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3a. Constituir un conjunto de instituciones o personas interesadas en realizar el proyecto mediante el llenado de los cartabones.

4a. Crear un equipo para programar el conteo electrónico de los datos.

5a. Formar una comisión de lingüistas de las diversas instituciones para la evaluación de los datos y la determinación de conclusiones histórico-temporales.

México, D.F.

## THE TONEMIC SYSTEM OF GUERRERO MIXTECO

By Edward Overholt

One of the most striking and important features of the Mixteco language is tone. It is likewise one of the noteworthy differentiae between the various dialects of Mixteco proper, and between the various members of the Mixtecan language family.<sup>1</sup>

The tonemic system is an especially important part of the dialect spoken in and around the municipality of Metlatonoc, Guerrero, where the data here presented were collected.<sup>2</sup> Tone is, for example, important in this dialect lexically as the distinguishing feature between otherwise homophonous forms. It is important morphologically as

<sup>1</sup> This paper includes only a limited amount of comparative material, but those interested in such a study should find it useful to compare the following:

Pike, K. L., *Tone Languages*. Ann Arbor: University of Michigan Publications in Linguistics, 1948, IV, 77-94.

Pike, K. L., "Analysis of a Mixteco Text," *International Journal of American Linguistics* X (October, 1944), 113-138.

Pike, K. L., "Grammatical Prerequisites to Phonemic Analysis," *Word* III (December 1947), 155-172.

Mak, Cornelia, "A Comparison of Two Mixtec Tone Systems," *International Journal of American Linguistics* XIX (April, 1953), 85-100.

Mak, Cornelia, "The Tonal System of a Third Mixtec Dialect," *International Journal of American Linguistics* XXIV (January, 1958), 61-70.

Longacre, Robert E., "Five Phonemic Pitch Levels in Trique," *Acta Linguistica*, VII, No. 1, 62-82.

Longacre, Robert E., *Proto-Mixtecan*, Publication 5 of Indiana University Research Center in Anthropology, Folklore, and Linguistics. Pp. 195.

<sup>2</sup> The materials contained in this paper were gathered under the auspices of the Summer Institute of Linguistics. They represent principally the idiolect of Esther Lopez, a bi-lingual about 50 years of age who has spent most of her life in the villages of San Rafael and Metlatonoc, Guerrero. Most of the data have been found to correspond quite closely to the idiolects of Braulio Martínez de Jesús, bilingual age 34, Macario Luiz, monolingual age 55, and Margarito Pinzon, bi-lingual age 40, all of San Rafael, though with wide contacts in other towns.

I would like to acknowledge the assistance of my wife and also of various of my colleagues of the Summer Institute of Linguistics, especially Kenneth L. Pike who checked much of the material incorporated here and made many helpful suggestions, Robert Longacre and Cora Mak who also aided in some of the analysis, and Viola Waterhouse who assisted in the final preparation of the manuscript.

The segmental phonemes of this dialect are: voiceless unaspirated stops /p, t, č, k, kʷ, ʔ/; pre-nasalized voiced stops /<sup>m</sup>b, <sup>n</sup>d, <sup>ŋ</sup>g/; palatalized stops /tʲ, dʲ/; fricatives /b, h/; sibilants /s, š/; nasals /m, n, ñ/; liquid /l/; flap /r/; palatal /y/; oral vowels /i, e, a, o, u/; nasalized vowels /i<sup>n</sup>, a<sup>n</sup>, u<sup>n</sup>/; tonemes high (´), mid (˘), low (˙). For indicating phonetically raised tone an asterisk (\*) is used, for indicating phonetically lowered tone a circumflex (ˆ) is used.

the contrastive feature between different aspects of the verb. It is important phonologically because it furnishes criteria for the placement of stress.

#### Structure—Function

The presentation of this paper is made in terms of structure and function, both of which are considered to be relevant aspects of the tonemic system. STRUCTURE is considered to consist primarily of the classificatory items of the system e.g. the number of tones, tone patterns and perturbation classes, which at the same time comprise its materials and limitations. It also includes the static representations of certain past functions of the language, as in the now crystallized developed tone patterns.

Since the present tonal system was not created ex nihilo by the speakers of this dialect, but is rather the outgrowth of an older now largely obsolete tonal system, which in turn grew out of a still older system, we would expect to find traces of these older systems, which in fact we do. Remnants of these older systems are still discernible and by means of them it can be shown that various basic elements of the present system comprised part of an older system or systems. The remnants of these older systems, treated here as crystallizations are referred to by Longacre in Proto-Mixtecan as 'frozen' phrases.<sup>3</sup>

Tone structure is of itself important when, for example, it serves to distinguish between morpheme classes as in *ĩnũ thorn* and *ĩnú thorny*, *tã<sup>n</sup>ã<sup>n</sup> companion* and *tã<sup>n</sup>ã<sup>n</sup> together*, in which the first example of both series belongs to the noun class and the second (derived) to the modifier class. It is tone structure that is the chief differentiating feature between the various aspects of the verb: *kãtã will weigh* (potential), *kãtã weighing* (continuative), *kãtã weighed* (completive); *kããtã will not weigh* (negative potential), *kããtã not weighing* (negative continuative), *nĩ kãtã did not weigh* (negative completive).

FUNCTION is considered to consist of the relationships existing between different forms, e.g. the occasions, types and range of influence of one form upon another. It deals with the extant processes of change involving items, such as the mechanical perturbation of tones, and the substitution of morphotonemes.

#### The Morpheme Pattern Tone Unit

In this paper the unit of reference is the MORPHEME PATTERN TONE UNIT (hereafter referred to as the MPTU). This unit is a morphological-phonological-tonemic complex in which each of these categories is represented by a naturally occurring unit, and to which each contributes certain restrictions. It is an amplification of the morpheme pattern unit required for a description of the phonology of this dialect.<sup>4</sup>

<sup>3</sup> See Longacre, Robert E., Proto-Mixtecan, Publication 5 of Indiana Research Center in Anthropology, Folklore, and Linguistics (October, 1957), 106.

<sup>4</sup> A comprehensive discussion of this unit is impossible in this paper as it would require a lengthy discussion of phonological data. The MPTU was found to be the only practical unit for a complete description of the phonology, as for example nasalization and certain phonetic characteristics of the segmental phonemes.

To the formation of this unit, morphology contributes the simple, i.e., single, non-complex morpheme. Single morphemes and bi-morpheme complexes function differently in the process of tone perturbation, even though their phonological and tonemic structures are similar. For example *kũ<sup>n</sup>ĩ will rub* and *ã<sup>n</sup>ĩ<sup>n</sup>ĩ will be disturbed, anxious* have identical CV<sup>2</sup>CV patterns and a two-tone pattern, yet they are only partially the same in their perturbation functions. The first example is a single morpheme the second is a bi-morpheme from *ã<sup>n</sup>ĩ<sup>n</sup>ĩ end, finish* + *ĩnĩ inside, ego, self*. The morpheme *ĩnĩ* always causes the tones of class C pronouns to perturb to low, but neither *ã<sup>n</sup>ĩ<sup>n</sup>ĩ* nor *kũ<sup>n</sup>ĩ* do so. Example: *ã<sup>n</sup>ĩ<sup>n</sup>ĩ-ñã she will be anxious*, but *sã<sup>n</sup>ĩ<sup>n</sup>ĩ-ñã ĩnĩ-nã she will cause them to be anxious*; also *kũ<sup>n</sup>ĩ-ñã (nãmãã tĩkõtò) she will rub (soap on the clothes)*. Note again *bẽ<sup>2</sup>ẽ house* and *bẽ<sup>2</sup>ũ<sup>n</sup> your house*, in which both have the same CV<sup>2</sup>V pattern and a two-tone pattern; *bẽ<sup>2</sup>ẽ* is a class C noun and perturbs to a high mid pattern, e.g., *kũmĩ bẽ<sup>2</sup>ẽ four houses*. All perturbation patterns of class C nouns end in a mid or low tone, but note *kũmĩ bẽ<sup>2</sup>ũ<sup>n</sup> your four houses* < *kũmĩ (Dm) four* + *bẽ<sup>2</sup>ẽ house (Cn)* + *ũ<sup>n</sup> your (Cpr)* where there is a different type of pattern because this is a bi-morpheme. As a further example note *sĩ<sup>n</sup>ĩ<sup>n</sup> leg (Ch)* which in context with *kũmĩ four (Dm)* > *kũmĩ sĩ<sup>n</sup>ĩ<sup>n</sup> four legs*. When the pronoun *ũ<sup>n</sup>* (Cpr) is added to form a bi-morpheme compound *sĩ<sup>n</sup>ũ<sup>n</sup> your legs* only the initial tone is perturbed in context with *kũmĩ*; thus *kũmĩ sĩ<sup>n</sup>ũ<sup>n</sup> your four legs*. The morpheme *sĩ<sup>n</sup>ĩ<sup>n</sup>* as a class C noun causes the tonemes (Cn) + *kã<sup>n</sup>ã<sup>n</sup> that (Bm)* > *sĩ<sup>n</sup>ĩ<sup>n</sup> kã<sup>n</sup>ã<sup>n</sup> that leg*. Class C pronouns do not cause (Cn) + *kã<sup>n</sup>ã<sup>n</sup> that (Bm)* > *sĩ<sup>n</sup>ĩ<sup>n</sup> kã<sup>n</sup>ã<sup>n</sup> that leg*. Class C pronouns do not cause the tonemes of class B modifiers to perturb, thus *ñã she (Cpr)* + *kã<sup>n</sup>ã<sup>n</sup> that (Bm)* > *ñã-kã<sup>n</sup>ã<sup>n</sup> she, that one*. Compare the following phrases: *sĩ<sup>n</sup>ĩ-ñã sĩ<sup>n</sup>ĩ<sup>n</sup> kã<sup>n</sup>ã<sup>n</sup> she sees that leg* and *sĩ<sup>n</sup>ĩ-ñã sĩ<sup>n</sup>ũ<sup>n</sup> kã<sup>n</sup>ã<sup>n</sup> she sees that leg of yours*. All perturbation is only of immediately following items. Since *bẽ<sup>2</sup>ẽ house (Cn)* and *ũ<sup>n</sup> your (Cpr)* behave differently in causing perturbations, *bẽ<sup>2</sup>ẽ* would cause *ĩĩ dry (Cm)* to become *ĩĩ*; *bẽ<sup>2</sup>ũ<sup>n</sup> ĩĩ the dry house* but following the bi-morpheme *bẽ<sup>2</sup>ũ<sup>n</sup> your house* *ĩĩ* would remain unperturbed: *bẽ<sup>2</sup>ũ<sup>n</sup> ĩĩ your house (is) dry*.

