] šrana? [šna:na?] *my mother*
rkaza? [Rka:za?] *I want*
[u?] becu? [bet:su?] *your brother*
rsanu? [Rsa:nu?] *you leave (it)*
[o?] [lcko? [llok:o?] *your forehead*
rago? [řa:go?] *you bite*

3.4 All six laryngeal vowels /i̇ ė i̇ ȧ u̇ ȯ/ occur unchecked preceding lenis consonants or semivowels. /ə̇/ occurs as [ē̇] in a closed syllable and as [ē̇] in an open syllable in the above environment.

[i̇] žiz [žizs] *branch*
giny [gini] *chili pepper*
[ē̇] kēza? [kēza?] *I will embrace*
rtēba? [Rtēba?] *I will make it crooked*
[ē̇] tēb [tēbɸ] *crooked*
bez [bēzs] *puma*
[i̇] gij [gij:džš] ~ [xi̇:džš] *pimple*
[ā] yulāy [yulāy] *town hall*
ptāza? [ptāza?] *I hit*
[ū] mandūz [mandūzs] *spider*
gūl [gūl] *egg yolk*
[ō] nōž [nōžš] *do you see?*

/ē̇ ā ū ȯ/ are checked before pause. No checked /i̇ i̇/ have been attested before pause.

[e̞ʔ]	ndě	[nděʔ]	<i>this one</i>
	bě	[běʔ]	<i>ant</i>
[ãʔ]	lábã	[lã:bãʔ]	<i>root</i>
[ũʔ]	dũ	[dũʔ]	<i>rope</i>
[o̞ʔ]	rldo	[ʔldoʔ]	<i>you (fam.) loosen</i>

All six laryngeal vowels are rearticulated when stressed preceding a fortis consonant. In the case of /i/, rearticulated variant [iʔi] occurs in the above environment following /y/.

[iʔi]	giš	[giʔiʔš:] ~ [xiʔiʔš:]	<i>field</i>
[iʔi]	yiç	[yiʔiʔit:s]	<i>paper</i>
[e̞ʔe̞]	rsěsaʔ	[ʔrsěʔes:aʔ]	<i>I shake</i>
[iʔi]	giʔty	[giʔiʔit:I] ~ [xiʔiʔit:I]	<i>a clay pot</i>
[ãʔã]	bãp	[bãʔãp:h]	<i>reed</i>
[ũʔũ]	guš	[guʔũš:] ~ [hũʔũš:]	<i>smoke</i>
[o̞ʔo̞]	šöp	[šöʔöp:h]	<i>six</i>

4. Eleven different syllable patterns occur in GZ: V, VC, CV, CVC, CVCC, CVCCC, CCV, CCVC, CCVCC, CCCV, and CCCVC.

4.1 The syllable nucleus contains one of any of the six vowels /i e ð a u o/, plain, checked, or laryngeal. Any vowel cluster of two vowels is ambisyllabic, and either [i] or [u] is one of the members. (In cases where stem-final vowels /e/ or /o/ occur before an /a/-initial suffix, a morphophonemic rule raises the two vowels to /i/ and /u/ respectively to maintain the /i/ or /u/ obligatory occurrence in a vowel cluster.)

4.2 A syllable-initial margin may be filled by any consonant or semivowel in a single C position. In consonant clusters involving a two-consonant onset, the majority involve /p b š r/ as first members, with a few rare instances of ld, nd, ng, and mn.

In the case of /p/-initial two-cluster onsets, /l/, /r/, and fortis obstruents, except /p/ itself, occur as second members. /b/-initial clusters have /l r w y/ and all lenis obstruents, with the exception of /b/ itself and /š/, occurring as second members. /š/-initial clusters have /r/ and all fortis consonants, except /š/ itself and /ç s š/, occurring as second members. /r/-initial

clusters have /y/ and all fortis and lenis consonants, except retroflexed palatals /č ǰ ž/ and /m/ and /w/, occurring as second members. Examples of the most frequently occurring two-consonant onset clusters; are:

pt	ptãz	to hit
pk	pkalor	a type of bird
ps	psla	eagle
bd	bdun	whirlwind
bz	bzã	bean
bl	blõ	crow
šp	špalã?	my bullet
št	štlesš	garlic
šk	šketã?	my tortilla
rt	rtãzã?	I hit
rd	rded	to give
rs	rseb	voice

Examples of rare consonant clusters:

ld	lday	a piece
nd	nde	that
ng	ngul	male
mn	mninín	little boy

A syllable onset filled by a three-consonant cluster occurs with only /p b š r/ as initial members. /p/ and /š/-initial clusters are most frequent, with /r/ next, and /b/ occurring only in a /bid/ cluster. /s/ is most frequent as the second member. Examples of attested three-consonant onsets are:

pst	pstubyu?	you (form.) consumed
psk	psko?	you (fam.) lengthened
psi	pslo	eye
pkw	pkwel	cornhusk
pty	ptyu	egg shell
štr	štrages	centipede
šty	štyu	shame

škw	škwána?	<i>my alfalfa</i>
šky	škyita?	<i>my squash</i>
šmn	šmnímbyu?	<i>your (form.) little boy</i>
rst	rstubya?	<i>I consume</i>
rsl	rslasa?	<i>I thin out</i>
rld	rldonisa?	<i>I rinse</i>
bld	blda	<i>shade</i>

4.3 In a syllable-final margin, any consonant or semivowel except retroflexed /č/ may occur in a single C position. Reference may be made to Section 1.1 for examples of consonants in final position.

