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THE WORD AND THE PHONOLOGICAL HIERARCHY OF MEZQUITAL OTOMI

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Prosodic features have frequently been related to the syllable, or viewed as phonemes extractable from a continuum of speech. In contrast, the Mezquital Otomi phonological word is the domain in which interacting systems of stress and tone operate. The structure of the word nucleus (simple or complex) determines the rules by which basic tone sequences are modified. A balance of the following components (in ranked order) is crucial to word structure: stress, tone, length, nasalization, glottalization, and syllable release (controlled or ballistic). A separate but interlocking system, that of the function of the phonological phrase in intonation contours, is also discussed.

Two decades ago certain features of Mezquital Otomi prosody were described from two differing points of view, according to the then current theories of the structure of sound systems. Subsequent investigation of the language has led to the analysis presented in this paper, which builds upon the previous studies but adds crucial data relating to larger units in the phonological structure. Specifically, the previous treatments focused almost exclusively on phonemic particles or components, viz., consonants and vowels with concomitant tone (Sinclair and Pike 1948) and/or stress and length (Leon and Swadesh 1949).¹ The syllable was the matrix in which these components were examined. The result in the case of both approaches was a distorted view of the sound system of the language.

The present description is based upon the discovery that larger rhythm units, especially the phonological word, provide the matrix in which features of particular phonemes and syllables can be tested for contrasting structure.² The phonological word is the dominant level in the hierarchy because of the following relations to higher and lower levels: (1) tones occurring on component syllables of the word are modified according to their placement in the word; (2)

¹ Sinclair and Pike presented evidence for establishing a tone system of three contrastive units; Leon and Swadesh presented evidence for considering stress a basic contrastive feature of the language, an analysis which would presumably obviate tonemic units. A more recent article by Leon (1963) essentially confirms the hypothesis of the 1949 article, with a few minor modifications. The solutions which I present here differ in two respects from the previous ones: (1) the theoretical framework is the whole phonological hierarchy, including not only phonemes and syllables, but also higher levels such as words and phrases; (2) it considers crucial phonetic data which were not handled in the previous analyses and incorporates them as factors in a unified solution.

² Although the present treatment is the first formal description of the entire phonological system, the rhythmic structure of words was observed and reported earlier (Wallis 1964) in an article focusing on the grammatical fusion in words. It was observed that certain forms 'though not parallel grammatically, form a phonological paradigm' (79). This skewness argues strongly for the separation of the phonological and grammatical hierarchies in analysis and for the presentation of data. The strong pressure of phonological rhythm is reflected in grammatical forms which are defective in the third person, but where allomorphic variability 'provides various phonological crutches to preserve or supplement rhythm' (79).

the closely knit stress-tone configuration of the word makes possible its ready identification even in phrase contours where its canonical form may be modified. In short, the phonological word, both in its simple and complex forms, represents the hierarchical level whose units can be easily identified and isolated.

1. THE PHONOLOGICAL HIERARCHY. The theory of a phonological hierarchy asserts that the phonology of a language has an internal hierarchical structure which is essentially independent of the grammar (morphology and syntax) of that language. The units and size-levels in the phonological hierarchy are phonetically based, but structurally determined. Accordingly, the number and kind of significant size-levels in the hierarchy may vary for individual languages. In Mezquital Otomi, there are four significant size-levels: the phonological phrase, the phonological word, the syllable, and the phoneme.³ (Higher phonological units such as paragraph or discourse are not considered in this paper.)

The units on each size-level have certain identificational contrastive features, marking the nucleus and margin of each unit. The larger size-level units are composed of units from the next smaller size-level. The identificational contrastive features of the larger units often account for allophonic variation in the smaller units of which they are composed.

Both the phrase and the word in Otomi are characterized by suprasegmental features of pitch and length, stress and rhythm; but under particular conditions, the stress and pitch of phrase contours may override the basic stress and tone of the phonological word. The accentual system of Mezquital Otomi is partially determined by features of higher level phonological units and partially by lexical contrasts of stress and tone.

In the present treatment, the syllable and phoneme are viewed as included or dependent units, representing lower but discrete levels whose structural status is described in terms of rhythm group levels. Thus a form such as *'?ù* 'salt' will be considered first as a rhythm unit, a word, which may also occur as a unit in a higher level, a phrase. Subsequently it may be described as a syllable of type CV composed of segmental phonemes occurring in definable slots in the syllable.

1.1. THE WORD. The basic word is an independent rhythm unit composed of stress groups of one or two syllables each. Heavy stress marks the nucleus of the word. A nucleus may be either short (one syllable) or long (two syllables).

In a two-syllable nucleus, stress falls on the first syllable. Length is a concomitant component of word stress and is therefore not contrastive on the phoneme level. A word may be minimally manifested by the nucleus, as in *'nũ* 'he looks at it', *'hũdì* 'sit down'. The nucleus may be preceded by one unstressed syllable, as in *rà'cé* 'the cold', *dì'pã'dì* 'I know'.

Words are classified as basic or complex. A basic word contains one nucleus,

³ The hierarchical concept utilized in the present discussion is based upon Kenneth Pike's theory (1954-60). A more recent study by him (1962) has helped in the solution of particularly difficult facets of rhythm patterns.

I am also grateful to Eunice Pike and Doris Bartholomew for helpful suggestions in the preparation of this paper. Eunice Pike's earlier study of prosodic features in a related language (1951) has thrown light upon similar phenomena in the Mezquital dialect, although her solution to the Mazahua problem was not handled hierarchically.

therefore one heavy stress. The nucleus with heavy stress may be preceded by a stress group with minor stress and may be followed by as many as three stress groups with minor stress. A complex word contains more than one heavy stress, and may contain a maximum of eight stress groups, two or more of which have major or heavy stress.

