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THE TONAL SYSTEM OF A THIRD MIXTEC DIALECT

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0. Introduction
1. Basic tonemes
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0. This paper is in the nature of a continuation of my previous paper,¹ adding a third Mixtec dialect to the two previously compared. Mixtec is characterized by numerous divergent dialects. The mountainous topography of the region, and the relatively autonomous life of its widely separated communities, have no doubt contributed to the present diversity even in neighboring villages. While on first inspection there seems to be a good deal of intercommunication in that the Indians travel extensively, carrying their scanty products for sale in neighboring markets, closer analysis reveals that communication is largely superficial, consisting only of contact on a trade basis, and not extending into intimate life situations.

The dialects of San Miguel el Grande and of San Esteban Atatláhuca, the first and second Mixtec dialects to be analyzed, are considerably divergent in their patterns of tonal perturbation. This paper will add the tonemic analysis of yet a third dialect to the two previously described, that of the town of Santo Tomás Ocotepec, situated at a distance of approximately five hours by foot

¹ A Comparison of Two Mixtec Tonemic Systems, *IJAL* 19: 85-100 (1953), a paper which compares the tonemic systems of the dialects of San Miguel el Grande and San Esteban Atatláhuca, located approximately two hours walking distance apart. For a description of the tonal system of San Miguel, see also: Kenneth L. Pike, *Tone Languages*, University of Michigan Publications, Linguistics IV, (Ann Arbor, 1948), 77-94.

trail northwest of the municipal center of San Esteban.²

1. Toneme levels for all three dialects will be symbolized in this paper by superscript numbers 1 (the highest level) to 3 (the lowest level) for the SM and ST dialects, which have 3 levels of phonemic tone; and 1 to 4 for SE, which has 4 levels of phonemic tone. Note carefully that SE toneme 3 is an additional intermediate toneme between what corresponds to SM and ST tonemes 2 and 3, and SE toneme 4 corresponds to SM and ST toneme 3. The additional toneme in SE occurs basically only in a limited list of morphemes with pattern 1-3. However, SE toneme 3 occurs very extensively when the basic tonemes are perturbed in sandhi or in certain grammatical constructions.

The ST dialect, in common with SM, has three phonemic tone levels (tonemes). These yield the following possible tone couplets:³ 1-1, 1-2, 1-3; 2-1, 2-2, 2-3; 3-1, 3-2, 3-3. Each of these nine tone couplets occur in ST. This is in contrast to SM and SE, where the 3-3 (or *4-4 for SE) couplet does not occur. The 3-3 tone couplet is a reflex not basic to

² Names of the three towns are abbreviated in this paper as follows: Santo Tomás Ocotepec, ST; San Esteban Atatláhuca, SE; San Miguel el Grande, SM. The data for this paper were secured during field trips under the auspices of the Summer Institute of Linguistics during the years 1954 to 1956, in collaboration with Ruth Mary Alexander who checked with me the tonal glides, extremely difficult to hear, which develop in the completive aspect of verbs. I am also indebted to Kenneth L. Pike and Viola Waterhouse for help in editing the paper.

³ See Kenneth L. Pike, *op. cit.*, pp. 79-81, for description of the disyllabic character of Mixtec morphemes, with their two units of tone, called tone couplets.

Mixtec. Longacre⁴ reconstructs no proto-Mixtec tone couplet with two low tonemes. Morphemes in ST which have a basic 3-3 tone couplet comprise the largest portion of those which in SM have 2-3, and in SE either 2-2 or 2-4 couplets. Compare the following:⁵

ST nu³ni³, SM nu²ni³, SE nu²ni⁴ *corn*;
ST ta³ta³, SM ta²na³, SE ta²Na⁴ *medicine*;
ST mi²nte³, SM bi²nja³, SE bi²nde⁴ *nopal cactus*;
but: ST ñu²u³, SM ñu²u³, SE ñu²u² *town, city*;
ST sa²a³, SM tã²sa²a³, SE sa²a² *bird*;
ST ñu²u³, SM ñu²u³, SE ñu²u⁴ *fire*.

2. In the ST dialect, perturbation is much less extensive than in the two previously studied systems. However, non-phonemic tone modifications and optional or irregular perturbation complicate the picture, as they do also in SE. In SM there is automatic type (b) perturbation (to higher tone levels) in all syntactic constructions, following certain members of all tone couplet classes except 3-2, 2-1 and 1-3; the category of each morpheme in respect to whether or not perturbation takes place after it, must

⁴ Robert E. Longacre, Proto-Mixtecan, Publication No. 5 of Indiana University Research Center in Anthropology, Folklore, and Linguistics (1957). The ST data were not available to him when he made this comparative study.

⁵ The phonemes of the ST dialect are as follows: voiceless unaspirated stops /p, t, č, k, k^w, ʔ/(ʔ/ usually very lightly articulated; all others voiced in clusters after nasals); fricatives /b, d, h/ (/b and h/ very lightly articulated); sibilants /s, z, š, ž/ (/z/ has acquired phonemic status in this dialect through the loss of n from the phonetic cluster [nz], leaving s and z in contrast; see 3); nasals /m, n, ñ/ (/n/ has allophone [ŋ] in clusters before /k, k^w, h/); liquid /l/; oral vowels /i, e, a, o, u/; nasalized vowels /ĩ, ẽ, ã, ũ/; semivowel /y/ (occurring only as second member of a morpheme initial consonant cluster); tonemes /1, 2, 3/ as described in 1.

The SM and SE vowels /ə/ and /ɘ/ do not occur in ST, where they merge with the /i/ and /ĩ/ vowels; SE /N/ does not occur in ST. SM and SE unit phonemes /^mb, ⁿd, ⁿj and ⁿg/ are treated as clusters /mp, nt, nč, nk/ in ST, because in addition to their frequent occurrence within the morpheme, the latter three also occur inter-morphemically; cf. 3.

be memorized.⁶ In SE there is automatic type (b) perturbation (to higher tone levels), type (c) perturbation (to lower tone levels), and also a special perturbation in certain grammatically close-knit sequences, called SPECIAL SEQUENCES.⁷ The ST dialect, however, admits perturbation only in such special sequences. The special sequences with which these perturbations are found are substantially as in SE: 1. noun + descriptive adjective; 2. head noun + noun or (rarely) verb acting as descriptive modifier; 3. locational or introductory noun + noun or dependent clause; 4. head verb + noun modifier.

