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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

CHIQUIHUITLAN MAZATEC PHONOLOGY

Allan R. Jamieson

1. Phonemes
2. Distribution
3. Interpretation

This paper describes the phonemes of Chiquihuitlan Mazatec,[1] an Otomanguean language of Southeastern Mexico. Consonants, vowels, and nasalization are introduced in the first section of the paper; their distribution within and between syllables is discussed in the second section; and the paper closes with a few remarks dealing with certain problems of interpretation that arose in the course of the analysis.

1. Phonemes

There are fifteen consonants: five plosives /t c ʈ č k/, two fricatives /s š/, six sonorants /m b n r ñ y/, and two laryngeals /ʔ h/. All consonants are normally realized with spread lips except preceding /o u/, when they are realized with slight to definite rounding.

Of the five plosives, three are stops--alveolar, alveopalatal, and velar--and two are affricates--alveolar and alveopalatal. They are voiceless except following /n/.

(1) tä^{3} [tæ^{v}] *ten* ntä^{4} [ndæ^{v}] *stair*
na^{4}ʈa^{2} [nąʈ^{y}a] *saliva* na^{4}nʈa^{4} [nąñg^{y}a] *town*
ba^{3}ki^{3} [ɓaki] *he nurses* ba^{3}nki^{3} [ɓaŋgi] *he searches*
ca^{4} [tsa] *cheek* nca^{3} [ndza] *my hand*
ča^{3}kų^{34} [ʈšakų] *citified* nca^{3}kų^{34} [ñgžakų] *godmother*

Both fricatives are grooved and voiceless, and are alveolar and alveopalatal retroflexed, respectively.

(2) sa^{2} [sa] *moon* ša^{2} [ʂa] *work*

Three sonorants are bilabial, alveolar, and alveopalatal nasals. The alveolar nasal assimilates in point of articulation to a following plosive.

(3) ma^{3} [mą] *is able* ña^{3} [ñ^{y}ą] *even*
na^{4} [ną] *she* nku^{2} [ŋgu] *one*
nʈa^{34} [ñg^{y}a] *there*

/b/ is normally a voiced bilabial flat fricative, but it fuses with a preceding /h/ to yield [ɸ] and is slightly nasalized when preceding a nasalized vowel.

(4) ba^{3} [ɓa] *sad*

hbä^{3} [ɸæ^{v}] *gets used up*

ʔbį^{21} [ʔɸ̥į.] *he doesn't know*

/y/ is normally a lenis voiced fronted alveopalatal grooved fricative with a palatal offglide, especially when preceding a high front vowel, varying freely to a voiced raised high close front unrounded vocoid; it fuses with a preceding /h/ to yield [ɧ̟], with or without slight aspiration, and is slightly nasalized when preceding a nasalized vowel.

(5) yä^{4} [ɧ̟^{ʏ}æ^{v}] or [ɧ̟$^{i^{\wedge}}$æ^{v}] *snake*

hyä^{3} [ɧ̟æ^{v}] or [ɧ̟ɐ̟æ^{v}] *big*

ʔyį^{21} [ʔɧ̟$^{į^{\wedge}}$į.] *you (sg) don't know*

/r/ is normally a voiced alveolar flap, but it is voiceless preceding /k/ and is a lateral when word-initial preceding a vowel.

(6) ču^{4}řä^{4} [ʈšuræ^{v}] *his animal*

rku^{4} [řku] *his head*

ra^{3}nka^{14} [laŋga] *little ones*

Both laryngeals are voiceless. /ʔ/ is a glottal stop. /h/ is normally the voiceless counterpart of a following vowel or sonorant, but it fuses with /b y/ as indicated above.

(7) ʔa^{3}nį^{1} [ʔanį] *red*

hį^{3}nə^{3} [Iinɛ^{v}] *he eats*

ho^{1} [Oo] *two*

čha^{4} [ʈšAa] *he speaks*

hma^{1} [Mmą] *black*

hne^{2} [Nnę] *palm leaf*

hña^{4} [Ñña] *chili pepper*

hbä^{3} [ɸæ^{v}] *gets used up*

hyä [ɧ̟æ^{v}] *big*

There are six vowels: /i e ä a o u/.