The border between stress groups in words is marked by slight decrescendo with controlled articulation of unstressed syllables, accompanied by tone sandhi in certain word patterns. The border between words in phrases is marked by pre-junctural features of abrupt, sharp decrescendo and lenis ballistic syllable release.⁴ In normally rapid speech a vowel and tone change may also occur in pre-junctural syllables in a type of phrase-medial sandhi. In more deliberate speech, juncture may be marked by an audible pause preceded by a controlled, tense articulation of the pre-junctural syllable. In some intonation contours this is a hesitation form.

1.2. THE WORD NUCLEUS. The nucleus of the word has two basic forms, short and long. The short nucleus is one syllable in length and is represented by the formula +C +(V+tone). The long nucleus is two syllables in length and is represented as +C +(VV+tone). The word nucleus is the domain of lexical tone. The syllable (prefix) immediately preceding the nucleus is also marked by a lexically contrastive tone.

The vowel of the short nucleus may be a vowel of any quality, with only one unit of length. One of three contrastive tones, /' high, /' low, or /' rising glide, occurs on the nucleus. Examples: 'pá 'he sells', 'pà 'he customarily goes', 'pě 'it is sticky'.

A long nucleus is so designated because it operates as one unit with two segments. In the word tone system, the segment of tone occurring on the first syllable is contrastive; the tone on the second is predictable in word-medial position. The three contrastive tone configurations are $\check{V}\check{V}$, $\check{V}\check{V}$, $\check{V}\check{V}$, illustrated by the following words: 'hλc'é 'he places something on the surface', 'hλc'è 'it (the fruit) is on the tree', 'hλc'è 'it spreads (e.g. a disease)'. Base forms of nuclei are determined in the position of maximum contrast, i.e. word-medial, rather than word-final, where phrase-final characteristics neutralize certain contrasts.

The second syllable of the long nucleus serves as a controlling frame in which the nuclear tone of the first syllable is stabilized. Because the overriding pitch of the intonational system involves a syllable in pre-pausal position (often the second segment of the long nucleus of a word), the base form of the second tone of the nucleus is determined in word-medial context, such as 'pătìbyà 'he changes it now'. Phrase-finally, 'pătì would most commonly occur as 'pătì, in which the tone of the base form of the nucleus is obscured by the intonational contour.

Because a short nucleus may occur before or after pause, its tone is more fre-

⁴ The terms 'controlled' and 'ballistic' appear in Pike's 1955 discussion of syllable types, and also in Pike 1957. Merrifield 1963 describes the contrastive function of controlled versus ballistic syllables in a Chinantec dialect. Bauernschmidt 1965 also describes the contrastive function of the two syllable types. In Mezquital Otomi, the terms are used to describe distinctive features of syllables, not contrastive syllable types as in Amuzgo and Chinantec; it may be noted, however, that all three languages belong to the Otomanguean family.

quently modified by intonation than the tone of the long nucleus (which always has at least one syllable between its stressed syllable and pause). Therefore the base form of the short nucleus must be determined by its occurrence in phrase-medial position. The distribution of a short nucleus with high tone in its base form is defective. The base form occurs before pause only with the normal non-emphatic intonation, which coincides with the high tone of the base form. In a phrase-medial environment, its alternant form has a glide tone.

Examples of the high tone in medial and final positions in the phrase are (with 'zì 'ate'): *bì'zì rà'hmé* 'he ate the tortilla', *bì'zì* 'he ate it'. In the following examples, the low tone occurs phrase-medially in its base form, but phrase-finally is modified by intonation (with 'dù 'died'): *bì'dù rà'détì* ... 'the sheep died ...', *bì'dù* 'it died'. The glide tone occurs phrase-medially and phrase-finally in its base form, as follows (with 'zǎ 'wood'): *bì'hyékà rà'zǎ 'má'ndě* 'he cut the wood yesterday', *bì'hyékà rà'zǎ* 'he cut the wood'.

In summary, the base forms of the short and long nuclei are always found in the following environments: The base form of the short nucleus with /^h/ or /^l/ occurs in phrase-medial position. The base form of the short nucleus with /^h/ is found phrase-finally when it occurs with the normal non-emphatic intonation contour. The base form of the long nucleus occurs in medial and nonfinal position in a simple word.

Two of the contrastive tone units occurring on the long nucleus are simple, /^h/ and /^l/, and one is complex, the glide /^h/. The glide begins at a lower level than high, and ends on high. It consists of two components, an onset of low tone and a peak of high tone. The end point is the nucleus of the complex tone, inasmuch as the two-tone segment parallels the function of the simple high tone in the word nucleus. Both the high tone and the high-ending glide are always followed by a counterbalancing low tone in the nucleus. The low tone is followed by a counterbalancing high tone. The noncontrastive tone of the second syllable represents a neutralization of two poles.

It is notable that the tone sequences /^hh/ and /^hl/ do not occur as base tones of the long nuclei. They do, however, occur in modified forms. In the system of tone dynamics based upon two tone ranges, high and low, a balance of the two opposing poles is required for the long nucleus in base forms.

In the high range of the tone system, the high level toneme is short, while the high-ending glide is long. The low toneme is longer than the high toneme, but shorter than the glide.

The allotones of the high and of the glide tonemes are conditioned by their occurrence in ballistic or controlled syllables, and by their placement in the word and the phrase. The major allotones of the high tone are:

Allotone 1 [²] is shorter than the basic high tone which occurs on the first syllable of the long nucleus of the word. This allotone occurs on ballistic unstressed syllables word-finally, as in *dì'vòl 'yábà* 'I live far away'.