There are a few morphemes which can be shown to have been two morphemes historically, but in which the fusion is so complete that they now have the same phonological pattern and function as do single morphemes and therefore they are treated as such. For example: *t<sup>2</sup>ã<sup>n</sup>kã fish* < *tĩ animal indicator* + *yãkã bark*, lit. *animal with bark*.

Phonology makes the contribution of the simple syllabic pattern to the MPTU. In this dialect of Mixteco, the simple basic patterns are dissyllabic: CVCV, CV<sup>2</sup>V, CV<sup>2</sup>CV, CVV; and the simple derived patterns are monosyllabic CV or trisyllabic CVVV. Pattern is at times an important descriptive criterion. For example, in lengthening vowels and adding a tone glide, class C nouns distinguish between CVCV and CVV patterns. In CVCV pattern morphemes, the length and glide is added to the first part of the second syllable as *nũnĩ corn* > *nũnĩĩ*, but in CVV pattern morphemes, it is added to the first part of the initial syllable as *kõõ snake* > *kõõõ*.

Tonemics makes the contribution of tone patterns to the MPTU. In the function of mechanical perturbation, the tone patterns are important criteria, for certain distinctions are made on the basis of tone pattern. For example class B nouns, except those whose tone pattern ends with a high tone, perturb class A pronouns to low. Class B nouns whose tonal pattern ends in high do not perturb class A pronouns at all.

No other unit of reference, such as an exclusively phonological or exclusively morphological or tonemic one has been found for this dialect which appears as useful as the one chosen. The present unit of reference permits a simpler, less distorted description of perturbation procedures, for example, than any single unit would.<sup>5</sup>

#### Structure of the Tonemic System

The structure of the tonemic system is relatively simple in that the included items of tone, tonal patterns and tone classes are few in number. The crystallized forms of certain past functions, such as glides and distinctive perturbation patterns, are also restricted in number. (For further information on these phenomena see the sections on *Glides* and *Crystallizations*.)

#### Tones

There are three phonemic levels of lexical tone: high, mid, and low. High as in *in<sup>h</sup> hail*, *núnú soon*; mid as in *in<sup>m</sup> one* and *kā<sup>m</sup>ā<sup>m</sup> to talk*; low as in *k<sup>w</sup>i<sup>n</sup>i<sup>n</sup> ocelot* and *kūñū meat*.<sup>6</sup>

These contrastive registers of pitch are areas of tone approximation rather than precise levels. The registers are relatively close together. There is considerable free fluctuation between tones, non-contrastive pitch on nasal, syllabic and voiced fricative consonants and very rapid one-mora glides. These factors introduce problems into the recording and analysis of the tonemic system. The first problem is the apparent overlap of tone areas, particularly of items in list form or in which there are changes in the context, such as emotional attitude. The second and related difficulty is that there are at least seven phonetic tone levels.

#### Fluctuation of Tones

In a sequence of identical tones there may be optional fluctuation. Thus in a sequence of high tones on a single MPTU the initial tone tends to fluctuate to a level perceptibly lower than the second tone as in *bá lí small* [bá lí]. In other instances, the final high tone of a single MPTU or tones of a combination of MPTU's tend to fluctuate to a phonetically higher level than the usual range of phonemic high tones. Thus *d<sup>h</sup>áá black* may be [d<sup>h</sup>áá\*] and *bíší-ńá her pineapple* may be [bíší-ńá\*].

<sup>5</sup> To compare a similar approach see *Tone Languages*, pp. 79-81. Here Pike discusses the "tonemic couplet", its structure and function in relation to the morpheme pattern.

<sup>6</sup> Cf. Longacre, op. cit. 104. See also Mak, Cornelia, "The Tonal System of a Third Mixtec Dialect," *International Journal of American Linguistics*, XXIX (January 1958), 61, 62 regarding low low tone patterns in Mixteco.

Similarly in the case of single MPTU's or a sequence of them with mid mid tones, the first remains relatively constant, but the second may fluctuate downward. To illustrate: *d<sup>h</sup>ükü branch* may become [d<sup>h</sup>ükü<sup>h</sup>] and *čiyō-rā his roof-tile* becomes [čiyō-rā<sup>h</sup>]. These are in contrast to true mid low patterns, as for example *tūtū-rā his paper* in which *-rā he/his* has been perturbed to low.

In a single MPTU having low low tones, the initial tone may fluctuate towards mid as *k<sup>w</sup>i<sup>n</sup>i<sup>n</sup> ocelot* ~ *k<sup>w</sup>i<sup>n</sup>i<sup>n</sup>*. In other instances the final low tone of a single MPTU or tones of a sequence of them tend to fluctuate to a phonetically lower level than the normal range of phonemically low tones. Thus *k<sup>w</sup>i<sup>n</sup>i<sup>n</sup> ocelot* may be [k<sup>w</sup>i<sup>n</sup>i<sup>n</sup>] and *sòkò k<sup>w</sup>i<sup>n</sup>i<sup>n</sup> the ocelot's shoulders* becomes phonetically [sòkò k<sup>w</sup>i<sup>n</sup>i<sup>n</sup>].

#### Tone on Voiced Consonants

Another feature of this dialect is the presence of phonetic tone on voiced consonants, e.g. m, n, ñ, mb, nd, ng, y, d<sup>v</sup>, t<sup>v</sup>, l, b. These tones are transitional and unstable because tone is not a series of independent, separated level pitches, but rather a continuous, modulated feature which is broken by junctures or voiceless consonants. At the onset of many expressions following a period of silence sufficiently extended as to deprive the utterance of an effective preceding verbal context, if the expression begins with a consonant that carries tone, it has a mid quality. From this initial quality the tone rises or falls to the general area of tone carried by the initial vowel. Within an effective verbal context (a stress group or series of them joined into a high-layered unit) voiced consonants carry the tone from one modulation to the next.

At normal low-level junctures i.e. those between words, phrases, and clauses, voiceless consonants may interrupt the tone continuum but do not destroy its continuous character. Exaggerated junctures, such as long pauses where there is actual silence, and normal high-level junctures such as those between sentences or paragraphs, may break the tone continuum. Emotion, volume, and other factors modify the normal speech pattern.

Largely as a consequence of the tonal fluctuations described, there are at least seven discernible phonetic areas of pitch. The three highest are the range of the high tonemes. Extra high is the raised final high tone of a sequence of high tones on a single morpheme as in [d<sup>h</sup>áá\*] *black*. The tonemes of the second morpheme in a sequence of morphemes with high tones may also be extra high as in [bíší-ńá\*] *her pineapple*. Normal high is the non-fluctuating high as heard in all morphemes carrying one high tone such as *bílú cat*, *śáśi eating*. It is also the initial tone of a series in which the second high fluctuates to extra high. Lowered high is represented by the lowered initial high tone of a high high tone pattern as [bá<sup>h</sup>lí] *small*.

Normal mid tone is heard in all single occurrences of mid tone in a tone pattern such as in *čit<sup>v</sup>à banana*, *yāk<sup>w</sup>i<sup>n</sup> armadillo* and *kisī clay pot*. It is also represented by both tones of a mid mid tone pattern when there is no fluctuation as in *čēlē rooster* and *kūñū will run*.

The fifth pitch is represented by the lowered final mid tone of a mid pattern as in [tā́tā́] *papa* or [itū́] *cornfield*. In a series of morphemes carrying mid tones the final mid tone may be lowered as in [čiyō-rā́] *his roof tile*. Further it is represented by the raised initial low tone of a low low tone pattern as [kà\*à] *metal, glass* and [kʷi\*ni] *ocelot*. It is at this point of intersection that the fourth toneme in the San Esteban dialect developed.<sup>7</sup>

The two lowest tones are normal low and lowered final low. Normal low occurs in all single occurrences of a low tone in a tone pattern as kátʷà *spindle*, lōlō *foam*, tʷòkó *ant* and šiyō *skirt*. Normal low is also represented by the initial low tone of a low pattern in which it has not fluctuated as in kũñù *meat* or šèʷè *chips, splinters*. Extra low occurs when the final tone of a low low pattern is lowered as in [sòkòˆ] *shoulders* and [kʷi\*ni] *ocelot*. It is also heard on the second morpheme in a series carrying all low tones as [šèʷè-ràˆ] *his chips* or [sòkò kʷi\*ni] *the ocelot's shoulders*.

The restrictions on the occurrence of these extra tones are those of location. Those on the initial syllable of a morpheme or initial member of a series of morphemes only occur following silence. Those on the final syllable of a morpheme or final member of a series of morphemes only occur preceding silence.

These extra tones must be considered nonphonemic because the place and method of their production are predictable, though their occurrence is optional. There are no stable tone patterns (i.e. basic or perturbed) which include these tones. The inclusion of these extra tones as regular members of the tonemic system would leave many unlikely gaps in the system of possible tone patterns. Finally, there is no evidence from the perturbation system to warrant their inclusion as phonemic.