/i/ is a high close front unrounded vowel. It is a short glide when following /a/ or preceding another vowel within the syllable. /e/ is normally raised mid open front unrounded, but is lowered when nasalized. /ä/ is lowered low close front unrounded. /a/ is normally low open central unrounded. In some idiolects it is raised to mid before the offglide /i/. /o/ is mid close back

rounded. /u/ is high close back rounded. It is a short glide when following another vowel within the syllable, and in some idiolects is fronted in this context.

(8) si^{3} [sɪ] *a dispute* khæ^{31} [kÆæ^{v}·] *not yet*
ʔai [ʔa^{ˈ}] *heavy* sa^{2} [sa] *moon*
siu^{2} [s^{ˈ}u] *are* ʔai [ʔa^{ˈ}] or [ʔʌ^{ˈ}] *heavy*
se^{2} [sɛ^{ʌ}] *you (sg) sing* čo^{2} [ʧšo] *woven cloth*
sę^{2} [sę^{v}] *we (in) sing* ču^{4} [ʧšu] *animal*
sä^{2} [sæ^{v}] *he sings* sua^{2} [s^{ᵘ}a] *he gives*

A vowel is lengthened when accompanying an upgliding tone cluster.

(9) sę^{21} [sę^{v}·] *I don't sing* kǫ^{21} [kǫ·] *I'll not grind*

A single vowel or the cluster /sɪ/ may be interrupted by a laryngeal. In such cases, the vowel is rearticulated after the interruption, with the whole sequence having a timing similar to that of a single vowel when accompanying an upgliding tone cluster. In the cluster /aɪ/, the interruption occurs between the /a/ and the /ɪ/.

(10) ba?^{31} [ɓa?ɛ] *I carry* bah^{31} [ɓaAa] *I hit*

Nasalization is a feature of the syllable rather than of individual vowels. The vowels of any given syllable are either all oral or all nasalized. A nasalized vowel is heavily nasalized following a non-nasal consonant. There is no contrast between nasalized and non-nasalized vowels following a nasal consonant; all such vowels vary between lightly to heavily nasalized forms. Preceding a nasal consonant, a vowel is slightly nasalized.

(11) skę^{2} [skę^{v}] *he'll smoke* sɪų?^{2} [s^{ˈ}ų?ų] *we (in) grind*
suą^{21} [s^{ᵘ}ą·] *I don't give* cɪ^{2}?ñuaɪ^{21} [tsɪ?ñ^{ʸᵘ}ą^{ˈ}] *he doesn't tie up*
suaɪ^{21} [s^{ᵘ}ę^{ˈ}] *he doesn't give* yu^{4}nkų^{4} [^{ˈ}ų̨ŋgų] *church*
cą?^{34} [tsą?ą] *mine* ?ɪ^{2}nta^{2} [?^{ˌ}inda] *soft*
cąlh^{31} [tsę̨ɬ̨] *there isn't any*

There are four tones: high /^{1}/, mid /^{2}/, low-mid /^{3}/, and low /^{4}/. The complexity of the tonal system merits a completely separate discussion (see the following article, this volume).

(12) ho^{1} *two* ya^{2} *tree* tä^{3} *ten* cä^{4} *guayaba*

2. *Distribution*

With two known exceptions in the language,[2] every syllable begins with a consonant or a consonant cluster. Any consonant may enter into a cluster, but of the four classes of consonants--plosives, fricatives, sonorants, and laryngeals--only one member of each class may occur in any one cluster.

/h/ may follow any plosive or precede any sonorant except /r/.

(13) thä^{2} *an itch* hma^{1} *black*
ʈho^{2} *cornhusk* hni^{2} *blood*
khä^{31} *not yet* hñu^{1} *dark*
cha^{2} *badger* hbä^{2} *I go*
čha^{2} *difficult* hyä^{2} *complaint*

/ʔ/ may precede any sonorant except /r/.

(14) ʔma^{3} *hidden* ʔbä^{3} *I know*
ʔne^{2} *language* ʔya^{3} *then*
ʔñu^{2} *strong*

/n/ may precede any plosive.

(15) nta^{2} *watery* ncų^{14} *torn*
nʈa^{34} *there* nčä^{42} *boiled corn*
nku^{2} *one*

Most clusters are of two consonants, but there are five three-member clusters in which /ʔn/ precedes one of the plosives.

(16) ʔntä^{1} *thin* ʔncä^{4} *his brother*
ʔnʈu^{2} *cocoa bean* ʔnči^{4} *wet*
ʔnka^{3} *high*

/s/ may precede the plosives /t k/ or the sonorants /m n/.