Allotone 2 [²] is normal high level with a slight downglide. It occurs phrase-finally in normal non-emphatic intonation, as in *té 'gí'pèfi* 'What are you doing?'

The major allotones of the glide tone are:

Allotone 1 [¹] is a very long variant which occurs phrase-finally. In it the low

tone component is prominent, and the high tone component is ballistically released. Thus the high tone component is most prominent when it occurs on the stressed syllable of the long nucleus, as in *rà'zá* 'the wood'.

Allotone 2 [²] of the glide occurs in postnuclear syllables of the word. It is shorter in total length than the basic type, with a shallower glide than either of the other two varieties. An example is *'šíkágǐbyá* 'tell me (something) now'.

Words with a long nucleus fall into three subtypes as follows: (1) CVCV, (2) CV₁V₂, (3) CV₁hV₁. In subtype (1) the vowels are of non-identical quality, or they may be of the same quality if they are subject to the rule of vowel harmony. The first vowel may be any vowel, but the second vowel is typically /i/ or /e/, depending upon the height of the vowel in the first syllable and the nasal status of the word nucleus. (This system of vowel harmony will be discussed in §1.43.) In subtype (2), words are like those of (1) minus the consonantal onset of the second syllable. Words of subtype (3) have identical vowels in both segments of the nucleus, but the second has an onset of /h/. Examples of subtype (1) are: *'pá'cè* 'he goes up', *'hókì* 'he makes something', *'pá'dì* 'he knows it'. Examples of subtype (2) are: *'táí* 'he buys something', *'hálè* 'it falls (e.g. a leaf)', *'šúú* 'night'. Examples of subtype (3) are: *'á'hà* 'he is sleeping', *'dáhà* 'he doubts it'.

The glide on the short nucleus may be phonetically long, particularly in phrase-final position. If the syllable in which the glide occurs has heavy intonational stress, the total phonetic complex may be realized as a syllable of several moras. The compounding of the phonetic length of the glide on the short nucleus, plus the length of word stress, plus the length of emphatic intonational stress—all realized in a one-syllable rhythm unit—may result in an extremely long etic variant of that unit. The long variant is characteristic of calls, calculated for audibility at a distance. This phonetic manifestation of such words as *'zá* 'wood' and *'ngǔ* 'house' has been used as an argument to establish the contrastive length of vowels, or of geminate vowels in contiguous syllables; but because of the slot which the glide tone fills on the nucleus of the word (paralleling high and low tones and in contrast with them), and because of the variation of the length of the glide tone depending upon its placement in the word and in contrastive phrase types, it can be identified as a contrastive complex unit of tone, with a concomitant feature of variable length.⁵

⁵ After this paper was submitted for publication, I received a copy of an article by Bernard (1966) on Otomi tones. His treatment is essentially an affirmation of the Leon and Swadesh view, plus a set of ordered rules purported to 'force us to relinquish the notion that Otomi is a tone language at all'. Whereas Leon and Swadesh 'considered tones a predictable function of stress', Bernard declares that 'rising tone is not phonemic but is a predictable function of length' (15). My own findings are that actual data from the language renders both these positions untenable. Both stress and tone are contrastive, but in separate sub-systems of the phonological hierarchy (for the function of stress, see §1.1). Examples of rising tone contrasting with high and low tones in identical environments, both in pairs and triplets, are crucial data which Leon and Swadesh, as well as Bernard, unfortunately did not observe in their investigation. Thus, in accounting for all the data, it is evident that length is a function of the rising tone, not vice versa. Bernard erroneously affirms that 'the rising tone is exactly a function of length, and that there is NO ARGUMENT [emphasis supplied], in terms of instability of length, to suggest otherwise' (16). On the contrary, there is

1.3. WORD TYPES.

1.31. SIMPLE WORDS. Words of the simple type consist of a nuclear stress group, plus or minus prenuclear and postnuclear syllables. These forms are most frequently grammatical words—nouns or verbs consisting of a root (one syllable) or a stem (two syllables), plus or minus a prefix and plus or minus suffixes. Patterns built upon a short nucleus of one syllable are 'S and S'S: e.g. *'ʔyé* 'hand', *bì'zì* 'he ate it'. Patterns built upon a long nucleus (of two syllables) are 'SS and S'SS: *'hókì* 'he makes something', *bì'hyékì* 'he cut it'.

Simple words also occur when postnuclear syllables, with predictable minor stress, follow the nucleus (the third syllable following word stress has minor stress): 'SSS *'ʔúmbábì* ... 'give it to him ...'; S'SSSS *gì'xùtwábìbyà* 'you will pay him for it now'; S'SSS *dà'pàpábì* 'he will sell it to him'; 'SSSS *'šíkágìbyà* 'tell me (something) now'.

This pattern may be further expanded by additional prenuclear syllables (the first syllable of the word has minor stress): SS'SS *hìmbì'hyókì* 'he did not make it'; SS'SSS *'ʔgì'špábì* ... 'don't tell him ...'; SS'SSSS *hìmbì'ʔúmbábìní* 'he didn't give it to him there'.

1.32. COMPLEX WORDS. Complex words are composed of a cluster of two or more heavy stresses occurring in patterned sequence. There is restricted co-occurrence of tone in certain of these patterns. The stresses may occur in contiguous syllables, or in contiguous stress groups with intervening unstressed syllables. Words with heavy stresses in contiguous syllables are frequently the phonological manifestation of grammatically compound words. Examples: *'dá'zǎ* 'banana', *'šú'hǎǎ* 'an inconvenience'.