#### Tone Patterns

There are nine possible tone patterns in the three tone system. All of these occur as basic, non-perturbed lexical patterns. All patterns representing perturbation also take one of these nine forms. Examples of the nine basic tone patterns are as follows: high high ʷdíní *fawn*, káátá *will not sing*; high mid yéʷè *doorway*, šítá *singing*; high low kátyà *spindle*, šákù *laughing*; mid high kótó *shirt*, kátá *will itch*; mid mid čělē *rooster*, kũñù *will run*; mid low kìnì *pig* and kōsò *will irrigate*; low high tʷáká *fish*, yòsò *not mounted*; low mid tʷúkù *louse*, šinū *ran*; low low kũñù *meat*, šákù *laughed*.

As might be expected there are homophones, some whose basic patterns are identical, others which are the result of perturbations. For example kánā *will call* and kánā *will card wool*; kātā *will sing*, kātā *will weigh*. These verbs are homophonous only in the potential aspect.

Homophones are distinguished by criteria additional to that of the semantic context. kánā *call versus kánā to card wool* belong to different perturbation classes. The verb kánā *call* does not cause the perturbation of following nouns or pronouns;

<sup>7</sup> See Mak, Cornelia, "A Comparison of Two Mixtec Tone Systems," *International Journal of American Linguistics* XIX (April, 1953), 87.

the verb kánā *card* causes the perturbation to low of the tonemes of all perturbable pronouns. Compare: kánā-rà *he will card* and kánā-rā *he will call*; kánā-ñà *she will card* and kánā-ñá *she will call*. Other verbs such as kātā *sing* and kātā *weigh* are homophonous only in the affirmative and negative potential aspects, in all other aspects there are differences in their segmental phoneme constituents. To illustrate: kātā *sing* becomes šítá *singing* kātā *weigh* becomes kátā *weighing*.

#### Tone Classes

All MPTU's fall into certain arbitrary groupings according to their function in the tonemic system. These arbitrary groupings are referred to as tone classes. Each of the four classes of words, i.e. nouns, pronouns, modifiers, and verbs, has its own distinct tone classes. Each tone class is determined by (1) the manner in which it causes the tonemes of MPTU's belonging to other tone classes to perturb, (2) the classes of MPTU's whose tonemes it has the power to perturb, and (3) whether its own basic tonemes may be perturbed. The nouns and pronouns are divided into three classes, the verbs into four, and the modifiers into five.

#### Crystallizations

Rather as an addendum to the structure of the tonemic system are the crystallized remnants of obsolete tonemic systems. These crystallizations are of two different types, and judging from parallels within the present system, represent two different functions. The first of these types considered here parallels the present perturbation system and probably represents a similar system. The second type parallels a system of fusions currently functioning in the tonemic system. This type actualizes as glides.

The crystallizations of older tonemic systems only remain in some close-knit constructions and never in regular syntactic environments.<sup>8</sup> The extant system of tonemic perturbation, to the contrary, is found in both places. These crystallizations are found only in the noun and verb classes, whereas the present system is operative in these and also in the pronoun and modifier classes. Between the crystallizations found in the noun class and verb class there are but few differences. In crystallized forms of the noun class, examples of regressive perturbation are observable and hence simultaneous regressive and progressive perturbation of two contiguous forms. In the verb class there is only progressive perturbation.

Although the crystallizations appear to represent more than one extinct system, no attempt is made in this description to distinguish between them. Each type is treated as a unit even though it may contain items from more than one old system. The present system of mechanical perturbation and the lexical tones of all items are taken as the norm, while deviations from it are considered to be representatives of older systems.

<sup>8</sup> Mak describes a rather extensive system of "special sequence perturbations" which appear to be somewhat like the crystallizations treated here. See *Ibid.*, 93-95. Cf. Mak, "The Tonal System of a Third Mixtec Dialect".

The items considered here as the crystallized remnants of old tonemic systems are those which in certain respects parallel the present system, but in other important respects differ from it. The differences are of such a nature as would destroy any reasonable system in terms of order, coherence, and predictability were this material to be incorporated into the present system as current function. The inclusion would create numerous conflicting, overlapping perturbation classes. Difference in the direction and manner of perturbation would also introduce considerable disorder.

The systems (the obsolete and the present) have in common the fact that they include the same number of tones and patterns. Also the older systems show evidence of having perturbation classes similar to those of the current system, but with a different distribution of included items. For example  $\tilde{n}\tilde{u}^{\tilde{n}}\tilde{u}^{\tilde{n}}$  *earth* now belongs to a perturbation class which causes perturbation of the tonemes of MPTU's of certain other perturbation classes, but the tonemes of which are themselves never perturbed. Note  $\tilde{n}\tilde{u}^{\tilde{n}}\tilde{u}^{\tilde{n}}$  *earth* +  $y\tilde{u}$  *rock* >  $\tilde{n}\tilde{u}^{\tilde{n}}\tilde{u}^{\tilde{n}}$   $y\tilde{u}$  *rocky earth*. Formerly  $\tilde{n}\tilde{u}^{\tilde{n}}\tilde{u}^{\tilde{n}}$  *earth* belonged to a perturbation class whose tonemes were perturbed to high mid as in  $\tilde{i}\tilde{t}\tilde{a}$   $k\tilde{u}\tilde{n}\tilde{u}^{\tilde{n}}\tilde{u}^{\tilde{n}}$  *wild flower* <  $\tilde{i}\tilde{t}\tilde{a}$  *flower* +  $k\tilde{u}$  *to be* quality or characteristic +  $\tilde{n}\tilde{u}^{\tilde{n}}\tilde{u}^{\tilde{n}}$  *mountain, earth*. Similarly both  $y\tilde{u}$  *rock* and  $t\tilde{y}\tilde{a}\tilde{a}$  *man* belong at the present time to the same perturbation class. Their tonemes may be perturbed to high low by certain preceding morphemes, for example:  $k\tilde{u}y\tilde{u}$  *to stone* <  $k\tilde{u}$  *to be* +  $y\tilde{u}$  *rock, stone* and  $k\tilde{u}t\tilde{y}\tilde{a}\tilde{a}$  *to be valiant or manly* <  $k\tilde{u}$  *to be* +  $t\tilde{y}\tilde{a}\tilde{a}$  *man*. In the older system however they were not members of the same perturbation class as evidenced by the following examples:  $k\tilde{a}\tilde{s}\tilde{a}$   $y\tilde{u}$  *to make hard like rock* <  $k\tilde{a}\tilde{s}\tilde{a}$  *to do or make* +  $y\tilde{u}$  *rock*, but  $k\tilde{a}\tilde{s}\tilde{a}$   $t\tilde{y}\tilde{a}\tilde{a}$  *to make valiant* <  $k\tilde{a}\tilde{s}\tilde{a}$  *to do or make* +  $t\tilde{y}\tilde{a}\tilde{a}$  *man*.

The current system is likewise similar to the older systems in that perturbation in both cases seems to have been only of contiguous items. However in the present system perturbation is always progressive; in the older systems there was evidently both regressive and progressive perturbation, even both simultaneously. At the present we see such things as  $t\tilde{y}\tilde{a}\tilde{a}$   $b\tilde{a}^{\tilde{a}}$  *the good man*, or  $b\tilde{a}^{\tilde{a}}$   $t\tilde{y}\tilde{a}\tilde{a}$  *the man is good*. In both examples the initial item represents the non-perturbed form and the following the perturbed form. In older systems are found such examples as these:  $t\tilde{u}\tilde{s}\tilde{a}\tilde{a}$  *stick on which the threads of woof are wrapped*,  $t\tilde{u}\tilde{s}\tilde{u}\tilde{b}\tilde{i}$  *large-leaf oak*, and  $t\tilde{u}\tilde{y}\tilde{e}^{\tilde{e}}$  *La Cruz y Morona (a place name)*. In the last two instances the morpheme  $t\tilde{u}$  bound form of  $y\tilde{u}t\tilde{u}^{\tilde{n}}$  *tree, pole, stick* shows regressive perturbation. In the phrase  $\tilde{s}\tilde{i}k^{\tilde{w}\tilde{a}}$   $b\tilde{e}^{\tilde{e}}$  *eaves of a house* <  $\tilde{s}\tilde{i}k^{\tilde{w}\tilde{a}}$  *eyebrow* and  $b\tilde{e}^{\tilde{e}}$  *house* there appears to be simultaneous regressive and progressive perturbation. Finally there are some similarities and many dissimilarities in the direction in terms of higher or lower tone which perturbation follows. In the extant system the perturbation of the initial tone (and only the initial tone) of nouns is upward. To illustrate:  $t\tilde{y}\tilde{a}\tilde{a}$  *man*,  $\tilde{i}^{\tilde{n}}$  *one* +  $t\tilde{y}\tilde{a}\tilde{a}$  >  $\tilde{i}^{\tilde{n}}$   $t\tilde{y}\tilde{a}\tilde{a}$  *one man*;  $k^{\tilde{w}\tilde{a}}\tilde{a}$  *many* +  $t\tilde{y}\tilde{a}\tilde{a}$  >  $k^{\tilde{w}\tilde{a}}\tilde{a}$   $t\tilde{y}\tilde{a}\tilde{a}$  *many men*. In contrast, observe that the perturbation of tonemes of  $y\tilde{u}$  *rock* in an old system raises both tones to high as in  $s\tilde{a}\tilde{a}$   $\tilde{n}\tilde{d}\tilde{i}y\tilde{u}$  *quail* <  $s\tilde{a}\tilde{a}$  *bird*  $\tilde{n}\tilde{d}\tilde{i}$  ? +  $y\tilde{u}$  *rock*).