Special sequences of ST verb auxiliary + main verb are treated separately in this study because their tonal action is in some cases distinct from that of other special sequences.

Most of the morphemes which act as locational or clause introducers in special sequences are body parts; when they occur as the first member of a special sequence they may be translated by English prepositions. They are listed here with both their primary meanings and their preposition-like meanings when occurring in special sequences: nu³u³ *face, eye* ~ *to, at, where*, si³ki³ *spine* ~ *on top of, against (someone)*, he³e³ *foot* ~ *at the foot of, in behalf of*, žu²u¹ *mouth* ~ *at the mouth of, ža³ta³ back* ~ *back of, outside*, ʔi²či² *road* ~ *toward, to or from the direction of*.

One morpheme is limited to the position of introducer of a dependent clause: ha³a³ *that, that thing*; in SE and SM this morpheme always causes perturbation of certain tone couplets; in ST it consistently perturbs some tone couplets, optionally perturbs others, and does not perturb others.

As in SE, there are a few such locational or introductory morphemes which constitute a sub-group following which perturbation does not occur. They are: ʔi³ni³ *in, inside*;

⁶ See Pike, op. cit., pp. 77-8.

⁷ See Mak, op. cit., pp. 88-95.

či³hi² *abdomen, inside of, underneath*; hi²žo² *by the side of*; la¹do³ *one side of* (Span. lado).

As in SE, it is difficult to make a neat listing of the special sequences in terms of perturbation occurrence. In some special sequences, perturbation is predictable and regular. In other grammatically parallel sequences, perturbation takes place optionally or not at all, or results in different developed couplets from the regular pattern. Thus, there are many sub-groupings and alternants in the resultant tone patterns. One has the impression that tonal perturbation in special sequences is in a state of flux, being a remnant of an earlier more regular and extensive perturbation pattern in either special sequences or in all syntactic environments.

For ST, then, we may state that, aside from irregularities, morphemes in each tone couplet pattern which occur as the first member of a special sequence may cause tone perturbation of following morphemes, as discussed below. Whereas in the other two dialects the category of each morpheme in respect to perturbing influence must be memorized, in ST all of those morphemes occurring as the first morpheme in a special sequence potentially have the power to perturb, with the above reservations.⁸

The nine basic tone couplets of ST fall into six groups according to how their initial tonemes are perturbed when these couplets occur as the second member of a special sequence. The pattern of perturbation of the second morpheme in a special sequence depends for the most part on the final toneme of the preceding morpheme and on the initial toneme of the morpheme being perturbed.

The patterns of perturbation in special sequences are given below.

If 1-1 is the second tone couplet in a special sequence, its first toneme is subject to

⁸ In this paper I continue to use 'cause and effect' terminology in describing the phenomena of tonal perturbation, i.e. the substitution of one toneme for another when following certain morphemes, though I am aware of possible objections to the use of such 'process' terminology.

being perturbed to lower, following tone couplets with final toneme 3, resulting in developed couplet 3-1.

If 1-2 or 1-3 is the second tone couplet in a special sequence, no perturbation occurs.

If 2-1 or 2-2 is the second tone couplet, their first tonemes are perturbed to lower, following tone couplet 3-3 only, resulting in developed couplet 3-1.

If 2-1 or 2-2 is the second tone couplet, their first tonemes are perturbed to higher, following tone couplets with final toneme 1 or 2 (except after 3-2), resulting in developed couplet 1-1, but 2-2 becomes 1-2 after 1-1.

If 2-3 or 3-3 is the second tone couplet, their first tonemes are perturbed to higher, following tone couplets with final toneme 1, 2 or 3, resulting in developed couplet 1-3, but 1-1 after some final 2, and 3-1 after some final 2 and 3.

If 3-1 or 3-2 is the second tone couplet, their first tonemes are perturbed to higher, following tone couplets with final toneme 1, 2 or 3, resulting in developed tone couplets 1.³-1 and 1.³-2, respectively. (One-syllable tone glides abstracted from their vocalic elements are shown with the second toneme raised.)

As the second tone couplet in a special sequence, couplet 1-1, having no higher possibilities, can only be perturbed to a lower couplet. Couplets 1-2 and 1-3⁹ are never perturbed, being stable in all environments. The first syllables of couplets 2-1 and 2-2 are perturbed to lower after couplet 3-3 and to higher after couplets with final tonemes 1 or 2 (except couplet 3-2). When the first syllable of the 2-2 couplet is perturbed to either higher or lower, its second syllable is in most instances also perturbed, so that toneme 2 of the second syllable > 1; thus 2-2 perturbed to lower > 3-1, and 2-2 perturbed to higher > 1-1. The remaining basic tone

⁹ Most morphemes with basic 1-3 tone couplets are Spanish loans (there are a few exceptions). In SM, Spanish loans carry 2-1 tone couplets and in SE they carry 1-1 tone couplets.

couplets, i.e. 2-3 couplets and those with initial toneme 3, are usually perturbed to higher couplets, with a few exceptions where 2-3 and 3-3 > 3-1. When the first syllable of patterns 3-1 and 3-2 is perturbed to 1, there is a very pronounced glide back to the basic 3 toneme. The 3-3 couplet, however, does not have this glide back to basic toneme 3. We have already seen that this couplet is a reflex of SM 2-3 and SE 2-2 or 2-4 (see 1). It is here grouped with the 2-3 couplet because, in keeping with its historically initial 2 toneme, its developed couplets are the same as those of the 2-3 couplet, and it does not glide back to 3 as do the other couplets with initial 3 toneme.