Certain grammatical suffixes, particularly *-hě* 'we (excl.)' and *-ʔbě* 'we (dual)' form complex stress groups with the stem to which they are appended, as in *'cì'hě* 'we (excl.) eat'. Also certain auxiliary grammatical forms, such as *'mǎ* 'going to', preposed to a stem, form complex stress groups: *'mǎga'nǎ* 'I'm going to see'.

Heavy stress may occur in contiguous or alternate syllables in complex words of three or four syllables. Examples: *'sìs'těhè* 'baptism', *'ʔǎšá'ngǎ* 'white house', *'θéngá'dǎní* 'red flower'.

strong evidence to establish the contrast of rising tone in the tone system, and the variability of its length both in the word and the phrase (see §2.1).

In his discussion of diphthongs, Bernard declares that 'in every case of diphthongs, a rising intonation is to be observed phonetically' (16). Again, the data controvert this statement. Bernard's statement that 'the combination low-high is automatic in clusters' (17) cannot be sustained.

The overriding force of intonation patterns, which obscure and sometimes neutralize the contrast between high, low, and rising tones of words, accounts for much of Bernard's difficulties with tone and length. That this is a basic problem is clear from his own statement that 'native speakers, no matter how hard they were pressed, could not shorten any monosyllables marked by a phonetic rising tone when these were repeated in ISOLATION' [emphasis supplied] (17). This is precisely my observation. The PHONETIC length of the rising tone is variable, and finally or in isolation may consist of several moras.

Bernard's 'lexical rules' (18-9) do not cover all the data, and are consequently defective. Ordered rules of the variety he suggests could, indeed, be formulated; but an enlarged set of such rules would be necessary, with subsets to account for (1) modification of basic tone sequences in words, and (2) modification due to intonation.

Clustered stress in complex words acts as a nucleus to which subordinate stress groups may be preposed or postposed. Examples: *híntóbi'dà'má'pá'dì* 'he didn't know anyone right away', *híngà'mǎgà'cλñ'á'ì* 'I am not going to visit you', *híndà'égà'tùtwábìbyà* 'I didn't come to sing to him now'.

If the tone of a stressed syllable in a cluster is a glide, the tone on the preceding syllable is restricted to high or glide. Examples: *dí'á'há'hě* 'we (excl.) are sleeping', *dá'hántwábì'bé* 'we (dual) saw him'. A sequence of glides may occur contiguously in complex words, as in *'mǎgà'sú'hñǎ'í'hě* 'we (excl.) are going to inconvenience you'.

1.4. WORD SANDHI. Words are subject to both internal and external sandhi. Internal sandhi refers to changes between syllables within the word. External sandhi is of two types: changes word-finally within the phrase, and phrase-final modifications involving intonational morphemes.

These types of sandhi turn upon an axis of prosodic features, of which the two contrastive types have been discussed, namely stress and tone. Three other non-contrastive factors enter into the sandhi system: ballistic versus controlled articulation of syllables; nasality as a long component of the syllable or word; and vowel quality, operating in a vowel harmony system which involves a high versus low contrast. The five factors which function in the total sandhi system may be ranked as follows:

(a) **STRESS.** Word and phrase rhythm are determined by heavy stress, which outranks other prosodic features. Within the stress system, three degrees of intensity are recognized, two of which are contrastive: intonational stress, which is loud and long; and word stress, with a loud-long component significantly less than that of intonational stress. Non-nuclear stress groups within words are marked by minor or light stress.

(b) **TONE.** Word tone has a dual patterning in the sandhi system, involving high-low and short-long dimensions. These may be charted as follows:

	SHORT	MEDIUM	LONG
HIGH	/		\
LOW		\	

Within the tone system, level high and level low tones are simple, in contrast to the glide which is complex and phonetically long.

(c) **SYLLABLE ARTICULATION.** Ballistic and controlled syllables do not manifest contrastive units, but are components in certain types of internal and external sandhi. Controlled syllables in words function as longer units than ballistic syllables. These two types of syllables are counterbalanced in computing the total complex of phonological factors in word construction and intonational contours. A combination of tonemes, plus syllable articulation, yields the following intonemes: (1) /R/ (rise) represents an intoneme higher than /' with a ballistic component /-h/, manifesting the morpheme 'emphasis'. (2) The normal high intoneme is /' with /-h/. These two intonemes operate in the high range in the intonation system. (3) /D/ (drop) is manifested variously by /' and /'/, depending upon its occurrence on a stressed or unstressed syllable, and has a component of glottal control /ʔ/ following the tone. (4) The glide intoneme is

manifested by controlled articulation which prevents the end point from rising to as high a range as /ʌ/ with ballistic release.

(d) **NASALITY.** The nasal component of a vowel or a consonant controls or modifies the length of tone within a word, and also the height of a vowel. Nasality may thus be assigned a unit of length in the sandhi system.

(e) **VOWEL HEIGHT.** Vowels which affect sandhi are high /i/ and /e/, and low /a/. In internal and external sandhi, high vowels function as shorter than low vowels.

One type of internal word sandhi affects word tone patterns, according to the placement of tones in the word. Changes of tone in basic forms may be described as occurring non-prepausally (word-medially and phrase-medially) or phrase-finally. Tone restrictions are due to position in both simple and complex words.

1.41. TONE CHANGE IN THE SIMPLE WORD. The basic high tone of the short nucleus in word- or phrase-medial position appears as the glide tone; thus the word 'cī 'he eats' occurs as *māgā'cīgā* 'I (emph.) am going to eat', and 'cī rā'hmé 'eat (imperative) the tortilla'.

A high tone on the third syllable of an affixed simple word occurs as the glide tone in medial position in the word or phrase. This variation may be noted in the following examples: in phrase-final position, 'šipābī 'tell him'; in phrase-medial position, 'šipābī ... 'tell him ...'; in word-medial position, 'šipābībyā 'tell him now ...'