Note also that there was perturbation to lower as  $\tilde{s}\tilde{i}^{\tilde{n}}b\tilde{e}^{\tilde{e}}$  *sides of a house* <  $\tilde{s}\tilde{i}^{\tilde{n}}$

*side* +  $b\tilde{e}^{\tilde{e}}$  *house* (progressive) and  $\tilde{s}\tilde{i}k^{\tilde{w}\tilde{a}}$   $b\tilde{e}^{\tilde{e}}$  *eaves of the house* <  $\tilde{s}\tilde{i}k^{\tilde{w}\tilde{a}}$  *eyebrow, bēē house*. As in the perturbation of both tonemes to high, both may be perturbed to low as in  $t\tilde{i}\tilde{s}\tilde{u}^{\tilde{m}\tilde{a}}$  *scorpion* <  $t\tilde{i}$  bound form of  $k\tilde{i}t\tilde{i}$  *animal* +  $s\tilde{u}^{\tilde{m}\tilde{a}}$  *tail*. Though both  $t\tilde{i}$  and  $s\tilde{u}^{\tilde{m}\tilde{a}}$  now belong to a class whose initial tones are perturbed to high as seen in  $k\tilde{u}m\tilde{i}$   $t\tilde{i}\tilde{s}\tilde{u}^{\tilde{m}\tilde{a}}$  *four scorpions* and  $k\tilde{u}m\tilde{i}$   $s\tilde{u}^{\tilde{m}\tilde{a}}$  *four tails*, in the older system seen in this construction, they apparently both belonged to a perturbation class whose tones were perturbed to lower.

In progressive perturbation there seems to have been perturbation either to high or low, involving one or both tonemes. In regressive perturbation there seems to have been perturbation to mid as well as high and low and involving the immediately preceding tone.

In progressive perturbation to high high<sup>9</sup> the second member in verb constructions includes examples from verbs, nouns and modifiers. Note the following with verbs:  $s\tilde{a}^{\tilde{d}\tilde{i}k\tilde{o}}$  *to return something borrowed* <  $s\tilde{a}$  *causative, transitivizer* +  $\tilde{d}\tilde{i}k\tilde{o}$  *return, go back again*;  $s\tilde{a}n\tilde{a}\tilde{a}$  *to err* <  $s\tilde{a}$  *causative* +  $n\tilde{a}\tilde{a}$  *to forget*. Examples with nouns:  $\tilde{n}\tilde{d}\tilde{u}y\tilde{u}$  *become hard like rock* <  $\tilde{n}\tilde{d}\tilde{u}$  *become* +  $y\tilde{u}$  *rock*;  $k\tilde{u}s\tilde{i}t\tilde{i}$  *to bow down, kneel* <  $k\tilde{u}$  *to be* (in the condition or position of) +  $s\tilde{i}t\tilde{i}$  *entrails*. Examples with modifiers:  $s\tilde{a}^{\tilde{d}\tilde{i}p\tilde{i}}$  *molest, distract (cause to be at its end)* <  $s\tilde{a}$  *transitivizer, causative* +  $\tilde{d}\tilde{i}p\tilde{i}$  *complete*.

With this type of perturbation in noun constructions nouns occur as the second member, with one exception where a modifier occurs as the second member. Note the following:  $t\tilde{y}\tilde{a}\tilde{s}\tilde{a}b\tilde{i}$  *Guschuapa (a place name)* <  $\tilde{i}t\tilde{y}\tilde{a}$  *river* +  $s\tilde{a}b\tilde{i}$  *rain, rain-god*;  $\tilde{n}\tilde{d}\tilde{i}c\tilde{e}^{\tilde{m}b\tilde{e}}$  *cocoon* <  $\tilde{n}\tilde{d}\tilde{i}$  *thing indicator* +  $c\tilde{e}^{\tilde{m}b\tilde{e}}$  *a pendant hung at the necks of children to keep away harm or sickness*. The single example of a modifier as the second member is  $s\tilde{a}b\tilde{i}$   $y\tilde{a}\tilde{a}$  *misty or soft rain* <  $s\tilde{a}b\tilde{i}$  *rain* +  $y\tilde{a}\tilde{a}$  *white (?)*. The construction  $t\tilde{y}\tilde{a}k^{\tilde{w}\tilde{a}}\tilde{a}n$  *Alcozauca (place name)* <  $\tilde{i}t\tilde{y}\tilde{a}$  *river* +  $k^{\tilde{w}\tilde{a}}\tilde{a}n$  *yellow* probably represents this same type of perturbation, but in the present tonal system the basic tones of  $k^{\tilde{w}\tilde{a}}\tilde{a}n$  *yellow* are high high. There are various other examples of MPTU's with high high tones which possibly represent the crystallized form of an old perturbation type. Certain loan words from Spanish also have this tonal pattern, which may indicate the period in which they were adopted. For example  $p\tilde{a}n\tilde{u}$  *shawl* <  $p\tilde{a}n\tilde{u}e\tilde{l}$  *handkerchief* and  $p\tilde{i}l\tilde{o}$  *vulture* <  $z\tilde{o}p\tilde{i}l\tilde{o}t\tilde{e}$ .

The progressive perturbation of the initial tone of the second member of verb constructions is quite similar to part of the present system of perturbation. It seems quite probable that this is the origin of the extant system; the only difference now noticeable being that of the included members. The only members of this group now recognizable are those which do not currently belong to a group whose tones may be perturbed.

Verb constructions which show this type of perturbation usually have a noun

<sup>9</sup> Cf. Longacre, op. cit., 106, where he treats 'frozen' phrases, reconstructs high high and high low as sandhi patterns. Note that Pike in *Tone Languages* finds high high as a regular sandhi pattern and variant of high mid.

as the second member, rarely a modifier. Note the following: *sākāā í<sup>n?</sup>ī<sup>n</sup> to give (another person) a steam bath* < *sā causative + kàā í<sup>n?</sup>ī<sup>n</sup> steam bath (the place)*; *kāsā íkī <sup>n</sup>dā<sup>a</sup> to double up the fist* < *kāsā to do or make, íkī bone + <sup>n</sup>dā<sup>a</sup> hand*. Neither *kàā iron* nor *íkí bone* presently belong to perturbation classes whose tones may be perturbed. Compare also *kūšīí become tough* < *kū become, state or condition + šīí tough (modifier)*.

Noun constructions which show this type of perturbation have as the second member verbs, nouns or modifiers. Example with verbs: *tikātā mange, scabies* < *tī animal indicator + kātā to itch*; *tikāsū<sup>n</sup> toasted tortilla* < *tī < <sup>n</sup>dī thing (?) + kāsū<sup>n</sup> will toast, fry*. Examples with nouns: *nū<sup>n</sup>díbí the coast* < *nū < nū<sup>n?</sup>ū<sup>n</sup> earth + <sup>n</sup>díbí sky (where earth and sky meet)*; *tīndíkī<sup>n</sup> sparks* < *tī (?) + <sup>n</sup>díkī<sup>n</sup> small seed (such as grass seed)*. Examples with modifiers: *<sup>n</sup>díkúšī<sup>n</sup> white body louse* < *<sup>n</sup>dī animal, thing (?) + kūšī<sup>n</sup> grisly whitish color*.

In the progressive perturbation to low low of the tones of the second member of constructions, there seem to be only noun constructions with one possible exception. Noun constructions include as the second member verbs, nouns, and modifiers. Examples with verbs: *tikāyū coals* < *tī ~ <sup>n</sup>dī animal or thing (?) + kāyū to crackle*; *tikèè blister* < *tī + kēè to go out*. Examples with nouns: *tī<sup>n</sup>d<sup>a</sup>yū Tlapa (a town)* < *tī + <sup>n</sup>d<sup>a</sup>yū mud lit. muddy place*; *tikòkò large globular gourd with a small opening* < *tī + kòkò coconut*. Examples with modifiers: *núkè<sup>?</sup>è patio* < *nū direction, place indicator + kē<sup>?</sup>è outside*; *yūbà yàšī<sup>n</sup> a fine-leafed herb* < *yūbà herb + yàšī<sup>n</sup> thin*. The one verb construction discovered to date: *kū<sup>?</sup>bī yàà to hurt slightly* < *kū<sup>?</sup>bī to pain or hurt + yāà white (?)*

In the progressive perturbation to low of the initial tone of the second member of the constructions, both verb and noun constructions are encountered, but they are very limited. Verbs constructions are the most numerous and include verbs, nouns, and modifiers as the second member. Examples with verbs: *kāčī<sup>?</sup>ī šà<sup>a</sup> to stub the foot* < *kā activizer and čī<sup>?</sup>ī to insert, enter + šà<sup>a</sup> foot*; *kā<sup>n</sup>dākābā to fall down* < *kā activizer + <sup>n</sup>dākābā to fall*. With noun: *kāsīnī to breakfast* < *kāsīnī breakfast*. With modifiers: *kānī <sup>n</sup>dīčī to stand (something) upright* < *kā activizer nī completive (?) <sup>n</sup>dīčī upright*; *kūšūšā<sup>n</sup> to be lazy* < *kū to be (state or condition) + šūšā<sup>n</sup> lazy*.

In noun constructions, only nouns figure as the second member. Note the single example *šī<sup>n</sup>bē<sup>?</sup>ē sides of the house* < *šī<sup>n</sup>ī<sup>n</sup> side bē<sup>?</sup>ē house*.

Regressive perturbation, which occurs only in noun constructions, is caused by the second member. It usually affects only the final tone of the first member, when that member has more than one syllable. Generally in such constructions the initial member consists of a single syllable preclitic or bound form of a morpheme. There are examples of regressive perturbation to high, mid, and low. Of perturbation to high: *yúkōtō hem* < *yū<sup>?</sup>ū mouth, border + kōtō shirt*; cf. *yū<sup>?</sup>ū yūšīnī edge of a hat* < *yū<sup>?</sup>ū mouth, border and yūšīnī hat* < *yū<sup>?</sup>ū edge and šīnī head*. This is the only recorded example of a full form being perturbed in this fashion. Note also *bēnū<sup>n?</sup>ū<sup>n</sup> church* < *bē<sup>?</sup>ē house* and *nū<sup>n?</sup>ū<sup>n</sup> sun (?)*. Perturbation to mid: *tūtābī boxwood bush*

< *tú yūtū<sup>n</sup> tree, stick* and *tābī (?)*. Perturbation to low: *túkāā ax handle* < *tú pole* and *kāā iron*; *t<sup>a</sup>tī<sup>n</sup>ī<sup>n</sup> sweat* < *<sup>n</sup>dūtyā water liquid* and *tī<sup>n</sup>ī<sup>n</sup> mouse*.