In a two-consonant cluster in syllable-final position, with the exception of -ld and -nd, all clusters end with semivowels /y/ or /w/. /w/-final clusters occur only with velars /k/ or /g/ as first members. /y/ occurs as the final member of a cluster preceded by any stop except /g/, or any nasal or lateral. Only one three-consonant cluster in syllable-final position has been attested: -ngw, found in bengw *bent*.

4.4 A few restrictions occur in regard to the relationship between a syllable margin and its nucleus. The rare phoneme /č/ occurs only before /u/. The phonemes /c/ and /z/, when occurring in word-initial position, precede /ɨ/ only.

The problem of differentiating between semivowels /w/ and /y/ and vowels /u/ and /i/ has been simplified in word-initial and final positions due to the fricative nature of /w/ and /y/ when preceding or following vowels and the feature of voicelessness and accompanying prelabialization and prepalatalization respectively when occurring finally after consonants, all of which are lacking with the vowels /i/ and /u/. When a high front vocoid occurs as a final member of a syllable onset, however, the only criterion available is stress placement. In words such as /štyu/ [štyú:] *shame*, for example, where stress is on the /u/ (causing it to be phonetically long), we consider the high front vocoid to be a semivowel, part of the margin. In words like /štieš/ [šti:eš:] *garlic*, however, where the /i/ is stressed, it is analyzed as part of a vowel cluster.

5. GZ has a register tone system. Three level phonemic tones occur: low /˨/, mid /˨˨/, and high /˨˨˨/. Each of these three tones has a slightly lower allotone before pause and a slightly higher allotone which occurs with laryngealized vowels, checked vowels, or when stressed. Each vowel carries one of these three tones,

and a phonetic long vowel may carry either two identical level tones or a mid followed by a high tone, which resembles a contour mid-to-high glide.

The following data show the phonemic contrast among these three tones:

LOW-MID CONTRASTS

gèl	[gè:l]	<i>cornfield</i>
gǝl	[gǝ:l]	<i>midnight</i>
bzà	[bzàʔ]	<i>bean</i>
bzǎ	[bzǎʔ]	<i>I will cooperate</i>
zy\it	[zy\it:h]	<i>far</i>
žy\it	[žy\it:h]	<i>cat</i>

LOW-HIGH CONTRASTS

tàp	[táp:h]	<i>four</i>
táp	[táp:h]	<i>lid</i>
làdy	[là:idi]	<i>clothes</i>
lát	[lát:h]	<i>tin can</i>
gèl	[gè:l]	<i>cornfield</i>
bál	[bá:l]	<i>bullet</i>

MID-HIGH CONTRASTS

mām	[mā:m]	<i>mother</i>
mám	[mám]	<i>grandmother</i>
mǎž	[mǎ:žž]	<i>table</i>
mǎž	[mǎ:žž]	<i>blond</i>
bǝd	[bǝdt]	<i>he came</i>
béd	[béd:dt]	<i>Peter</i>

Examples of long vowels carrying two different tones:

bzǎž	[bzǎ:žs]	<i>smile</i>
gǎny	[gǎ:nI] ~ [xǎ:nI]	<i>ear wax</i>
za	[zǎ:]	<i>cloud</i>

NOTES

1

Guelavfa Zapotec is a Zapotecan language spoken by approximately 30,000 people centering in the area of the village of San Juan Guelavfa located in the district of Tlacolula in the state of Oaxaca in southern Mexico. The present study is based upon data gathered by TEJ while living in San Juan Guelavfa for nine months and during a four month linguistic workshop sponsored by the Summer Institute of Linguistics at Mitla, Oaxaca, Mexico in the Spring of 1974. The principal informant was Edmundo Vásquez García, age 40, of Guelavfa, for whose patience and cooperation we are indebted.

2

An open transition occurs between fortis stops or nasals and a voiced heterorganic consonant.

3

Since there is no release between identical consonants, a long /c/ is actualized phonetically as [t:s], and likewise long /č/ and /č̣/ as [t:š] and [ṭ:ṣ̌], respectively.

4

A nasalized [y] occurs extra systemically in rare instances in the environments of /n/:

[nỹ] *smooth*

[yaṇỹ:n] *a small fruit*

[nʔ̣ỹ] *your foot*