Another type of tone change affects the long nucleus of the CV₁hV₁ type, with a high-low tone configuration. If the second syllable of the nucleus is apocopated, the high tone of the first syllable becomes low. Note the change from 'ʔá'hàⁿ to 'ʔàⁿ- in the following forms: *dí'ʔá'hàⁿhà* 'we (incl.) are sleeping' alternates with *dí'ʔàⁿhà*. Note the change from 'ʔbáì to 'ʔbà- in the following forms: 'ʔbáì 'núbyā *xà rá'ngũ* 'he is now in his house' alternates with 'ʔbàpyā *xà rá'ngũ*.

One specialized type of change affects only the glide tone of the short nucleus. If the vocalic peak of the nucleus is a nasalized or nasalizable vowel, and if a nasal consonant occurs in the onset preceding the vowel peak, the glide tone is changed to low tone when an element is postposed to the nucleus. Thus 'ngũ 'house', *má'ngũgá* 'my (emph.) house'; 'ndě 'become late', *dí'nděbyá* 'it is now late'.

1.42. TONE CHANGE IN THE COMPLEX WORD. Tone sequences in complex words are restricted according to the combined occurrence of long and short nuclei. When a long nucleus is followed directly by a short nucleus or another long nucleus, the tone of the second syllable of the word is always high, as in 't'úšá'ngũ 'white house', 'hógá't'ladé 'good news'. Four-syllable Spanish words, with lexical stress on the third syllable and secondary stress on the first syllable, are incorporated into the Otomi phonological system following the stress and tone pattern of the last cited form; thus such words as *presidente* and *municipio* occur in Otomi as 'pré'sí'dénté and 'mú'ní'sípyó. In phrase-final position with normal non-emphatic intonation /#/ , these words have sequences of all high tones. When a short nucleus is followed by a long nucleus, the third syllable of the word may be either high or low, as in 't'úš'fáni 'white horse'; and this form

may be followed by another short nucleus, as in *mà'tʷǎš'fàni'hě* 'our (excl.) white horse'. If the last two syllables of the word constitute a long nucleus, the last syllable may be either high or low, as in *'tʷǎš'tʷǎb'cʷǎdì* 'little white pig'. If the third syllable of the word is a suffix, the tone on that syllable is a glide; e.g. *dí'sú'hǎǎ'í'hě* 'we (excl.) are bothering you', *gà'tútuvábi'hě* 'we (excl.) will sing to him'.

A simple or a complex word may also include one or two prenuclear syllables, with a permitted tone sequence of high or glide on the first syllable, and high or low on the second syllable, as in *'ǎš'kí'mǎgé* 'don't go', *hím'bi'sú'hǎǎ* 'he didn't bother (anyone)'.

1.43. VOCALIC HARMONY. Another type of internal sandhi affects the height of the second vowel occurring in the long nucleus of a word of the CVCV and CV₁CV₂ types. If the first vowel is of the mid front variety, /e/ or /Δ/, and if no nasal component (consonantal or vocalic) occurs in the nucleus, then the second vowel, normally /i/ in the long nucleus, becomes /e/. This system of vocalic harmony reflects a distinction of nasal versus non-nasal nuclei in the word. Examples: *'hó'tí* 'he comforts (someone)', *'hǎ'tʷè* 'he pretends'; *'hà'í* 'he takes it out', *'hǎè* 'it (the leaf) falls'; *'hè'kí* 'he deepens it', *'hékè* 'he divides it'; *'mà'dí* 'he loves', *'mǎtè* 'outside'; *'ǎni* 'chicken', *'ǎdè* 'he hears'.

1.44. TONE CHANGE IN THE PHRASE. The border between words constitutes a potential pause point. The features manifested at this prejunctional spot are correlated with the difference between rapid speech forms and deliberate speech forms. The rapid variety of articulation is characterized by types of sandhi occurring between words, while the deliberate speech preserves isolated or basic forms of words. In fast speech the most common features of word juncture are rapid decrescendo and short lenis ballistic syllables. These features are often accompanied by a lowering of the tone on the prejunctional unstressed syllable, and the substitution of low vowel /a/ for high vowels /i/ and /e/. Examples:

DELIBERATE	FAST	
<i>'ǎmbì rà'hmé</i>	<i>'ǎmbà rà'hmé</i>	'he gives him the tortilla'
<i>'hókí rà'ngǔ</i>	<i>'hókà rá'ngǔ</i>	'he makes the house'

An alternate form of *'ǎmbì*, namely *'ǎmbábǐ*, does not occur phrase-medially in fast speech. The third syllable of the word (the first syllable of a postnuclear stress group) is not subject to the sandhi characteristic of the second syllable of the nuclear stress group. The alternant form *'ǎmbábǐ* is used only in deliberate phrase-medial articulation, or in phrase-final position (the form **'ǎmbábá* never occurs.)

If the consonant preceding the vowel in the prejunctional syllable is /n/, a special sandhi form occurs in fast speech. The nasal is reinforced by the addition of a homorganic voiced stop, as in the following example:

DELIBERATE	FAST	
<i>'fàní rà'déhè</i>	<i>'fàngà rà'déhè</i>	'he throws out the water'

In very fast speech, the postnuclear syllable of the first word and the prenuclear syllable of the second word in the forms above are collapsed into one portmanteau syllable. In the form *'fàngrà'déhè*, the syllable /ngra/ represents

a coalescing of two unstressed syllables into a syllable in double function between two words.