Simultaneous progressive and regressive perturbation is rare, but there are occurrences. Note *túkāā axe handle* in which *tú < yūtū<sup>n</sup> tree, pole* is perturbed to low while *kāā* has become high high; *šīk<sup>w</sup>à bē<sup>?</sup>ē eaves of house* in which *šīk<sup>w</sup>à eyebrow* is perturbed to mid low and *bē<sup>?</sup>ē house* to high mid.

While the samples given here as representative crystallizations of old perturbation systems form an important group they are relatively few in number. In every instance they differ in certain important respects from the current system of perturbation, so that it is necessary for the sake of system to consider them as being apart from it.

### Glides

There are two distinct types of glides in this dialect of Mixteco, one of which is described here and one which will be treated as fusion glides in the section on function. Regular glides differ from fusion glides in several respects; first they are not being formed by any observable process as are the fusion glides, and they occur on single MPTU's whereas fusion glides occur on bi-MPTU's. The regular glides are an important part of tone patterns in their function in the perturbation process and for this reason they are considered to be intrinsically important as independent structural entities.

There are two types of regular glides:<sup>10</sup> short and long as seen in *īsá(˘) day after tomorrow* and *tātā<sup>n</sup>ā<sup>n</sup> remedy*. Short glides are a sequence of two phonemic tones occurring on a single mora of vowel length. Long glides are a sequence of two phonemic tones occurring on more than one mora of vowel length i.e. long vowels (written as a sequence of two identical vowels).

The occurrence of regular glides bears certain definitive relationships to the MPTU. They occur only on single morphemes. There are two occurrences which appear to have been bi-morphemes historically, but now function as single morphemes. These are *yōótū tumpline* < *yōhó rope* and *tú pole, stick*; *yūútū woven palm band* (in some dialects *tumpline*) which seems to be a derivative of the former. These are paralleled by *nā-yūúbī world* < *nā- thing* and *yūúbī people*.

The morpheme pattern seems to have some importance as a contributing factor in determining where glides occur. Long glides occur frequently on the first vowel of CVV.V patterns, occasionally in CVVCV patterns and never in CV<sup>?</sup>V or CV<sup>?</sup>CV patterns. They occur in all patterns on the final vowel. Short glides in contradistinction occur on the final vowel of CV<sup>?</sup>V and CVCV (~<sup>?</sup>VCV) patterns, though never on the first. Likewise they occur on the first vowel of CV<sup>?</sup>CV patterns, which long glides do not do.

Regular glides, whether short or long, form an integral part of the tone pattern

<sup>10</sup> In this description a hyphen connects the two parts of a long glide. Parentheses enclose the tone (of short vowels) or tone and mora of vowel length (of long vowels) which distinguishes the triplet alloform from the couplet.

in which they occur, producing a tone triplet. These tone triplets act similarly to tone couplets. That is, tone triplets often distinguish one tone class from another characterized by tone couplets, where there would otherwise be no surface distinction. For example, all class A nouns of high low pattern have a final rising glide to mid, creating a high low mid triplet. Class B nouns of high low pattern do not have any glide. Likewise class B nouns of high high tone pattern have a down glide to mid forming a high high mid triplet. Class A nouns of high high tone pattern have no down glide. Thus in these and other series the distinction between tone perturbation classes is, among other things, a couplet-triplet tone pattern contrast.

Glides occur at four points in the MPTU. They occur on both the initial and terminal points of the vowels in both syllables of dissyllabic MPTU's. The basic criterion used for proposing the location at which glides occur is the difference in the way in which they appear in isolation and in context. Others, as those occurring on the initial vowel preceding glottal stop, are assumed to conform on the basis of pattern pressure.

Short glides usually occur on the terminal points of vowels, as páñú(˘) *shawl*, sí(˘)bí *small green parrot*, itū(˘) *cornfield*, yā(˘)ʔbī *expensive*. A few occur on the initial end as kwít(˘)ī *short*, and lēk(˘)ā *knapsack*. Their most frequent occurrence is on the vowel of the final syllable. Long glides occur on either the initial or terminal end of the final vowel of a dissyllabic morpheme and on the initial end of the first vowel. For example at the initial end of vowels: ˘d(ā)āā *maguery fiber*, and ˘diʔ(è)ē *peach*. Examples of those occurring at the terminal end of final vowels are: nāmà(ā) *soap*, and kibi(i) *name*.

Glides are most easily detected when preceding silence or glottal stop. Many appear to be lost or suppressed in context as kōšī *fig* + ˘nā *her* > kōšī-ñā(ā) *her fig*, but kōšī ñā-kā˘ā˘ (that) *her-that-one fig*. Some long glides are retained for emphasis in context: nùn(i)ī *corn* + ˘rā *his* usually becomes nùnī-rā *his corn*, but for emphasis occurs as nùn(i)ī-rā (It's) *his corn!*

The location and direction of glides is regular and similar to the system of fluctuation in certain respects. Glides occurring on the borders of the MPTU (i.e. the initial end of initial vowels and the terminal end of terminal vowels) except those from mid mid tone pattern, always originate or terminate at the mid tone level. Thus CV<sup>3</sup>V<sup>2</sup> (couplet alloform)<sup>11</sup> is CV<sup>2</sup>V<sup>3</sup>.V<sup>2</sup> (triplet alloform) as seen in sōò.ò *fruit rind*, and ī˘i˘.ī˘ *salt*. CV<sup>2</sup>V<sup>3</sup> (couplet alloform) is CV<sup>2</sup>.V<sup>3</sup>V<sup>2</sup> (triplet alloform) as in sō.ò.ò and ī˘.i˘.ī˘ (which is one perturbation pattern — for further information on this see the section on Mechanical Perturbation, subsection class C nouns). CV<sup>3</sup>V<sup>3</sup> (couplet alloform) is CV<sup>3</sup>V<sup>3</sup>V<sup>2</sup> (triplet alloform) as seen in lèè *infant*. CV<sup>2</sup>CV<sup>1</sup> (couplet alloform) is CV<sup>2</sup>CV<sup>12</sup> (triplet alloform) as in kōtó˘ *shirt* and ˘isá˘ *day*

<sup>11</sup> Because of printing generalized patterns are cited with numbers rather than accents for tones. Thus V<sup>1</sup> means vowel with high tone (written elsewhere with an acute accent), V<sup>2</sup> means vowel with mid tone (written elsewhere with a macron), and V<sup>3</sup> means vowel with low tone (written elsewhere with a grave accent).

after tomorrow. CV<sup>1</sup>CV<sup>3</sup> (couplet alloform) is CV<sup>1</sup>CV<sup>3</sup>V<sup>2</sup> (triplet alloform) as in tātā˘ā˘ *medicine* and bíkōò *cloud* (this also is a perturbed pattern — see Mechanical Perturbation class C nouns). Note also CVVCV as seen in yōótū *tumpline* which occurs in the one form only.

Glides, except those from mid mid pattern, which occur internally (i.e., on the initial end of final vowels) originate at the level of the tone on the preceding vowel. Thus CV<sup>1</sup>CV<sup>2</sup> (couplet alloform) is CV<sup>1</sup>CV<sup>12</sup> (triplet alloform) as in kwítí˘ *short*, and léká˘ *palm knapsack*. CV<sup>3</sup>CV<sup>2</sup> (couplet alloform) is CV<sup>3</sup>C<sup>3</sup>V<sup>2</sup> (triplet alloform) as seen in nùnī *corn* and tātā˘ā˘ *medicine*.

In the case of glides from mid tones, the glides are always downward to a point roughly midway between mid and low. Such glides always occur on the terminal end of the vowel regardless of whether it is the first or final vowel of the MPTU. Thus CV<sup>2</sup>V<sup>2</sup> (couplet alloform) is CV<sup>2</sup>V<sup>23</sup> (triplet alloform) as in ī˘i˘ *badger*. CV<sup>2</sup>CV<sup>2</sup> (couplet alloform) is CV<sup>2</sup>CV<sup>23</sup> (triplet alloform) as in ˘itā˘ *flower* and kākā˘ *lime*. In the pattern CV<sup>23</sup>CV<sup>2</sup> as in yā˘˘bī *expensive* there has been no observed couplet alloform. However, on the basis of pattern pressure created by forms such as kākā˘ ~ kākā˘ it is assumed that the glide occurs on the terminal end of the vowel.

All MPTU's having basic couplet-triplet alloforms tend to preserve both in perturbed patterns. Some MPTU's which apparently have only a basic couplet form have couplet-triplet alloforms in their perturbed patterns. The preservation or development of a triplet alloform in perturbed tone patterns always involves adding a mora of vowel length with mid tone to the terminal end of the final vowel of the MPTU.

Perturbation affects the location and direction of glides in individual MPTU's, but in no way changes the foregoing statements. Thus t˘(ā)āā *man* when perturbed to mid low t˘āā has no glide on the initial vowel which now has a basic mid tone, but has a glide to mid on the final vowel in the triplet alloform t˘āā(ā). When this same MPTU perturbs to a high low couplet alloform t˘āā it has the triplet alloform t˘āā(ā) with a glide to mid. Some MPTU's which have no glide in their unperturbed form do show such when perturbed. For example, the pronominal clitic ˘nā *her, she* which becomes ñā(ā) ~ ñā(˘).

#### Function

The basic concepts delineating the function of the present tonal system are relatively simple, but the considerable number of possible relationships complicates its working. There are two types of tonal change: mechanical perturbation of basic tonemes, and the morphologically significant substitution of one tone pattern for another. Mechanical perturbation occurs in three of the four morpheme classes: nouns, pronouns, and modifiers. Substitution of morphotonemes occurs principally in the verb class, but is also operative in the process by which morphemes of one class may be derived from morphemes of another class e.g. modifiers derived from nouns. In each of the morpheme classes where mechanical perturbation occurs, it manifests certain characteristics peculiar to that class alone. Thus each of the four morpheme



classes is tonemically definable and distinct. For this reason, each class will be described separately.