We now list examples of these perturbations in special sequences for the particular combinations of tone couplets for which we have encountered this perturbation; other combinations either do not occur or might be found to round out the theoretical possibilities. In parentheses following each of the combinations are shown their SE and SM combinations involving either cognates or lexically equivalent items. Where we have examples of irregularities, these are listed under their corresponding tone couplet combinations. If we have more than one example of an irregular combination, we indicate this by 'etc.'

Couplet 1-1, perturbed to lower:

1-3 + 1-1 > 3-1: ka³zi³ *street* (Span. calle) + ka³ni¹ *long* > ka³zi³ ka³ni¹ *long street* (SE: ka³zi¹ + ka³ni² > ka³zi¹ ka²⁻¹ni²; SM: ža³ža² + ka³ni² > ža³ža² ka³ni²). But: mar¹ku³ *doorcase* (Span. marco) + bye¹e¹ *door* > mar¹ku³ bye¹e¹ *doorcase* (SE: sə³ə²ə⁴ *post* + že²zi¹ *door* > sə³ə²ə⁴ že²zi¹; SM: čiča³ *post* + žu²še¹e¹ > čiča³ žu¹še¹e¹).

2-3 + 1-1 > 3-1: ku²nte²e³ *sit* + si¹e¹i¹ *female* > ku²nte²e³ si³e¹i¹ *sit like a lady* (i.e. *on the knees*) (SE: ko²nde³e² + sə¹ə¹ > ko²nde³e² sə³ə¹; SM: ku²nde²e² + sə¹ə¹ > ku²nde²e² sə¹ə¹).

3-3 + 1-1 > 3-1: ta³čiči³ *wind, spirit* + ka³nu¹ *large* > ta³čiči³ ka³nu¹ *Satan* (SE: he²e⁴ *that thing* + še²e⁴ *fierce* > he²še²e⁴

Satan; SM: ta²čiči³ + ŋa²nu² > ta²čiči³ ŋa²nu²).

After a few 3-2 couplets, 1-1 > 3-1: žu³te² *river* + ka³ni¹ *long* > žu³te² ka³ni¹ *long river* (SE: žu⁴te² + ka³ni² > žu⁴te² ka³ni²; SM: žu³ča² + ka³ni² > žu³ča² ka³ni¹). But: sji³ə¹i² *leg* + ka³ni¹ *long* > sji³ə¹i² ka³ni¹ *long leg* (SE: sə⁴ə² + ka³ni² > sə⁴ə² ka³ni²; SM: sə³ə²ə² + ka³ni² > sə³ə²ə² ka³ni²); etc.

Couplet 2-1, perturbed to lower:

3-3 + 2-1 > 3-1: ši³ta³ *tortilla* + ?i²ni¹ *hot* > ši³ta³ ?i²ni¹ *hot tortilla* (SE: sta²a⁴ + hi²ni¹ > sta²a⁴ hi²ni¹; SM: sta²a³ + ni²ni¹ > sta²a³ ni²ni¹).

Couplet 2-2, perturbed to lower:

3-3 + 2-2 > 3-1: ža³ta³ *back* + be²e² *house* > ta³be³e¹ *outside the house* (SE: nu²u⁴ *at, where* + be²e² (?) *house* > nu²u⁴ ke²⁻¹e²; SM: ža²ta³ + be²e² > ža²ta³ be¹e²). But: ši³ni³ *head* + ka²ba² *rock* > ši³ni³ ka²ba² *top of the rock* (SE: ši²ni⁴ + ka²ba² > ši²ni⁴ ka²⁻¹ba²; SM: ši²ni³ + ka²ba² > ši²ni³ ka¹ba²).

Couplet 2-1, perturbed to higher:

1-1 + 2-1 > 1-1: bye¹e¹ *door* + he²e¹ *new* > bye¹e¹ he¹e¹ *new door* (SE: že²i¹ži¹ + he²e¹ > že²i¹ži¹ he¹e¹; SM: žu²še¹e¹ + ha¹a¹ > žu²še¹e¹ ha¹a¹).

2-1 + 2-1 > 1-1: ŋi²ə¹i¹ *hen* + lu²li¹ *little* > ŋi²ə¹i¹ lu¹li¹ *little hen* (SE: ŋə¹ə¹ + lu²li¹ > ŋə¹ə¹ lu¹li¹; SM: ŋi¹ə¹i¹ + lu¹li¹ > ŋi¹ə¹i¹ lu¹li¹).

3-1 + 2-1 > 1-1: su³čiči¹ *child* + ŋi²kj¹ *of tender age* > su³čiči¹ ŋi¹kj¹ *infant* (SE: su⁴čiči¹ + žə²kə¹ > su⁴čiči² žə¹kə¹; SM: su³čiči¹ + žə¹kə¹ > su³čiči¹ žə¹kə¹).

1-2 + 2-1 > 1-1: sto²lo² *rooster* + kwi²hi¹ *white* > sto²lo² kwi¹hi¹ *white rooster* (SE: li²li³ + kwi¹hi¹ > li²li³ kwi²hi¹; SM: li²li² + kwi¹hi¹ > li²li² kwi¹hi¹).

2-2 + 2-1 > 1-1: ži²ki² *bone* + žu²u¹ *mouth* > ži²ki² žu¹u¹ *jaw bone* (SE: žə²kə² + žu²u² > žə²kə² žu²⁻¹u²; SM: žə²kə² + žu²u² > žə²kə² žu¹u¹). But: be²e² *house* + lu²li¹ *little* > be²e² lu²li¹ ~ lu¹li¹ *little house* (SE: be²e² + lu²li¹ > be²e² lu¹li¹; SM: be²e² + lu¹li¹ > be²e² lu¹li¹).

Couplet 2-2, perturbed to higher:

1-1 + 2-2 > 1-2: žu¹tu¹ *carrying rope* + ŋi² leather > žu¹tu¹ ŋi² *leather carrying rope* (SE: žo²žu¹tu¹ + ŋə²ə² > žo²žu¹tu¹ ŋə²ə²; SM: žo²žu¹tu² + ŋə²ə² > žo²žu¹tu² ŋə²ə²). But: žu¹žu¹ *drop* + ntu²te² *water* > žu¹žu¹ ntu²te² *drop of water* (SE: žu¹žu¹ + ⁿdu²te² > žu¹žu¹ ⁿdu²te²; SM: žu¹žu¹ + ⁿdu²ča² > žu¹žu¹ ⁿdu²ča²).