The low tone in isolated forms or in phrase-final position with normal non-emphatic intonation /#/ changes to simple high tone. For example, note the tone of 'dù 'die' in *bì'dù 'má'ndě* 'he died yesterday', *bì'dú* 'he died'. The basic form of 'déhè 'water', when in phrase-final position with non-emphatic intonation /#/ , has a tone change on the unstressed syllable: *dá'cí rà'déhé* 'I drank the water'. Other tone changes due to intonation, and involving an intoneme plus /?/, will be discussed below under phrase-final intonation types.

2. THE PHRASE. The phrase is the level above the word, and is the largest unit to be described in the present analysis. (Brief reference is made to a larger unit, the macro-phrase.) It is marked by terminal pause with contrastive prosodic features occurring on the phrase nucleus, i.e. the word in prepause position. The bundle of features marking the nucleus form an intonation contour.

As a rhythmic unit, the phrase consists of one or more words. Normally, in a phrase several words long, a decrescendo in intensity and a downdrift of the total pitch profile spreads over the whole phrase preceding the nucleus. There is a crescendo of speed and intensity on the nucleus. Word stress may be reinforced by stress of the phrase nucleus, or the placement of word stress may be shifted and overridden by the heavier stress of the contour.

Intonational pitch may radically change basic word tone. The tone of the word nucleus in phrase-final position is subservient to the larger system of phrase prosody which is superimposed upon that of the word system. The pitch level of the contour is generally phonetically higher than the level of the downdrift immediately preceding the phrase nucleus. When the features of word prosody coincide with features of phrase prosody, this phenomenon may be considered a fortuitous congruence of two units operating on two different levels in the hierarchy. The homophony of units in such cases is due to the overlapping of the two systems at given points.

2.1. PHRASE-FINAL INTONATION. The following prosodic components, appearing in patterned combinations on the phrase nucleus, form contrastive contours: (1) heavy stress; (2) one of three intonemes; (3) terminal ballistic versus glottal-controlled articulation, accompanied by corresponding variations in length.

The stressed syllable of the phrase nucleus is heavier than normal word stress, and phrase stress is accompanied by more length than word stress. There are three types of pitch, two in the high range and one in the low. The high pitch occurring on the final syllable of the normal contour is the most frequent pitch of the intonation system; this intoneme, which is slightly higher than high tone occurring in basic forms, is marked by the symbol /#/ . An intoneme /R/ (rise) is contrastively higher than the normal high intoneme, and occurs on the phrase nucleus in certain emphatic contours. A contrastive low contour based upon the low intoneme /' / is designated by /D/ (drop). Intonation contours occurring on the phrase nucleus are summarized in Table I.

	CONTOUR TYPE	PITCH ON FINAL SYLLABLE	STRESS	CONTOUR CODA	MEANING
Non-emphatic:	# (normal)	normal high	coincides with word stress, but heavier	ballistic fade; optional downglide	unemotional predication
	D (drop)	sharp drop	coincides with word stress, but heavier	glottal control	mild surprise; interrogation for confirmation
Emphatic:	#! (reverse-normal)	normal high	stress shift to last phonetic syllable	ballistic fade; downglide with rapid decrescendo	general emphatic
	R (rise)	extra high	coincides with word stress, but heavier	ballistic fade; downglide with long decrescendo	used in calls, and in animated conversation
	R! (reverse-rise)	extra high	stress shift to last phonetic syllable	ballistic fade; downglide with rapid decrescendo	strong emphatic
	D! (reverse-drop)	sharp drop	stress shift to last phonetic syllable	glottal control	irritation, anger, scolding

TABLE I. DISPLAY OF THE CONTRASTIVE FEATURES OF THE PHRASE NUCLEUS

Contours are of two basic types, emphatic and non-emphatic. Non-emphatic contours are of two types:

(1) **NON-EMPHATIC NORMAL.** This is the most common type of contour which occurs in narrative discourse or unemotional statement. The stress of the nucleus of the normal contour coincides with that of the underlying word, with typical phrase stress augmenting the word stress. The normal contour has two allo-contours, defined by variation in pitch. The pitch of the first of these contours coincides with the basic tone of the underlying word, with the slight variation mentioned above. The second occurs in the following case: if the tone of the second syllable of a word with a long nucleus is low, that tone may be replaced by the high tone of the normal contour. In both types, the coda of the final syllable is a fast ballistic fade. The allo-contour with high tone may be released in a relaxed downglide. Examples of the normal contour are: ['mähá] or ['mähà] /'mäha/ 'let's go', [híndí'pǎⁿdí] or [híndí'pǎⁿdì] /híndí'pǎⁿdí #/ 'I don't know'. The normal contour with the low intoneme sometimes occurs as the repetition in a sequence—when forms are elicited from a speaker, for example—or as a slight reaffirmation of a first utterance. Apart from connoting this type of sequence closure, no difference in meaning has been noted.

(2) **NON-EMPHATIC DROP.** The contrastive feature of this contour is the abrupt drop in pitch on the word nucleus. In the case of a long nucleus, the pitch of the second syllable drops to a level below any of the preceding tones in the phrase, and is followed by a glottal coda. In the case of the short nucleus, the low tone and the glide tone are dropped, and are followed by a glottal coda. The high tone on the short nucleus not only drops but is glided, and is also checked by a glottal coda. The meaning of the contour is 'mild surprise' or 'interrogation for confirmation'. Examples are: [gí'mǎ?] /gí'má D/ 'you are going?'; [gí'hóki?] /gí'hóki D/ 'you are making it!'