#### Mechanical Perturbation

The mechanical perturbation of the tonemes of a morpheme does not change its semantic or morphological value. By perturbation two morphemes minimally different by tone may become identical in form, although not in meaning or morphological classification. For example: *íçí* dry when perturbed becomes *íçí* and identical in form with *íçí* road. Likewise morphemes identical in form can become dissimilar through perturbation as *kū<sup>h</sup>bā* sister (of a man) and *kū<sup>h</sup>bā* measurement. In perturbing contexts the tonemes of *kū<sup>h</sup>bā* sister > *kú<sup>h</sup>bā* whereas those of *kū<sup>h</sup>bā* measurement remain unchanged: *kùmí* *kú<sup>h</sup>bā* four sisters but *kùmí* *kū<sup>h</sup>bā* four measurements. Other homophones such as *n(i)ii* dried ear of corn and *n(i)ii* blood belong to the same perturbation class and continue to be homophonous after perturbation. To illustrate: *k<sup>w</sup>á<sup>h</sup>á* much plus *nii* blood becomes *k<sup>w</sup>á<sup>h</sup>á* *nii(i)* much blood; *k<sup>w</sup>á<sup>h</sup>á* much plus *nii* dried ear of corn becomes *k<sup>w</sup>á<sup>h</sup>á* *nii(i)* many ears of corn.

All mechanical perturbation is contiguous and progressive in nature, that is, perturbation is always caused by the immediately preceding morpheme. In some instances, the entire tonal pattern may be changed as for example: *t<sup>v</sup>áá* man becomes *t<sup>v</sup>áá* and in certain contexts *t<sup>v</sup>áá*; *<sup>n</sup>d<sup>v</sup>áá* black becomes *<sup>n</sup>d<sup>v</sup>áá*. In other cases, perturbation is that of the first tone only: *bē<sup>h</sup>ē* house becomes *bē<sup>h</sup>ē* as in *kùmí* *bē<sup>h</sup>ē* four houses.

Compound MPTU's behave differently from simple MPTU's as previously mentioned. It is possible to perturb the entire tonal pattern of a simple MPTU (see above), but only the initial member of a bi-MPTU may be perturbed by a preceding morpheme, as seen in *bē<sup>h</sup>ú<sup>n</sup>* your house < *bē<sup>h</sup>ē* house and *-ú<sup>n</sup>* / *-kú<sup>n</sup>* your, which in context with the perturbing morpheme *kùmí* four becomes *kùmí* *bē<sup>h</sup>ú<sup>n</sup>* your four houses. It is the perturbation class of the final member of a compound MPTU which determines its perturbing powers; compare *bē<sup>h</sup>ē* *k<sup>w</sup>á<sup>h</sup>á* red house < *bē<sup>h</sup>ē* house, a class C noun with perturbing power + *k<sup>w</sup>á<sup>h</sup>á* red with *békàà* *k<sup>w</sup>á<sup>h</sup>á* red jail < *bē<sup>h</sup>ē* house (C noun) + *kàà* iron (class B noun without perturbing power) + *k<sup>w</sup>á<sup>h</sup>á* red.

A morpheme capable of causing the perturbation of the tonemes of another morpheme does so even though its own tonemes have been perturbed. For example, *yùšíní* hat < *yù* ~ *yù<sup>h</sup>ú* mouth, border plus *šíní* head + *t<sup>v</sup>áá* man > *yùšíní* *t<sup>v</sup>áá* the man's hat. There is perturbation of *t<sup>v</sup>áá* by *šíní* although its own tones have already been perturbed. There does not appear to be any limit as to the theoretical number of successive perturbations possible. Note the hypothetical, though correct, example: *kùmí* *kìbì* *t<sup>v</sup>áá* *bá<sup>h</sup>à* the good man's four names < *kùmí* four (Cm) *kìbì(i)* name (Cn), *t<sup>v</sup>áá* man (Cn), *bá<sup>h</sup>à* good (Bm). The practical limit, however is usually two for semantic reasons.

The description given here of mechanical perturbation is based on speech spoken

at medium speed. In fast speech, glides occurring in normal speech tend to disappear, but other glides may appear, as the result of morpheme fusion. At times only a tonal glide remains to indicate the presence of more than one morpheme. To illustrate: *kótó* shirt + *yóó* our (perturbed form of *yóó*) becomes *kótó* our shirts.

In slow speech, the glides of normal speech tend to be longer with extra rises or falls obscuring the terminal points.

#### Nouns

The perturbation system of nouns is described first because nouns comprise the largest class of perturbable items, and because the noun perturbation system is the most regular. Further, the system of perturbation operative in the noun class of morphemes appears to represent the latest and most important development in the overall perturbation system of this dialect. There are certain parallels to it in both the pronominal and modifier systems of perturbation.

Perturbation in the noun system is to a higher tone, with a few exceptions. The regular resultant patterns of perturbation are mid low and high low; the special resultant pattern is low low. The normal patterns have the potential of a low mid long glide on the terminal end of the final vowel.

Nouns are divided into three perturbation classes on the basis of their function in the perturbation system. These classes are designated with the letters A, B, and C. In addition to the differences in perturbation characteristics, there are certain surface distinctions between the various classes. Thus An include members from all tonal patterns terminating in a mid or high tone. It also includes some members having a high low(-mid) triplet tone pattern. The mid tone actualizes as part of a low-mid long glide. This glide to mid limits in effect the possible tone patterns of class A nouns to those ending in mid or high tone. Further, the high low (-mid) triplet pattern distinguishes these MPTU's from class B nouns of high low couplet pattern. There are other surface distinctions between An, Bn, and Cn. Between An and Bn tone patterns of high high and mid high there is a couplet-triplet distinction with a long high-mid glide potential on all Bn but not on An. Thus, with one possible exception (low high) all Bn in effect terminate with a mid or low tone. An and Cn mid mid or low mid tone pattern MPTU's are distinguished from Bn mid mid or low mid tone pattern MPTU's by a mid-low long glide potential on the final vowel of Bn's only. There is a couplet-triplet distinction. Cn of C(V<sup>2</sup>)V<sup>3</sup>.V<sup>2</sup> pattern are distinguished from An and Bn of low mid tone pattern by having a (mid)-low long glide potential on the first vowel which the other two do not have.

Class B and C nouns of mid low and low low tone patterns are distinguishable from each other in that class C nouns have couplet triplet alloforms. Class C nouns never contain a high tone and always end on a mid tone.

#### Class A Nouns

The perturbation characteristics of class A nouns (An) are: the tonemes of An are never perturbed; they cause the tonemes of certain Cn and Bn to perturb.

An cause the perturbation of the tones of Cn to mid low (-mid) as <sup>nd</sup>dàkú *hominy* (An) plus tʷ(ā)āā *man* (Cn) > <sup>nd</sup>dàkú tʷāā(ā) *the man's hominy*.

An cause the perturbation of the tones of class B modifiers (Bm) with low mid pattern to mid low, as <sup>nd</sup>dīšī *roasting ear of corn* (An) plus bàʷā *good* (Bm) > <sup>nd</sup>dīšī bàʷā *good roasting ear*.

#### Class B Nouns

The perturbation characteristics of class B nouns (Bn) are: the tonemes of Bn, except those of mid low tone pattern, are never perturbed; they do not regularly cause perturbation of other nouns; they do, however, cause the tonemes of certain Cn to perturb to a special pattern, likewise class B and C modifiers. Bn cause regular perturbation of the tonemes of class B and class C pronouns, and of class B and class C modifiers.

Class B nouns cause the tonemes of class A and class C pronouns to perturb to low. In the case of class C pronouns, there is a low-mid (or higher) long glide potential. Thus kōtó *shirt* (Bn) plus -rā *his* (Bp) > kōtó-rā *his shirt*; yàkū<sup>n</sup> *hair brush* (Bn) plus -ñá *her* (Cp) > yàkū<sup>n</sup>-ñáā *her hair brush*.

Class B nouns with mid mid (-low) tone pattern perturb class C modifiers of high mid/high (high)-mid tone patterns to mid high/mid high (-mid). Thus itā<sup>n</sup> *flower* (Bn) plus k<sup>w</sup>áʷā *red* (Bm) > itā<sup>n</sup> k<sup>w</sup>áʷā *red flower*; also itū *cornfield* (Bn) plus ícīē *dry* (Cm) > itū ícīē *dry cornfield*.

There is potential (optional) perturbation of class B modifiers by Bn. Class B modifiers of high high tone pattern perturb to low mid as <sup>nd</sup>dūkū *rod* (Bn) plus bálí *small* (Bm) > <sup>nd</sup>dūkū bálí *small rod*. Class C modifiers of high mid or high (-high) -mid tonal patterns perturb to mid high. Those of high (-high)-mid have this potential high-mid short glide on the final tone. Thus <sup>nd</sup>dàbā *rafter pole* (Bn) plus ícī<sup>n</sup> *dry* (Cm) > <sup>nd</sup>dàbā ícī(-) *dry rafter pole*; also tū<sup>n</sup>dú *madroño wood* (Bn) plus k<sup>w</sup>áʷā *red* (Bm) > tū<sup>n</sup>dú k<sup>w</sup>áʷā *red madroño wood*.

As a special, rare type of perturbation Bn cause the tonemes of CV<sup>3</sup>.V<sup>2</sup> class C nouns to perturb to low low. Thus ní<sup>n</sup>mà *heart* (Bn) plus tʷāā *man* (Cn) > ní<sup>n</sup>mà tʷāā *the man's heart*. Likewise, Bn sometimes cause the tonemes of low mid class B modifiers and mid low class C modifiers to perturb to low low. Thus lášá<sup>n</sup> *orange* (Bn) plus bàʷā *good* (Bm) > lášá<sup>n</sup> bàʷā *good orange*; yú<sup>n</sup>cī *machete* (Bn) + <sup>nd</sup>dāā *level, straight* (Cm) > yú<sup>n</sup>cī <sup>nd</sup>dāā *straight machete*.