2-1 + 2-2 > 1-1: žu²u¹ *mouth* + ?i²č² *road* > žu²u¹ ?i²č² *beside the road* (SE: žu²u² + ?i²č² > žu²u² ?i²-č²; SM: žu²u² + ?i²č² > žu²?i²č²).

3-1 + 2-2 > 1-1: sa³a¹ *do* + ti²ŋu² *work* > sa³ti²ŋu¹ *to work* (SE: sa¹a² + Ni²ŋu² > sa¹Ni²ŋu²; SM: sa¹a² + ti²ŋu² > sa¹ti²ŋu²).

2-2 + 2-2 > 1-1: ?i²ŋu² *thorn* + ža²bi² *maguey* > ?i²ŋu² ža²bi¹ *maguey thorn* (SE: ?i²ŋu² + ža²bu² > ?i²ŋu² ža²-bu²; SM: ?i²ŋu² + ža²u² > ?i²ŋu² ža²u²). But: sa²ma² *cloth* + pin²tu² *many-colored* (Span. pintojo *mottled*) > sa²ma² pin²tu² *many-colored cloth* (SE: sa²ma² + pi²ndu² > sa²ma² pi¹ndu¹; SM: sa²ma² + pi²ndu² > sa²ma² pi¹ndu¹); sa²ma² + ža²a² *white* > sa²ma² ža²a² *white cloth* (SE: sa²ma² + ža²a² > sa²ma² ža²-a²; SM: sa²ma² + ža²a² > sa²ma² ža²a²); etc.

In addition, there is one irregular perturbation of 2-2 > 1-2 after 2-3: ta²ta³ *offspring* + pin²tu² *many-colored* > ta²ta³ pin¹tu² *many-colored seed* (of corn or beans), (cf. sa²ma² pin¹tu² *many-colored cloth*, above), (SE: ta²ta² + pi²ndu² > ta²ta² pi³ndu¹; SM: ta²ta³ + pi²ndu² > ta²ta³ pi¹ndu¹); but ta²ta³ + ntu²č² *beans* > ta²ta³ ntu²č² *seed beans* (SE: ⁿdu²č² + ta²ta² > ⁿdu²č² ta²-ta²; SM: ta²ta³ + ⁿdu²č² > ta²ta³ ⁿdu²č²).

Couplet 2-3, perturbed to higher:

1-1 + 2-3 > 1-3: ža¹a¹ *tongue* + ŋu²u³ *fire* > ža¹a¹ ŋu¹u³ *flame* (SE: ža¹a¹ + ŋu²u³ > ža¹ŋu²u³; SM: ža¹a¹ + ŋu²u³ > ža¹a¹ ŋu¹u³).

2-1 + 2-3 > 1-3: žu²u¹ *mouth*, *edge* + ŋu²u³ *town* > žu²u¹ ŋu¹u³ *edge of town* (SE: žu²u² + ŋu²u² > žu²u² ŋu²-u⁴; SM: žu²u² + ŋu²u³ > žu²u² ŋu¹u³).

3-1 + 2-3 > 1-3: č²i² ?i² *skunk* + ?i²ta³ *flower* > č²i² ?i²ta³ *a species of small skunk*

(SE: č²i² ?i² + ko²syu² (?) > č²i² ?i² ko²syu²; SM: č²i² ?i² + pi²ndu² *many-colored* > č²i² ?i² pi¹ndu²).

2-2 + 2-3 > 1-3: nti²ki² *horn* + ?i²su³ *deer* > nti²ki² ?i²su³ ~ ?i²su³ *deer's horns* (SE: ⁿda²kə² + ?i²su² > ⁿda²kə² ?i²-su² ~ ?i²su²; SM: ⁿda²kə² + ?i²su³ > ⁿda²kə² ?i²su¹). But: sa²ma² *cloth* + ?i²t²i³ *bag*, *pocket* > sa²?i²t²i³ *tortilla bag* (SE: sa²ma² + žə²Nə² > sa²žə²-Nə²; SM: sa²ma² + hi²nu³ > sa²ma² hi²nu¹).

3-3 + 2-3 > 1-3: nu³u³ *to, at, where* + ŋu²u³ *fire* > nu³u³ ŋu¹u³ *to the fire* (SE: nu²u⁴ + ŋu²u⁴ > nu²u⁴ ŋu³u¹; SM: nu²u³ + ŋu²u³ > nu²u³ ŋu¹u³). But: there are a few sequences of 3-3 + 2-3 > 3-1: nu³ni³ *corn grains* + ta²ta³ *offspring* > nu³ni³ ta³ta¹ *seed corn* (SE: nu²ni⁴ + ta²ta² > nu²ni⁴ ta²-ta²; SM: nu²ni³ + ta²ta³ > nu²ni³ ta²ta¹). One 2-3 morpheme develops a unique tone glide: ši²ni³ *head* + ti²na³ *dog* > ši²ni³ ti¹-na³ *dog's head* (SE: ši²ni⁴ + ?i²na² > ši²ni⁴ ?i²-na²; SM: ši²ni³ + ti²?i²na³ > ši²ni³ ti¹?i²na³). After some 3-3 couplets, the 2-3 couplets are optionally perturbed: he³e³ *foot* + nč²i²bi³ *people* > he³e³ nč¹bi³ ~ nč²i²bi³ *for the people, people's feet* (SE: he²e⁴ + ŋa²žu³u² > he²e⁴ ŋa¹žu²u²; SM: ha²a³ + ŋa³žə²bə² > ha²a³ ŋa¹žə²bə²); etc.

Couplet 3-3, perturbed to higher:

1-1 + 3-3 > 1-3: ši²ŋa¹ *hawk* + šə²ə³ *fierce* > ši²ŋa¹ šə²ə³ *fierce hawk* (SE: ši²ŋa¹ + šə²ə⁴ > ši²ŋa¹ šə²ə⁴; SM: ši²ŋa³ + šə²ə³ > ši²ŋa³ šə²ə³).