The emphatic contours are of four types:

(1) **REVERSE-NORMAL.** In this contour there is a normal high intoneme on the final syllable, but word stress is shifted to the last phonetic syllable in the

phrase nucleus. The coda is a ballistic fade with rapid decrescendo on a downglide following the high intoneme, as in [mǎ gǎmpè'fí] /'mǎ gǎmpèfi #!/ 'I'm going to work!' When the phrase nucleus is a word with the glide tone on a short nucleus, the stress may fall on the second segment of the phonetically long syllable, on which the high part of the tone occurs. The resulting contour may be realized as two phonetic syllables, as in [gǎ'mǎ mà'ngù.ú] /gǎ'mǎ mà'ngǔ #!/ 'I'm going to my house!'

(2) **RISE.** In this contour, extra high pitch occurs simultaneously with heavy stress. A long decrescendo and downglide typically follow the peak of stress, ending in a ballistic fade. This contour is used for calls and for animated, emphatic conversation. Examples: [bá''ěnhé^a] /bá''ěhe^a R/ 'come here!', [ʔbēsθò bì'má:] /ʔbēsθò bì'má R/ 'he went away in a hurry!'

(3) **REVERSE-RISE.** This contour is like the simple rise, except that phrase stress is very heavy, and is shifted to the last syllable of the phrase nucleus, regardless of where the stress would normally fall in the underlying word. This reversed stress results in a strong final emphasis in the utterance. In the case of the glide tone on the short nucleus, heavy stress falls on the second segment, i.e. on the high tone component. The intoneme is a very high variant, with an abrupt downglide. Examples: [bá''ěnhè^a] /bá''ěhe^a R!/ 'you come here!!', [mǎhà màngù.ú] /mǎhà mà'ngǔ R!/ 'let's go to my house!!'

(4) **REVERSE-DROP.** In this contour the heavy emphatic stress is shifted to the last syllable of the nucleus of the contour, with an abrupt drop in tone followed by a glottal coda. The meaning of this contour is 'irritation', 'anger', or 'scolding'. Examples: [gí''à''kèʔ] /gí''à''ke D!/ 'you mean you're going to sleep?', [híngí'ně rà'hmé''byàʔ] /híngí'ně rà'hmébya D!/ 'then you don't want the tortilla now!' This contour is commonly used in rhetorical questions for scolding.

2.2 THE MACRO-PHRASE. A cluster or sequence of phrases, each of which terminates medially in a contour normally occurring before silence, forms a macro-phrase. The medial contour in the macro-phrase precedes an audible pause which may be fairly long in *lento*, deliberate speech. Examples of this phrase type are: [bì'yǎtʔi 'xàrà'ngúmfrì | 'ěná ||] /bì'yǎtʔi 'xàrà'ngúmfrì # 'ěna #/ 'he entered the stable, he says', [dí'hñǎ^a yà'mà'dó | gí'tàiʔ ||] /dí'hñǎ^a yà'mà'dó # gí'tài D/ 'I brought the eggs—will you buy them?' In the last macro-phrase, *yà'mà'dó* 'the eggs' constitutes a normal contour type, while *gí'tài* 'you buy' represents a non-emphatic drop, indicating a question requiring a yes-or-no answer. Although the pause following 'the eggs' is brief, the contour preceding it is of a terminal type.

2.3. PHRASE PROFILE. Two main types of downdrift have been observed in narration, particularly in taped text. The first is a smooth profile, with a continuous fall of pitch over the phrase until the first major juncture, as in the macro-phase [mǎga'ʔumbà 'rétʔà 'yàsól'dádò | 'pàdà'sùpá rà'ngǔ | 'pàdà'sùpá rà'bòxá^a ||] 'I am going to give him ten soldiers, to guard the house, to guard the money'.

Another main type of downdrift is in steps, with deliberate *lento* articulation, accompanied by a long pause after each successive step down to the lowest level in a nonfinal macro-phrase: [wá'hǎ^awà rà'nděgá | 'sǒpá | 'dèθá^a |] 'Go and bring

the lard ... soup ... corn ...' In this latter phrase profile, each pause is long and is preceded by a final contour of the normal type, but the nonfinal macro-phrase lacks the features of the phrase nucleus. This type (often associated with lists) is relaxed preceding juncture, and lacks typical phrase stress. A final contour, even of a deliberate *lento* type picks up speed and intensity on the nucleus.

3. SYLLABLE DYNAMICS. The basic shape of the emic syllable is CV, the nucleus of which is a one-vowel peak. The onset may be any consonant. A coda occurs only in word-medial position. In phrase-final position, a phonetic glottal closure signals the drop intoneme. Two vowels of different quality in sequence represent two emic syllables. An etically long vowel constitutes only one emic syllable, though the vowel may be re-articulated and even though the second part of the re-articulated vowel may have intonational stress. The etic syllable [zaa] or [za:] is emically /za/. At the word level this syllable may be manifested as the unit 'zǎ 'wood'. At the phrase level this word may be variously manifested as ['zǎ.á], or ['zǎá], or in phrase-final as an emphatic contour ['zǎ.'á:]. A ballistic, fading syllable may be very short, and a controlled syllable on which the glide tone occurs may be quite long.

The syllable onset may contain from one to three consonants. The CCV type occurs in such forms as 'mbòt 'black', 'hmé 'tortilla'. The CCCV type occurs most frequently in complex prenuclear syllables, e.g. škrt'ù 'when you have died'.

A syllable coda of one or two consonants occurs only word-medially, where consonant clusters may occur at the juncture of two syllables; e.g. 'hñéc' m'yé 'high cliff', 'nšúp'c'ádì 'sow (female pig)'. In the first example the syllable patterns are CCVCC.CCCV; in the second, CCVC.CCV.CV.