(17) nta^{3}stu^{14} *at least* sme^{1} *I loose*
ska^{2} *crazy* sne^{4} *tepejilote palm*

/š/ may precede the plosives /t ʈ k/ or the sonorant /n/.

(18) šta^{1} *smooth* ška^{4} *leaf*
šʇa^{3} *salty* šnɨ^{2} *log*

/r/ may precede /k/, and in a common freely variant pronunciation of -rä^{4} na^{4} *of her*, it may precede /n/.

(19) rka^{14} *blind* ču^{4}rna^{4} *her animal*

Every syllable has one or more vowels; any vowel except /o/ may enter into cluster with other vowels. Clusters are almost exclusively of two vowels, with /i u/ as the first member. The exceptions are /a/ and nasalized /uą̈ɨ/. /i/ may precede /a u/ as an onglide or follow /a/ or /uą/ as an offglide.

(20) bɨ^{3}sɨa^{2}hmɨ^{2} *he converses* ʔaɨ^{2} *heavy*
sɨu^{2} *are* khuą̈ɨ^{41} *he will not grab*

/u/ may precede /i e ä a ą̈ɨ/ as an onglide. It does not follow another vowel as an offglide but does follow /i/ when the latter is an onglide, as mentioned above.

(21) khuɨ^{1} *he is going* khua^{4} *word*
khue^{3} *he will go* khuą̈ɨ^{41} *he will not grab*
khuä^{3} *it will get used up*

Any single vowel or /a/ may be interrupted by /ʔ/, and any single vowel may be interrupted by /h/ in the absence of nasalization.

(22) čɨʔ^{4} *he is drunk* ntɨh^{4} *grass*
čeʔ^{3} *you (sg) buy* nteh^{34} *sugar cane*
čäʔ^{3} *I am drunk* yäh^{3} *every*
čaʔ^{2} *a load* nʇah^{4} *cattle*
čoʔ^{3} *stingy* nʇoh^{4} *a rock*
cuʔ^{2} *huipil* ntuh^{4} *soap*
ʇhaɨʔ^{3} *clean*

Any single vowel except /ä/, or the cluster /aɨ/, may occur with nasalization in the presence or absence of the laryngeals /ʔ h/.

(23) cį^{2} *he gets born* nɨ^{3}čǫʔ^{2} *we (in) deny*
sę^{2} *we (in) sing* tų$^{?31}$ *you (pl) give*

šą^{2}	*sugar cane juice*	štą$^{?314}$	*mushroom*
kǫ^{21}	*I will not grind*	cị̈h^{34}	*ours (ex)*
sų^{2}	*you (pl) sing*	cęh^{2}	*visible*
hąi^{2}	*really*	cąh^{42}	*ours (in)*
tị̈$^{?314}$	*we (ex) give*	ni^{3}kǫh^{2}	*we (in) touch*
tę$^{?314}$	*stunted*	cųh^{41}	*yours (pl)*
tą$^{?31}$	*we (in) give*	cąih^{31}	*there is none*

The sequences /ia iu/ occur uninterrupted in the absence of nasalization, and uninterrupted or interrupted by /ʔ/ in its presence.

(24) bi^{3}sia^{2}hmi^{2}	*he converses*	sią^{42}	*we (in) drink*
siu^{2}	*are*	cią$^{?314}$	*person from Usila (Chinantec)*
chią^{2}	*cloth*	sią$^{?2}$	*we (in) grind*

The sequence /ai/ may occur uninterrupted or interrupted by /ʔ/ in the presence or absence of nasalization, or interrupted by /h/ in its presence.

(25) ʔai^{2}	*heavy*	štąi$^{?314}$	*mushroom*
hąi^{2}	*really*	čąih^{21}	*it does not get lost*
ʇhai$^{?3}$	*clean*		

In the absence of a laryngeal, /u/ occurs as an onglide before oral /i e ä a/ and nasalized /į ę ą ąi/.

(26) khui^{1}	*he is going*	khuį^{21}	*you (sg) will not go*
khue^{3}	*he will go*	khuę^{21}	*I will not go*
khuä^{3}	*it will get used up*	khuą^{21}	*I will not grab*
khua^{4}	*word*	khuąi^{41}	*he will not grab*

Interrupted by /ʔ/, /u/ occurs as an onglide before oral /i e ä a/ and nasalized /į ę ą/.