This type of perturbation to low parallels the regular perturbation caused by Bn on most morpheme and perturbation classes affected by it. The morpheme and perturbation classes treated here are not regularly affected by Bn, nor do they ever in other environments perturb in this fashion. Perhaps this indicates a developing trend for the extension of Bn perturbing powers.

There is a sub-class of B nouns (termed B<sub>1n</sub>) all of mid low tonal pattern, whose tones are perturbed to high low by class D modifiers. Thus k<sup>w</sup>áʷā *many, much* (Dm) + tʷáyù *chair* (B<sub>1n</sub>) > k<sup>w</sup>áʷā tʷáyù *many chairs*. Class B<sub>1</sub> nouns perturb

pronouns and modifiers in the same fashion as do other class B nouns. Although B<sub>1</sub> nouns are themselves perturbed in the same fashion as class C nouns of mid-low tonal pattern, they are classified as B nouns because of their perturbing action upon the pronouns and modifiers.

#### Class C nouns

These comprise the regular class of perturbable nouns. This group has the most diverse system of mechanical perturbation of the nouns. A certain group of Cn MPTU's have couplet-triplet tone pattern alloforms; for example: nūnī *corn* ~ nūnī and kōō *snake* ~ kōōō. The triplet form of class C nouns occurs optionally in isolation, next to silence, or for emphasis in context. The couplet form may occur in isolation or be followed by silence, but is usually heard in context. The classification of Cn on the basis of their couplet-triplet distinction is essential for establishing criteria in the Cn perturbation system. The couplet alloform (Cn<sup>2</sup>) is basic for the description of certain procedures, as the triplet alloform (Cn<sup>3</sup>) is for others.

In the process of perturbation, the couplet alloform acts as the basic form, hence in some of the tonal patterns the entire pattern is perturbed. To illustrate: tʷāāā *man* is perturbed to tʷāā(ā) in some contexts and to tʷāā(ā) in others. The form tʷāāā is identical in appearance with the unperturbed triplet alloform tyāāā, however the triplet normally loses the initial mora of vowel length and the accompanying mid tone when it occurs in context, becoming tʷāā, but the perturbed form loses the final mora of vowel length and its accompanying mid tone and becomes tʷāā. Further, CV<sup>3</sup>CV<sup>2</sup> pattern Cn tone couplet alloforms show identical perturbation patterns, i.e. mid low (-mid) and high low (-mid), as do the CV<sup>3</sup>V<sup>2</sup>. The triplet alloform of CV<sup>3</sup>CV<sup>2</sup> is low (low) -mid. Since then both the CV<sup>3</sup>V<sup>2</sup> and CV<sup>3</sup>CV<sup>2</sup> MPTU's have identical couplet tone patterns and identical perturbation patterns, the similarity between the unperturbed triplet alloform and one of the perturbed triplet alloforms of the CVV is seen to be rather an accident of the system than a significant characteristic.

It should be noted that in both of these morpheme patterns, CVV and CVCV, the extra mora of vowel length with its tone occurs on the initial end of the vowel. The distinction lies in that in the CVV pattern it is added to the initial vowel, whereas in the CVCV pattern it is added to the second vowel, which determines the tone of the additional mora of vowel length.

The perturbation characteristics of the Cn are: the tonemes of certain Cn are perturbable by An, Cn<sup>2</sup>, Am, and Av to a mid low (-mid) pattern. They are perturbable by Cn<sup>3</sup>, Cp, Bm, Dm, Cv and Dv to a high low (-mid) or high mid pattern, depending on the tone pattern of the unperturbed form. Cn cause the tonemes of class B pronouns and class B modifiers to perturb.

The tones of Cn are perturbed by An to a mid low (-mid) pattern. Thus yāšī<sup>n</sup> *gourd* (An) + tʷ(ā)āā *man* (Cn) > yāšī<sup>n</sup> tʷāā(ā) *the man's gourd*.

The tonemes of class C nouns, except those of mid mid pattern, are perturbed

by Cn<sup>2</sup> to a mid low (-mid) tone pattern. Thus bē<sup>2</sup>ē house (Cn) plus t<sup>2</sup>(ā)ā man (Cn) > bē<sup>2</sup>ē t<sup>2</sup>(ā)ā the man's house.

The tones of Cn, except those of mid mid pattern, are perturbed by Cn<sup>3</sup> to a high low (-mid) pattern. Thus nāñ(ā)ā chayote (Cn) + t<sup>2</sup>(ā)ā man (Cn) > nāñā t<sup>2</sup>(ā)ā the man's chayote.

The tonemes of mid mid Cn are perturbed to high mid by Cn<sup>3</sup>. Thus yūbì(i) palm mat (Cn) + sē<sup>2</sup>ē son / offspring > yūbì sē<sup>2</sup>ē the son's mat.

Class C nouns are perturbed by class C pronouns to a high low (-mid) tone pattern, as šinī knowing, acquainted with + <sup>n</sup>dó you plural (Cpr) + yūbì(i) palm mat (Cn) > šinī<sup>n</sup>dó yūbì(i) you know the mats.

All Class C nouns are perturbed by class A modifiers to a high low (-mid) pattern, as in kúkū<sup>n</sup> thick (Am) + bišī<sup>n</sup>(i<sup>n</sup>) leafy branch (Cn) > kúkū<sup>n</sup> bišī<sup>n</sup>(i<sup>n</sup>) the branch is thick.

Class C nouns are perturbed by class B modifiers to a high low (-mid) pattern as yāsī<sup>n</sup> delicious (Bm) + <sup>n</sup>dí<sup>2</sup>ē(ē) peach (Cn) > yāsī<sup>n</sup> <sup>n</sup>dí<sup>2</sup>ē(ē) the peach is delicious.

Class C nouns are perturbed by class C modifiers to a high low (-mid) pattern: <sup>n</sup>dāā level (Cm) + nāmà wall (Cn) > <sup>n</sup>dāā nāmà. The well is level.

Class C nouns, except those of mid-mid tonal pattern, are perturbed by class D modifiers to high low (-mid): kīnī ugly (Cm) + t<sup>2</sup>(ā)ā man (Cn) > kīnī t<sup>2</sup>(ā)ā the man is ugly; yā<sup>2</sup>bī expensive (Dm) + bē<sup>2</sup>ē house (Cn) > yā<sup>2</sup>bī bē<sup>2</sup>ē the house is expensive.

Class C nouns are perturbed by class C verbs to high low (-mid) pattern: t<sup>2</sup>(ā)ā man (Cn), šá<sup>2</sup>nī is killing (Cv) + kīnī pig (Cn) > t<sup>2</sup>(ā)ā šá<sup>2</sup>nī kīnī the man is killing the pig.

Class C nouns are perturbed by class D verbs: to high low (-mid) pattern: <sup>n</sup>dābā sprang (Dv) + k<sup>w</sup>i<sup>n</sup> ocelot (Cn) > <sup>n</sup>dābā k<sup>w</sup>i<sup>n</sup> the ocelot sprang.

Class C nouns cause the tonemes of other class C nouns to perturb in the manner already described.

Class C nouns with a triplet tone pattern cause the perturbation of the tonemes of class B pronouns to high low (-mid) or the fraction possible. For example: <sup>n</sup>dí<sup>2</sup>ē(ē) peach (Cn) + yū<sup>2</sup>ù I, my (Cp) > <sup>n</sup>dí<sup>2</sup>ē yū<sup>2</sup>ù(ū) my peach; <sup>n</sup>d(ā)ā maguey fiber (Cn) + rā he/his (Bp) > <sup>n</sup>dāā-rā his maguey fiber.

Class C nouns cause the perturbation of the tonemes of class B modifiers. Cn<sup>2</sup> tend to cause B modifiers to perturb to a high mid tone pattern before silence. Cn<sup>3</sup> tend to cause the tones of B modifiers to perturb to a high low (-mid) tone pattern before silence. Either a Cn<sup>2</sup> or Cn<sup>3</sup> may, however, cause perturbation to either pattern before silence. In context the pattern is high low, as seen in <sup>n</sup>d(ā)ā maguey fiber (Cn) + bā<sup>2</sup>ā good (Bm) > <sup>n</sup>dāā bā<sup>2</sup>ā(ā) good maguey fiber.

#### Pronouns

Perturbation in the pronominal system is to either higher or lower. Perturbation

to high results in a high low (-mid) (or fraction possible) tone pattern. In this it parallels part of the noun perturbation system. The perturbation to low parallels to a certain extent that of the modifier system. Basic tone patterns have no glides, whereas the perturbed tone patterns may have them.

The pronouns are divided into three tonemic perturbation classes designated A, B, and C. One distinctive feature of the pronouns is the presence of full, short, and alternate forms. In most cases, irrespective of the form in which they occur there is no change of either lexical tone or perturbation class. The exceptions are the second person singular yó<sup>2</sup>ò (Ap) with clitic forms -kú<sup>n</sup> ~ -ú<sup>n</sup> (Cp) and the second person plural <sup>n</sup>dó<sup>2</sup>ò (Ap) whose clitic form is <sup>n</sup>dó (Cp).

#### Class A Pronouns

There are two class A pronouns: yó<sup>2</sup>ò second person singular, masculine or feminine, and <sup>n</sup>dó<sup>2</sup>ò second person plural, masculine or feminine. They can neither themselves be perturbed nor do they ever cause the perturbation of any morpheme.

#### Class B pronouns

The Class B pronouns are: yū<sup>2</sup>ù ~ yū / -ī first person singular; <sup>n</sup>dū<sup>2</sup>ù ~ <sup>n</sup>ndū first person plural exclusive; rā ~ -rā third person singular masculine; -ñā<sup>n</sup> ~ -ā<sup>n</sup> ~ -ē<sup>n</sup> third person inanimate singular and plural; <sup>n</sup>d<sup>2</sup>ā- / <sup>n</sup>d<sup>2</sup>ā third person dual; nā- / -nā third person plural. Class B pronouns cause both B pronouns and C pronouns to perturb to low. They are themselves perturbed by certain Bn, Cn, Bb, Cp, and C verbs.