2-1 + 3-3 > 1-3: nta²a¹ *arm* + mi²nte³ *nopal cactus* > nta²a¹ mi²nte³ *nopal cactus branch* (SE: ⁿda²a² + bi²ndə⁴ > ⁿda²a² bi²ndə¹; SM: ⁿda²a² + bi²ndə³ > ⁿda²a² bi²ndə³).

3-1 + 3-3 > 1-3: šu³u¹ *bit (twelve and a half cents)* + ku²mi³ *four* > šu³u¹ ku¹mi³ *fifty cent piece* (SE: šu⁴u¹ + ku²u⁴ > šu⁴u² ku¹u⁴; SM: šu³u¹ + ku²u³ > šu³u¹ ku¹u³).

2-2 + 3-3 > 1-3: ?i²č² *road* + ža²ta³ *back* > ?i²č² ča¹ta³ *behind* (SE: ?i²č² + ža²ta⁴ > ?i²č² ža¹ta¹; SM: ?i²č² + ža²ta³ > ?i²č² ža²ta¹). But: ču²u² *put* + ta³č²

wind > ču²ta¹čī¹ *put air into* (SE: ču²u² + ta²čī⁴ > ču²ta¹čī¹; SM: ču²u² + ta²čī³ > ču²ta¹čī¹); etc.

3-3 + 3-3 > 1-3: ha³a³ *that* + ki³?i³ *go* + -de³ *he* + be²?e² *house* > ha³a³ ki¹?i³ -de³ be²?e² *that he go to the house* (SE: he²e⁴ + ki²?i⁴ + -de² + be²?e² > he²e⁴ ki³?i¹ -de² be²?e²; SM: ha³ + ki²?i³ + -de² + be²?e² > ha³ ki¹?i³ -de² be²?e²). But: ši³ni³ *head* + žu³u³ *rock* > ši³ni³ žu³u³ ~ žu¹u³ *top of the rock* (SE: ši²ni⁴ + žu²u⁴ > ši²ni⁴ žu³u¹; SM: ši²ni³ + žu²u³ > ši²ni³ žu¹u³); etc.

In addition, there is the following irregular perturbation of 3-3 > 3-1 after a few 3-2 and 3-3 couplets: ku³ñu² *meat* + hi³tu³ *barbecue pit* > ku³ñu² hi³tu¹ *barbecued meat* (SE: ku⁴ñu² + ?i²Nu⁴ > ku⁴ñu² ?i³Nu¹; SM: ku³ñu² + hi²nu³ > ku³ñu² hi³nu¹); nu³ni³ *corn grains* + te²?žu³ *rot* > nu³ni³ te²?žū¹ *rotten corn grains* (SE: nu²ni⁴ + te²?žū⁴ > nu²ni⁴ te²?žū¹; SM: nu²ni³ + te²?žū³ > nu²ni³ te²?žū¹); etc.

Couplet 3-1, perturbed to higher:

1-1 + 3-1 > 1³-1: ntu²ku¹nu¹ *board* + ži³čī¹ *dry* > ntu²ku¹nu¹ ži¹-3čī¹ *dried boards* (SE: žu²nu² ku¹nu² + ?i²čī² > žu²nu² ku¹nu² ?i²-1čī²; SM: žu²nu² + ?i¹čī¹ > žu²nu² ?i¹čī¹).

2-1 + 3-1 > 1³-1: žu²u¹ *mouth* + ti³ka¹ *basket* > žu²u¹ ti¹-3ka¹ *rim of the basket* (SE: žu²u² + hi⁴ka² > žu²u² hi²-1ka³; SM: žu²u² + hi³ka² > žu²u² hi¹ka²).

2-2 + 3-1 > 1³-1: žu²ku² *mountain* + ti³čī¹ *avocado* > žu²ku² ti¹-3čī¹ *mountain where avocados are to be had* (SE: žu²ku² + ti⁴čī² > žu²ku² ti²-1čī³; SM: žu²ku² + ti³čī² > žu²ku² ti¹čī¹). But: ñā²?ā² *woman* + su³čī¹ *child* > ñā²?ā² su¹čī¹ *young woman* (SE: ñā²?ā² + su²čī¹ > ñā²?ā² su¹čī¹; SM: ñā²?ā² + su¹čī¹ > ñā²?ā² su¹čī¹).

2-3 + 3-1 > 1³-1: žu²ku³ *herb* + ne³?e¹ *useless* > žu²ku³ ne¹-3?e¹ *useless herbs* (SE: žu²ku⁴ + ne⁴?e¹ > žu²ku⁴ ne²-1?e³; SM: žu²ku³ + ñā³?ā¹ > žu²ku³ ñā³?ā¹).

3-3 + 3-1 > 1³-1: ko³?o³ *bowl* + ži³čī¹ *dry* > ko³?o³ ži¹-3čī¹ *dry bowl* (SE: ko²?o⁴ + ?i²čī² > ko²?o⁴ ?i²-1čī²; SM: ko²?o³ + ?i¹čī¹ > ko²?o³ ?i³čī¹). But: ši³ni³ *head* +

čū³u¹ *chicken* > ši³ni³ čū¹-3u¹ ~ čū³u¹ *chicken's head* (SE: ši²ni⁴ + ?du²hi¹ > ši²ni⁴ ?du²hi¹; SM: ši²ni³ + čū³u¹ > ši²ni³ čū¹u¹); etc.

Couplet 3-2, perturbed to higher:

2-1 + 3-2 > 1³-2: žu²u¹ *mouth* + mi³ni² *pond* > žu²u¹ mi¹-3ni² *edge of the pond* (SE: žu²u² + mi⁴ni² > žu²u² mi²-1ni³; SM: žu²u² + mi³ni² > žu²u² mi¹ni²).