(27) sui$^{?2}$	*holiday*	khuį$^{?314}$	*we (ex) will arrive*
khue$^{?314}$	*you (sg) will arrive*	khuę$^{?314}$	*we (in) will arrive*
khuä$^{?314}$	*I will arrive*	kuą$^{?2}$	*clay dish*
khua$^{?31}$	*I will grab*		

Interrupted by /h/, /u/ occurs as an onglide before oral /e a/ and nasalized /ɻ ę ą ąi/.

(28) kueh^{2} *you (sg) will hit* kuęh^{314} *I will go up*
kuah^{41} *he will get dressed* kuąh^{21} *I will not get dressed*
kuɻh^{41} *he will not go up* kuąih^{41} *he will not get dressed*

From one to three consonants may occur in the syllable margin, and from one to three vowels may occur in the syllable nucleus--giving a total of nine potential syllable types. All of these are found to occur except the largest expansion of three consonants with three vowels.

(29) tä^{2} *wide* skuä^{3} *I will see*
ntä^{4} *stair* ʔncua^{3} *his mouth*
ʔntä^{2} *he hears* suąi^{21} *he does not give*
suä^{1} *hot* khuąi^{41} *he will not grab*

The following generalizations may be made for one-syllable words in isolation: Any single consonant except /ʈ/ and any cluster except /st/ may be found in the syllable margin, while all single vowels and all clusters except /ia ęʔ ęh/ occur in the nucleus.

All eight syllable types are found as the final syllable of two-syllable words which are not compounds. In the margin of such syllables, all single consonants except /ʔ/ and all clusters except /šʈ sn šn/ are found; in their nuclei, all single vowels except /uʔ ih uh/ and all clusters except /ui ua uɻ uą ue? uɻ? ueh uɻh iɏ ɻɏ? ąi ąih uąi uąih/ are found. If the nucleus is interrupted, however, consonants in the margin are limited to a single consonant or a cluster /nt čh/.

The first syllable of a two-syllable word which is not a compound has only one or two consonants in its margin and one or two vowels in its nucleus. Any single consonant except /m ñ/ may occur in the margin, but only /k/ has been found with two vowels in the nucleus. Of the consonant clusters, only plosives preceded by /n s š/ or followed by /h/ are found with a single vowel in the nucleus, and only /kh/ with two vowels.

Only uninterrupted vowels are generally found in the first syllable of two-syllable words which are not compounds. There are two apparent exceptions.

(30) šaʔ^{2}sę^{2} *heart* saʔ^{1}sę^{2} *will dawn*

Vowel clusters in the first syllable of a two-syllable word which is not a compound are never nasalized; they always have /u/ as their first member and /i e a/ as the second member.

The following generalizations may be made irrespective of the position of a syllable within a word:

(a) Of the alveolar consonants, only the single consonants /s c r/ and the cluster /ch/ may precede a vowel cluster whose first member is /i/.

(b) It is generally the case that only /k/ or a cluster with /k/ and /s š r h/ may precede a vowel cluster whose first member is /u/. The following exceptions have been noted: /č s š th ʔnc ʔnč hñ ʔñ/.

(c) If the margin of a syllable has /ţ/ as a single consonant or in cluster with /š n h/, it is generally the case that a non-front vowel /a o u/ or the sequence /ai/ is found in the nucleus. There are two verbs, however, in which /ţh nţ/ are found preceding a front vowel in second person singular and first person plural exclusive forms.

(31) bi^{2}thį^{24} *we (ex) shell* tį$^{?31}$ntį^{14} *we (ex) bother it*
bi^{2}ţhe^{2} *you (sg) shell* te$^{?31}$nţe^{1} *you (sg) bother it*

Most words, which may have up to six or seven syllables, are composed of various combinations of one and two-syllable words and have more or less the same distributional restrictions as those described above.

3. *Interpretation*

Of the plosives, /ţ c č/ and clusters with /n/ present certain problems of interpretation.

My first transcriptions of /ţ/ alternated between [ţ^{y}] and [k^{y}]. I now see that some speakers tend to [ţ^{y}], some to [k^{y}], and others to some intermediate point between the two. Still others seem to vary freely between the two. There was never any doubt as to its being different from /t/ and /k/, but the precise point of articulation was hard to pin down. [ţ^{y}] seems to be the most prevalent and is used throughout the paper, although one informant thought it should be written in our practical alphabet with the Spanish equivalents for /k/ rather than /t/.