Only one type of cluster may occur in the onset of the first syllable of the word nucleus; this is describable in terms of (1) glottal versus nonglottal elements, (2) nasals, and (3) the presence of palatals. The total consonant cluster may be symbolized by the formula $+(\pm N/? \pm ?/h) +C$ (Bartholomew 1960:323). The onset of the initial syllable must have a nuclear consonant, and at least one consonant from within the parentheses. The nuclear consonant is usually a stop or affricate (or /h/), with palatals and nasals as satellites in the cluster. Medially in words, especially in compounds, two glottal stops may occur in a cluster, one preceding and one following C.

The structure of the syllable immediately preceding the stem of the word is quite restricted. Only the vowels /i/ and /a/ may occur in the nucleus of that prefix syllable. Consonants other than stops and affricates, frequently /s š r/, occur in the prenuclear syllable in such combinations as /škr str br/. Examples: brá'hñǎ" 'it was brought', strá'hñèl 'it may be difficult'.

The prenuclear syllable of the word is also a limited submatrix for the distribution of tone: only /' / and / / occur on this syllable. The glide tone occurs only on the nuclear (stressed) syllable which follows, or on postnuclear stressed syllables.

4. PHONEME SETS. The phonemes of Mezquital Otomi have been variously described by the linguists who have investigated the dialect. The viewpoint taken in the present description of phonemes and hyper-phonemes is that units in the higher levels of the hierarchy substantially shape the variant occurrences of units from lower levels. Phonemes are particles from the lowest level which function in sets in higher levels.

4.1. CONSONANT SETS. As may be seen in the schematic representation of phonemes in Table II, the consonant phonemes are members of several asymmetrical sets. There is a set comprising the voiceless stops and affricate /p t c k/: 'pλnì 'he goes out', 'tūdi 'it is soft', 'càptì 'he tries (it)', 'kù 'brother'. There is a corresponding set of three voiced lenis fricatives /b d g/: 'béⁿ 'robber', 'dó 'rock', 'gòstì 'door'. There is a set of voiceless fortis fricatives /f θ x/: 'fáni 'horse', 'θógi 'he passes', 'xǎ 'bean'. Sibilants are a small asymmetrical set of phonemes /s z š/ which play an important role in the system: 'sùnì 'cooked corn', 'zàfrì 'fodder', 'šáhà 'turtle'. Nasals are /m n ñ/: 'mũ 'squash', 'nũ 'he sees it', 'ñáⁿ 'he speaks'. The semiconsonants and one vibrant form a set /w r y/: 'wá 'foot', 'rà'ngũ 'the house', 'yó 'candle'. The glottal phonemes, /ʔ h/, also form an important subset: according to an Otomi vocabulary listing, a glottal component fills the onset slot of the initial syllable in about fifty per cent of the words of the language.

The allophonic system of the consonants is quite symmetrical. The lenis and fortis fricative sets have sets of allophones following a nasal consonant: /b d g/ have stop allophones in ['mbǎⁿdì] 'a wise person', ['ndó] 'hail', ['ngò] 'fiesta'. Fortis fricatives have aspirated stop allophones: ['mp^hèf] 'a slap', ['nt^hó] 'an explosion', ['nk^hù] 'sister'.

4.2. VOWEL SETS. There are ten contrastive vowel phonemes, forming two asymmetrical sets; these are displayed in Table III. The primary set is differentiated on the basis of potential or actual nasalization. The vowels /i e a u/ function in the total system as if each had a nasal counterpart. Actually, phonemic contrast of nasality has been established for only two, /eⁿ/ and /aⁿ/; witness numerous pairs such as 'pé 'he weaves', 'péⁿ 'he steals'; 'mǎ 'it is long', 'mǎⁿ 'he says'. The vowels /i/ and /u/ are considered basically nasal, with non-nasal variants: the non-nasal variants occur less frequently than the nasal. In certain idiolects or subdialects, there is almost complete fluctuation between the oral and nasal varieties: variants occur as in ['tíhì] or ['tíⁿhì] 'he runs', ['kù] or ['kùⁿ] 'brother'.

	LABIAL	APICAL	PALATAL	VELAR	GLOTTAL
voiceless obstruents	p	t	c	k	ʔ
voiced fricatives	b	d		g	
voiceless fricatives	f	θ		x	h
voiceless sibilants			s	š	
voiced sibilant			z		
nasal	m	n	ñ		
semi-consonant and vibrant	w	r	y		

TABLE II. OTOMI CONSONANT SETS

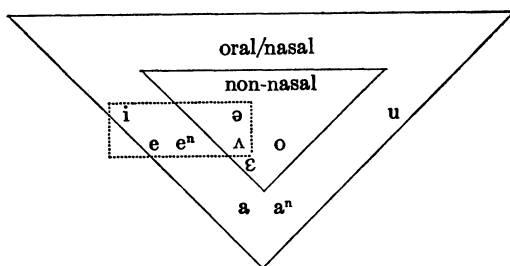


Table III

The phoneme /aⁿ/ has dialectal or idiolectal variants [ə] and [əⁿ]. Unlike the other nasal vowels, /aⁿ/ does not correspond in quality to its oral counterpart, but is backed, approaching the position for [ə]. This is especially marked in marginal dialects of the area. In some idiolects, particularly in the case of Otomies who speak as much or more Spanish than Otomi, this variant closely approaches the pronunciation of /o/, as in /'dáⁿzǎ/ 'banana', which becomes ['dózǎ]. However, even such speakers differentiate in the total system of their idiolect between /aⁿ/ (with its variants) and /o/.

The non-nasal set of vowels has the members /ə ɛ o/. Examples are 'xǎ 'bean', 'ʔɛni 'chicken', 'θɛni 'red', 'yóhó 'two'.

A small subset of vowels, including both nasal and non-nasals, interact in the system of vocalic harmony at the word level. This subset includes /i ə ɛ ɛⁿ/, and is enclosed by the dotted line in Table III.

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