2-2 + 3-2 > 1³-2: bi²ko² *fiesta* + nti³ži² *deceased person* > bi²ko² nti¹-3ži² *All Saints Day* (SE: bi²ko² + ?dā⁴žā² > bi²ko² ?dā²-1žā³; SM: bi²ko² + ?dā³žā² > bi²ko² ?dā¹žā²).

3-2 + 3-2 > 1³-2: te³e² *man* + ni³?i² *strong* + ?i²ni³ *inside* > te³e² ni¹-3?i² ?i²ni³ *stubborn man* (SE: te⁴e² + ni⁴?i² + ?i²ni² > te⁴e² ni²?ni²-ni³; SM: čā³a² + ni³?i² + ?i²ni³ > čā³a² ni³?i² ?i²ni³). But: ntu³žū² *nail* + ka³a² *metal* > ntu³žū² ka³a² *nail* (SE: ?du⁴žū² + ka⁴a² > ?du⁴žū² ka⁴a²; SM: ?du³žū² + ka³a² > ?du³žū² ka³a²).

3-3 + 3-2 > 1³-2: ha³a³ *that thing* + ba³?a² *good* > ha³a³ ba¹-3?a² *the good* (SE: he²e⁴ + ba⁴?a² > he²e⁴ ba²-1?a³; SM: ha³ + ba³?a² > ha³ ba¹?a²). But: he³?e³ *foot* + te³e² *man* > he³?e³ te³e² *the man's foot* (SE: he²e⁴ + te⁴e² > he²?e⁴ te²-1e³ ~ te⁴e²; SM: ha²?a³ + čā³a² > ha²?a³ čā³a²); etc.

Occasionally there is a sequence of three morphemes which contains two special sequences, i.e. morphemes 1 + 2, and morphemes 2 + 3 each comprise a special sequence. In this case, more often only the second special sequence is perturbed, though sometimes the first sequence is also perturbed.¹⁰ ?i²ti² *torch* + ñu³ma³ *wax* + ba³?a² *good* > ?i²ti² ñu³ma³ ba¹-3?a² ~ ?i²ti² ñu¹ma¹ ba¹-3?a² *good wax candle*.

3. The first column of Table A shows the basic tone couplets of verbs in the potential aspect, from which other aspects may be predicted. Basic couplets 1-1, 1-2 and 1-3 are not shown on this Table, because in this dialect there are no verbs with a basic tone 1 in the initial syllable, except a few which presumably were historically a com-

¹⁰ This same phenomenon occurs in SE, though it is not described in my paper.

bination of s- causative + verb stem which has been perturbed to higher by this morpheme.¹¹ Therefore verbs with couplets 1-1, 1-2 and 1-3, all of which have initial clusters st-, sk-, sk^w-, and sy-, may be considered to be bi-morphemic and with initial syllable toneme 1 developed from basic toneme 2 or 3.

Mixtec verbs show three aspects: the potential, which is basic, since from these forms the other two aspects can be predicted; the continuative; and the completive. In my analysis of the SE dialect, I treated the continuative aspect of verb stems as also basic, since the differences between the continuative and the potential aspects are not caused by any immediately apparent morpheme, and since this approach was simplest for the SE dialect. For the SM dialect, Pike postulated that the raising of verb tone couplets in the continuative aspect is, like all other tone changes, the result of their position following a morpheme that causes this perturbation. This morpheme, apart from the tonal phenomena seen on the following morpheme, is zero in all three dialects. In SE we by-passed it completely by considering the tone couplets of the continuative aspect as basic. In SM Pike treated the continuative aspect as a regular perturbation phenomenon (plus a palatalizing influence in those verbs where the phonemes of the initial syllable are changed), since this perturbation, though preceded by a zero morpheme, coincided with all other perturbation phenomena for SM. For the ST dialect, I must return to Pike's postulation of a zero morpheme preceding the continuative aspect of verbs, in order to avoid the setting up of morphemes with basic tone glides in their initial syllable. This is undesirable both

¹¹ One verb, however, is a combination of s-causative + nta^ʔbi[!] *poor* > sta^ʔbi[!] *to cheat, deceive, lie* (i.e. *to cause to become poor through deceit*). Four other verbs are presumably combinations of s-causative + stems whose meaning is not known: ste[!]e³ *teach, show*; sta[!]a³ *provoke, quarrel*; sk^wa¹a² *study*; su[!]a² *make*.

TABLE A
Verbs

Potential (basic tonemes)	Occurring after continuative (zero), deliberative na [!] , causative s-, are replaced by the following:	Occurring after complete ni ³ , are replaced by the following:	Occurring after prohibitive ma ³ , are replaced by the following:
2-1	1-1	3- ² 1	3-1
2-2	1-2	3- ² 2	3-1
2-3	1-3	3- ² 3	1-3
3-1	1- ³ 1 or 1-1 (see text)	3-1	1- ³ 1
3-2	1- ³ 2 or 1-2 (see text)	3-2	1- ³ 2
3-3	1-3	3-3	1-3

because it would add to the number of basic tone couplets, and because it would introduce glides as basic to a system which has only basic level tonemes in its other known dialects.¹²

The second column of Table A shows the tone glides which are developed when verbs with initial toneme 3 are preceded by the postulated zero continuative aspect morpheme (and also by na[!] deliberative and s-causative). This zero morpheme perhaps possessed a 1-1 tone couplet in this dialect, since 2-2 couplets following it > 1-2 in accordance with other special sequences of 1-1 + 2-2. The second column of Table A shows the same patterns of perturbation to higher as those listed in 2 for special sequences, except that those verbs with couplets 3-1 or 3-2 whose second syllable begins with glottal stop > 1-1 and 1-2 respectively and do not develop the 1-³ glide in the first syllable: ža¹a²-na² *she is passing* (< ža³a² *will pass*); but to¹⁻³o² ntu²te² *water is dripping* (< to³o² *will drip*).