The phonetic sequence could have been interpreted as a phonemic sequence /ty/ or /ti/, and since its occurrence was of relatively low frequency, my first inclination was to avoid setting up a special phoneme. Without belaboring the point, however, the decision to establish /ţ/ as a unit results in the following pat-

terns:

(a) /ʈ/ clusters almost as fully as the other stops /t k/; it may be aspirated or prenasalized (resulting in a voiced allophone and assimilation of the nasal), and it may be preceded by /š/. Two holes remain in the pattern; /ʈ/ may not be preceded by /s/, as in /st sk/, or by /ʔn/ in the speech of certain individuals, as in /ʔnt ʔnk/.

(b) /ʈ/ contrasts with /t/ in nearly identical environments.

(32) nta^{2} *watery* tho^{4} *wind*

nʈa^{34} *there* ʈho^{14} *wind instrument*

/c č/ could have been interpreted as /ts tš/, since the reverse sequences /st št/ occur. They were interpreted as units for the following reasons:

(a) There are no nonsuspect consonant clusters of more than two consonants. Sequences /ts tš/ would yield frequently occurring clusters of three and four consonants.

(b) They fit well as units in the pattern of a single consonant preceding aspiration, as opposed to sequences like /st šk/, which are never aspirated.

(c) They fit well as units in the pattern of a single consonant following a nasal or glottal stop plus nasal, yielding /nt nʈ nk nc nč/ and /ʔnt ʔnʈ ʔnk ʔnc ʔnč/.

The five clusters of prenasalized plosives /nt nʈ nk nc nč/ can be interpreted as a series of voiced plosives /d ɖ g z ǰ/, thereby reducing the number of two-consonant clusters by five as well as all of the undesirable clusters of three consonants (with /ʔ/). Nevertheless, their treatment as clusters is preferred because of the following advantages:

(a) The phoneme inventory is, of course, reduced by five.

(b) The plosives pattern with /n/ as they do with other preceding consonants in that they are never aspirated in that context. Thus, /št/ but never /*šth/ occurs, and similarly /nt/ but never /*nth/.

(c) The nasal property of the clusters, which results in light allophonic nasalization of a preceding oral vowel, would be obscured if they were treated as a series of voiced plosives only.

/b y/ could be interpreted as /u ɨ/, but such an interpretation would contradict the overwhelming pattern of all syllables beginning with a consonant. The phonetic sequence [ʁu] would yield the nonpermitted cluster /uu/; [ɨ̞ ɨ] would yield /ɨɨ/. Phonetically, /y/ and /ɨ/ are basically the same, but preceding a nasalized

vowel, a slight difference can be observed. /ɣ/ is only slightly nasalized in this context, whereas /i/ is heavily nasalized. Using this criterion, all occurrences of [i] before a vowel and following a consonant are interpreted as /i/ unless the consonant is /ɣ/.

The allophones of /r/, [ř ɾ l], are in complementary distribution except for one or two borrowed words and are of low frequency occurrence. Due to the low frequency of modern sounds in this phonetic range, some of which seem to be reflexes of *ntʸ or *t, Kirk (1966:66) posits neither *l nor *r for Proto-Mazatec. Chiquihuitlan -rä *(third person)* and -ri *(second person)* correspond to Huautla -le and -li respectively, perhaps indicating a longstanding relationship between the flap and the lateral which extends beyond the phonetics of Chiquihuitlan speech.

Sequences of /h/ and nasal consonant could be interpreted as a series of voiceless nasal consonants matching the simple voiced series, but this alternative is rejected since the nasals also occur in cluster with the other laryngeal /ʔ/ and with /s š/. Nor is there a voiced/voiceless contrast between pairs or groups of phonemes elsewhere in the phonological system of the language.

The sequences /hb hɣ/ present interesting cases of portmanteau realization as [p x̌]. The former is of very high frequency, the latter of low frequency;[3] but both are in clear contrast to /b ɣ/, respectively. /hɣ/ has a freely variant pronunciation [x̌ʰ], with slight aspiration, which could point to an interpretation as /šh/, but no such pattern of aspiration of fricatives otherwise exists in the language. The present interpretation does fit into the existing pattern of laryngeal and sonorant, and avoids setting up additional phonemes such as /ɣ p/, which would have unusual distributional limitations.