There are several observations to be made

¹² Two morphemes have been found, however, which do have these basic tone glides in this dialect: sk^wa¹⁻³ñu² *squirrel* may possibly be historically a combination of s-causative + k^wa³ñu², the meaning of which is unknown, or it may have developed the glide by analogy with 3-2 couplets > 1-³2 after s-causative. bi¹⁻³či² *fan* is the cognate of SE bi[!]či³ and SM bi[!]či² and I have no explanation for the glide in this dialect.

regarding the completive aspect in the ST dialect. This is formed by the morpheme ⟨ni³i³⟩ preceding the verb. In SM, verbs are not affected tonally following this morpheme, but are tonally identical in the potential and completive. In SE the ni²i⁴ completive is a type (c) morpheme, since verbs following it are perturbed to lower tonemes in accordance with type (c) action in that dialect. In ST, ⟨ni³i³⟩ exhibits several peculiarities. The third column of Table A shows perturbation of verb stems in patterns distinct from those listed for special sequences. In each case, when following ⟨ni³i³⟩, the basic tonemes of the stem remain, but stems with toneme 1 or 2 in the initial syllable develop a tone glide from 3 up to the basic initial syllable toneme (3⁻¹ or 3⁻²). Initial syllables with basic toneme 3 are not affected. Therefore, the developed couplets occurring on verbs following ⟨ni³i³⟩ may best be described as the result, not of regular perturbation, but of the fusion or extension of the tone of ⟨ni³i³⟩ onto the verb. Basic tonemes of verb stems remain the same, but the final toneme of ⟨ni³i³⟩ carries over to the initial syllable of the verb, resulting in a tone glide where that initial syllable carries a basic toneme higher than 3. These tone glides are exceedingly rapid and difficult to hear.

Furthermore, ⟨ni³i³⟩ seems to be disappearing, in common with the completely disappeared continuative aspect morpheme, for at least some of the verbs. The full disyllabic form ⟨ni³i³⟩ is heard only in very precise or hesitant speech, and we do not show it in the illustrations to follow; the abbreviated alternants ni³ and n-, the zero alternant, and the repeated alternant ni³ n- will be illustrated below. The process of disappearance perhaps began by the elimination of the vowel element, leaving the form n-. Possibly because some of the resultant consonant clusters were awkward, the n- was dropped in such clusters. At present the completive aspect of verbs is expressed always with the tone fusion described above,

and often without any other trace of the completive morpheme.

There are just eight consonants and one consonant cluster¹³ which occur initially in the completive aspect of verb stems in the ST dialect: n, nt, z, ž, h, t, č, k, k^w.

For verbs with initial n and nt in the potential aspect, the completive plus the verb is actualized as follows: ne³nta²-hi² *the child will appear* > ni³ ne³⁻²nta²-hi² ~ ne³⁻²nta²-hi² *the child appeared*; nti³ko²-ña² *she will grind* > ni³ nti³⁻²ko²-ña² ~ nti³⁻²ko²-ña² *she ground*.

For verbs with initial s, š, and h in the potential aspect, the completive plus the verb is actualized as follows: sa^{3?}a¹-ña² *she will do* > nza^{3?}a¹-ña² ~ ni³za^{3?}a¹-ña² ~ za^{3?}a¹-ña² *she did*; ši³ko¹-ña² *she will sell* > nži³ko¹-ña² ~ ni³ži³ko¹-ña² ~ ži³ko¹-ña² *she sold*; ka²ta²-sa¹ *I will sing*¹⁴ > nhi³⁻²ta²-sa¹ ~ ni³hi³⁻²ta²-sa¹ ~ hi³⁻²ta²-sa¹ *I sang*.

For verbs with initial t, č, k, k^w, and ž in the potential aspect, the completive plus the verb is actualized as follows: ta²ba³-de³ *he will take out* > nta³⁻²ba³-de³ ~ ni³ nta³⁻²ba³-de³ *he took out*; či²so¹-de³ *he will add to* > nči³⁻²so¹-de³ ~ ni³ nči³⁻²so¹-de³ *he added to*; ka^{3?}a³-nu³ *you will speak* > nka^{3?}a³-nu³ ~ ni³ nka^{3?}a³-nu³ *you spoke*; k^{wi}ta¹-nu¹ *you will tire* > nk^{wi}ta¹-nu¹ ~ ni³ nk^{wi}ta¹-nu¹ *you tired*; žu^{3?}u¹-ti³ *the animal will fear* > nču^{3?}u¹-ti³ ~ ni³ nču^{3?}u¹-ti³ *the animal feared*.

Note in the last group the repetition of the completive morpheme (ni n-) in the second alternants. These alternants are perhaps those used in slower or more precise speech, and may very well be a development brought about by the reduction of the vowel in ni³ > n- and then a reinsertion of the original ni³. Verbs in the last group, which do not occur in the completive without the bound

¹³ See fn. 5 for the phonemes and allophones of this dialect.

¹⁴ This verb is one of several classes whose initial consonants are k or k^w in the potential aspect, and which change to initial h or ž in the completive and continuative aspects.

n-, may conceivably at some later date keep the n plus initial verb consonant cluster after the free morpheme ⟨ni³i³⟩ has disappeared completely, thus setting up two classes of verbs on the basis of this dichotomy.

From the above it will be seen that clusters of n- + initial verb consonant or consonant cluster actualize as follows: n- + n or nt > n, nt, which may be considered as zero completive. n- + s, š or h > nz, nž, nh, or (more often) z, ž, h, with zero completive; for nz > z, an additional pheneme, z, has developed.¹⁵ n- + t, č, k, k^w or ž > nt, nč, nk, nk^w, nč respectively.

In a sequence ⟨ni³i³⟩ completive + s-causative (following which verbs are perturbed to higher), + verb stem, the verb, though not contiguous to ⟨ni³i³⟩, is still affected: ka²ku² *will be born* > ska¹ku² *will give birth to* > ni³ ska³⁻¹ku² ~ ska³⁻¹ku² *gave birth to*; ka³ku² *will escape* > ska¹⁻³ku² *will rescue* > ni³ ska³⁻¹⁻³ku² ~ ska³⁻¹⁻³ku² *rescued*; there are few three-way glides as seen in the latter verb.

In a sequence of either of the two introductory nouns nu³u³ *to, where* or ha³a³ *that* + ⟨ni³i³⟩ completive + verb stem, the first syllable of ⟨ni³i³⟩ is perturbed to higher; it actualizes, however, as the raising to toneme 1 of the final syllable of the preceding morpheme (plus the regular fusion or extension of the toneme 3 onto the verb stem and the prefixing of n- to verb initial t, č, k, k^w, or ž, as in the last group listed above): ñu²u³ *town* + nu³u³ *where* + ni³i³ *completive* + ka²ku² *will be born* (> nka³⁻²ku² *was born*) + -sa¹ I > ñu²u³ nu³u¹ nka³⁻²ku² -sa¹ *the town where I was born*; č³k¹ *prickly pear* + ha³a³ *that* + sko¹žo² *cause to fall* (> sko³⁻¹žo² *caused to fall*) + ?i²ñu² *thorn* + ku¹u² *is* > č³k¹ ha³a¹ sko³⁻¹žo² ?i²ñu² ku¹u² *it is a de-thorned prickly pear*.

The fourth column of Table A shows perturbation of verb stems following ma³a³ *prohibitive*. This sequence is the same as any other perturbation following a morpheme

with final toneme 3 (2-1 and 2-2 verb couplets > 3-1, and other verb couplets are perturbed to higher). For combinations of ma³a³ + s-causative + verb stem, the verb stem is perturbed only by the s-causative (see the second column of Table A) and not by the non-contiguous ma³a³.

4. Pronoun enclitics are a highly specialized group in SM and SE because they have an intricate set of tonal rules distinct from other morphemes. In contrast to these two dialects, none of the ST pronouns cause perturbation, nor are they themselves perturbed, though three of them have two alternants¹⁶ as seen below. Or otherwise stated, sequences of pronoun enclitic plus any other morpheme or of any morpheme plus pronoun enclitic, do not constitute special sequences as defined in this paper. We list below the pronouns in their enclitic and full forms for the sake of comparison with already published SE and SM lists;¹⁷ the enclitic—

¹⁶ As in the other dialects, we treat pronoun enclitics separately, not attempting to equate these alternant forms with perturbation in special sequences, because they do not entirely fit into this type of perturbation, and because this would make it necessary to consider as a special sequence every sequence in the language with a pronoun enclitic as its second member.

¹⁷ In SE, -o¹ ~ -o³ (SM -žo¹ ~ žo³; SE -žo¹ ~ -žo⁴) *we inclusive* has lost its initial ž. It affects preceding morphemes in the following ways: (1) In these morphemes the final vowel is lost: ti²ñu² *work* + -o¹ > ti²ñ-o¹ *our work*; ka²bi² *will read* + -o¹ > ka²b-o¹ *we will read*. (2) For the remaining vowel of the preceding morpheme, u vowels are assimilated to o: ku¹u³ *sick* + -o³ > ko¹u³ *we are sick*; žu¹tu¹ *carrying rope* + -o¹ > žo¹t-o¹ *our carrying rope*. (3) Two other morphemes also harmonize their vowels before this enclitic: k¹i²i³ *go* + -o³ > ko¹i²-o³ *let's go!*; ma²a¹ *demonstrative* + -o¹ > mo²-o¹ (the a > either [o] or may be more central, [ə]).

In addition to the eleven pronoun enclitics existent in SE and SM, two additional ones are listed for SE: -tu³ *wooden object or tree* would in SM and SE be designated as *thing*, -i². In SE and SM *they* is expressed by means of a morpheme meaning *all* plus the pronoun enclitic. The enclitic -nta¹ *they* in ST seems to be a development from

¹⁵ See fn. 5.

subject and possessor—forms (with hyphens) precede the full—object—forms.

I (polite) → -sa¹, → sa³a¹.

You (polite) → -ni¹, → ni¹?i¹.

You (familiar) → -nu¹ (after tonemes 1 & 2) ~ -nu³ (after toneme 3), nto¹?o¹.

We (inclusive) → -o¹ (after tonemes 1 & 2) ~ -o³ (after toneme 3), → žo¹?o¹.

Child. thing → -hi², → su³či¹.

Woman → -ña², → ña²?a².

I (familiar) → -ni³ (after tonemes 1 & 2) ~ -ni² (after toneme 3), ntu²?u³.

He → -de³, → te³e².

Animal, star → -ti³, → ki²ti².

Supernatural being, priest, rain → -ža³, → ža³a³.

Wooden object, tree → -tu³, → ñu²tu².

Water → -de³, → ntu²te².

They → -nta¹, → nta³ka¹.

the morpheme nta³ka¹ *all, each*; in this dialect this form occurs both preceding a noun and following a verb: nta¹ nči²bi³ *all the people*; nka³?a³ -nta¹ *they said*.

Of the other pronoun enclitics, only two are identical in both phonemes and basic tonemes with SE and SM: -ña² *she* and ni¹ *you (polite)*. In ST, -ža³ *supernatural being, priest* is also used to designate *rain*.

5. There is the same type of non-phonemic lowering of tone in ST as described for SE, consisting of an optional drift toward phonetically lower tones as the sentence progresses. This lowering occurs usually following a toneme 3, after which following tonemes 1 or 2 may be actualized as [1 minus] and [2 minus] respectively. For 3-1 couplets, the toneme 1 is practically always lower than a preceding toneme 1. Thus in the phrase ?i²nka³ hi¹či¹ sa³?a¹ -sa¹ *I will do it again*, the toneme 1 of sa³?a¹ is considerably lower than those of hi¹či¹; -sa¹ is then also lowered; when a toneme 1 actualizes as [1 minus], all succeeding 1 tonemes are likewise actualized on the same lowered pitch. In the phrase ?i²ku² hi³⁻²?i² -ña² ntu²te² *yesterday she drank water*, the end-point of the 3-2 glide in the initial syllable of hi³⁻²?i² may be actualized as [2 minus], and all of the succeeding 2 tonemes are lowered to the same phonetic pitch, so that the 2 tonemes of ?i²ku² are considerably higher than those of the rest of the phrase. For 3-3 couplets, the second toneme 3 is always lower than the first.