Kirk (1966:16, 29) considered the sounds here interpreted as /ä e/ to be /e ei/, respectively, and there is evidence that the two sounds are historically related. In the first place, the contrast between the two is neutralized in the presence of nasalization; there are only five nasalized vowels as opposed to six oral vowels. Nasalized /ę/ is realized about midway between oral /ä/ [æ˅] and /e/ [ɛ^]. In the second place, what has here been interpreted as /e/ is extremely rare except in verbs. As the last vowel of a verb form, /e/ often correlates with second person and /ä/ with third person. In Huautla (Pike 1948:110-117), the third person form of a verb often differs from the corresponding second person form by an additional /i/. Sound change in Chiquihuitlan has resulted in the reduction of the cluster and the emergence of the sixth vowel in oral contexts. In the third place, the sounds are seen to be related in grammatical forms of a common source: tä^{3} *ten* and ho^{1} *two*, but te^{2}ho^{1} *twelve*.

As the only vowel sequence ending in /i/, /ai/ could be in-

terpreted as a unit, but like /e/ above (which corresponds to Huautla /ei/) it is rare except in verbs and involves a complex morphological situation in which the /i/ is associated with a separate morpheme.

(33) sua^{2} *he gives* bah^{2} *he hits*

suąi^{21} *he does not give* bąih^{21} *he does not hit*

Vowel onglides tend to fall into the pattern in which /i/ is associated with a preceding alveolar consonant and a following nonfront vowel, while /u/ is associated with a preceding velar consonant and a following nonback vowel. A number of possible /i/-glides were eliminated by setting up /ʈ/, but a few remain. Although the majority of /u/-glides occur after /k/ or one of its clusters, there are enough cases with alveolar or alveopalatal consonants to reduce the incentive to set up a /kʷ/ phoneme.

Chiquihuitlan syllable nuclei are here interpreted as uninterrupted, interrupted by /ʔ/ , or interrupted by /h/. Slightly different interpretations (Kirk 1966) have been made for related languages; cognates of interrupted syllables are treated in Jalapa as consonant clusters, as in CʔV and ChV, and as two syllables in Soyaltepec, as in CVʔV and CVhV.

(34) Chiquihuitlan: meh^{31} *want*

Tɛlapa: mhé^{2} *want*

Soyaltepec: me^{3}hé^{1} *want*

(35) Chiquihuitlan: cäʔ^{314} *lazy*

Tɛlapa: cʔé *lazy*

Soyaltepec: ceʔé *lazy*

The following considerations led to the Chiquihuitlan interpretation of interrupted vowels:

(a) If one mora of length is assigned to an uninterrupted syllable, an interrupted one is about one and one-half mora--the same as a single vowel with an upglide. A sequence of two syllables is much longer.

(b) Tones always step from one syllable to the next; only within one syllable do phonetic tone glides occur. Many interrupted syllables have more than one tone; but when whistled by any informant, they are without exception whistled as a continuous uninterrupted upglide. Likewise, those with a steady tone are not whistled as an interrupted sequence of two like tones, but rather as a slightly longer steady single tone.

The words of (36) sound exactly alike when whistled, since an upglide also adds length to the vowel(s) of the syllable.

(36) khä^{31} *not yet* käh^{31} *I went*

(c) There is clear contrast between CVhV^{T}, CV^{T}hV^{T}, and ChV^{T}.

(37) ntoh^{4} *stone*
nko^{4}ho^{4} *hole*
khä^{13} *not yet*

There is contrast between CV?V^{T} and CV^{T}?V, but C?V^{T} does not occur at all. A vowel interrupted by /?/ shows signs of general instability in that in certain morphemes it may vary from /V?/ to /V/, even within the speech of one person.

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NOTES

1
This description is based primarily on the speech of Mr. Ernesto Tejada Salvador, native speaker of Mazatec as spoken in Chiquihuitlan de Juarez, Cuicatlan, Oaxaca, Mexico. Mr. Tejada is in his early forties. Chiquihuitlan has about 6000 inhabitants, approximately ninety percent of whom are native speakers of Mazatec.

2
Both exceptions are bound morphemes: -ą *and how about___?* and -ua *until*. The latter is -kuą in some idiolects.

3
Data from unpublished concordance prepared by computer under NSF grant GS-932 (1971).