Class B pronouns cause the tonemes of both Class B and C pronouns to be perturbed to low; in the case of C pronouns, to low (-mid). In the Cp yóó we inclusive the initial tone is perturbed to low and the glide (phonetic) is back to high. Thus: šinī- seeing, plus -rā he (Bp) plus yū<sup>2</sup>ù me (Bp) > šinī-rā yū<sup>2</sup>ù he sees me; with -ñā her/she (Cp) > šinī-rā-ñā(ā) he sees her; with yóó us inclusive (Cp) šinī-rā-yóó he sees us.

The tonemes of Bp are perturbed to low following Bn; šùšā incense (Bn) plus -rā his (Bp) > šùšā-rā his incense.

The tonemes of Bp are perturbed following Cn of triplet tone pattern to high-low(-mid), or the fraction possible. Thus nāmà(ā) soap (Cn) plus yū<sup>2</sup>ù my (Bp) > nāmà yū<sup>2</sup>ù(ū) my soap; with -rā his (Bp) > nāmà-rā his soap. Bp do not perturb following Cn couplet patterns.

#### Class C pronouns

The class C pronouns are: -kú<sup>n</sup> / -ú<sup>n</sup> second person singular, masculine or feminine; -ñā / -ñāā ~ -á-é third person feminine, -rí (ríí) animal; yóó first person plural inclusive; <sup>n</sup>ndí first person plural exclusive.

Class C pronouns are perturbed by all class B nouns: tānī belt (Bn) and -kú<sup>n</sup> (Cpr) > tānī-kú<sup>n</sup> your belt; yāà tongue (Bn) + -ñā her (Cpr) > yāà-ñā her tongue.

Class C pronouns are perturbed by class C verbs: *tʷāā* (Cn) *man*, *šáʷnī* *kill* (Cv) + *-rí* *animal* (Cpr) > *tʷāā šáʷnī-rí* *the man is killing the animal*.

Class C pronouns are perturbed by class B verbs: *šānī* *dreaming* (Bv) + *-ñā* *3rd person feminine she/her* > *šānī-ñā* *she is dreaming*.

Class C pronouns perturb class C nouns: *šínī* *knows* (Cv) + *-ñā* *her* (Cpr) + *tʷāā* *man* (Cn) > *šínī-ñā tʷāā(ā)* *she knows the man*; *šínī* *knows* (Cv) + *-ñā* *she* (Cpr) + *bēʷē* *house* (Cn) > *šínī-ñā bēʷē* *she knows the house*.

#### Modifiers

The modifier tonal system comprises the most complex and most diversified of the mechanical perturbation systems. There are five perturbation classes designated by letters A through E: Class A modifiers (Am) are non-perturbable; they cause the perturbation of Cn to mid low; Class B modifiers (Bm) are perturbable; they cause the perturbation to mid low of the tonemes of Class C nouns; Class C modifiers (Cm) are perturbable; they cause the perturbation to mid low of the tonemes of Class C nouns; they cause the perturbation to low of the tonemes of all Class B and C pronouns; Class D modifiers are non-perturbable; they cause the perturbation to high low (-mid) of the tonemes of mid low couplets of Class C nouns; Class E modifiers (Em) are non-perturbable and do not cause the perturbation of the tonemes of any other morphemes.

As an aid to description these five classes have been regrouped into two macro groups according to the tonal perturbation of the modifiers themselves and according to their perturbing influence upon other classes of morphemes. Thus in macro group I there are two alloclasses (1) those whose tonemes are unperturbed, namely A, D, E; (2) those whose tonemes are perturbable, or B and C.

Nothing further need be said regarding alloclass (1) at this point because their tonemes are never perturbed. In alloclass (2) perturbation is of three types: to lower, to higher, and a pattern of perturbation metathesis.

All modifiers of alloclass (2) of high high tone pattern are perturbed to low mid by class B nouns: *yákā* *dust* (Bn) + *bálí* *small, fine* (Bm) > *yákā bálí* *fine dust*.

Modifiers with a mid low tone pattern undergo a unique type of perturbation to low low following Bn. This is optional and rare. Thus *yúčì* *machete* (Bn) + *ʷdākù* *strong* (Cm) > *yúčì ʷdākù* *strong machete*.

Modifiers with a low mid or low low tone pattern are perturbed by class A nouns to a mid low pattern: *yāšín* *gourd* (An) + *bàʷā* *good* (Bm) > *yāšín bàʷā* *a good gourd*; *ʷdʷúší* *hen* (An) + *čākō* *bearded (heavy face hair or feathers)* (Cm) > *ʷdʷúší čākō* *a bearded hen*, also *ʷdīší* *a roasting ear of corn* (An) + *bīší* *sweet* (Cm) > *ʷdīší bīší* *a sweet roasting ear*.

Further modifiers of low mid and low low tone patterns have their tonemes perturbed to high low (alternate high mid) by class B pronouns, class C nouns and class C verbs. Thus *-ñā* *thing* (Bp) + *bīší* *sweet* (Cm) > *ñā-bīší* *candy*, *bēʷē*

*house* (Cn) + *bīšín* *cold* > *bēʷē bīšín* *a cold house*, also *kū* *become - quality or characteristic* (Cv) + *bīší* *sweet* (Cm) > *kūbīší* *to become sweet*.

Of class (2) modifiers all morphemes of a high (high-)mid/ high mid tone pattern are caused to metathesize their tones to a mid high-(-mid) / mid high pattern following class B nouns. Thus *nímā* *heart* (Bn) + *šúšān* *lazy* > *níma šúšān* *a lazy heart*; *itāi* *flower* (Bn) + *káʷnū* *large* (Cm) > *itā káʷnū* *large flower*.

The second macro group of modifier perturbation classes is divided into three alloclasses: 1. Those which cause class C nouns to perturb to a mid low pattern, consisting of classes A, B, and C modifiers; 2. those which cause class C nouns to perturb to high low (-mid), consisting of class D modifiers; 3. those which do not cause perturbation, class E. This third alloclass will not be further discussed.

Alloclass 1 of this second classification causes class C nouns, excepting those of mid mid or mid low (-mid) pattern to perturb to mid low. Thus *íʷí* *raw* (Am) + *ʷdīʷē(ē)* *peach* (Cn) > *íʷí ndīʷē(ē)* *the peach is raw*; *bēē* *heavy* (Bm) + *y(ū)ūū* *rock* (Cn) > *bēē yūū(ū)* *the rock is heavy*; *ʷdāšā* *rancorous* (Cm) + *tʷ(ā)āā* *man* (Cn) > *ʷdāšā tʷāā(ā)* *the man is rancorous*.

Alloclass 2 of this second classification perturbs all class C nouns, except mid mid, to a high low (-mid) pattern. Class C nouns of mid mid tone pattern are perturbed to high mid. Thus *kʷāʷā* *much/many* (Dm) + *nāñū(ū)* *blackberry* (Cn) > *kʷāʷā nāñū(ū)* *many blackberries*.

#### Verbs

On the basis of their function in the mechanical perturbation system, verbs are divided into four sub-classes designated A through D. Verbs themselves are never perturbed tono-mechanically, but certain classes of verbs cause the perturbation of the tonemes of other morphemes.

Class A verbs cause the tonemes of class C nouns to perturb to mid low (-mid). Class B verbs cause the tonemes of class B pronouns and C pronouns to perturb to low. Class C verbs cause the tonemes of Class B pronouns to perturb to high low or the fraction possible; class C pronouns to perturb to low (-mid), class C nouns to perturb to high low or the fraction possible. Class D verbs cause the tonemes of class C pronouns to perturb to mid-high and the tonemes of class C nouns to perturb to mid low.

Class A and D verbs cause the tonemes of class C nouns, except mid mid's, to perturb to mid low: *kàʷbī* *read, counted* (Av) + *tʷ(ā)āā* *man* (Cn) > *kàʷbī tʷāā(ā)* *the man read*; *kátānū* *hanging* (Dv) + *ñāʷān* *thing* (Cn) > *kátānū ñāʷān* *the thing is hanging*.

Class B verbs cause the tonemes of class B pronouns to perturb to low: *kāʷndʷā* *will cut* (Bv) + *yūʷù* *I* (Bp) > *kāʷndʷā yūʷù* *I will cut (something)*; *kúbítā* *to be weak* (Bv) + *-rā* *he* (Bp) > *kúbítā-rā* *he is weak*.

Class B and C verbs cause the tonemes of class C pronouns to perturb to low (-mid): *kàʷā* *choked* (Bv) + *-ñā* *she* (Cp) > *kàʷā-ñā(ā)* *she choked*; *kāší* *will eat* (Cv) + *yóó* *we inclusive* (Cp) > *kāší-yóó* *we are going to eat*.

Class C verbs cause the tonemes of class B pronouns and class C nouns to perturb to a high low pattern, or at times to a high mid pattern in C nouns (other than those of basic mid mid tone pattern).  $ká^ndú^ú$  live (Cv) +  $yū^ú$  I (Bp) >  $ká^ndú^ú$   $yú^ú$  (yó'ó) I live (here);  $yòsò$  mounted (Cv) +  $t^v(ā)ā$  man (Cn) >  $yòsò$   $t^vā$  the man is mounted.

Class D verbs cause the tonemes of class C pronouns to perturb to a mid (-high) pattern:  $kúčí^?nā$  begging (Dv) +  $nā$  she (Cp) >  $kúčí^?nā-nā(ā)$  she (is) begging.

#### Morphologically Significant Tone Substitution

Quite distinct from the mechanical perturbation of tonemes, which has no morphological significance, is the process of substituting one morphotoneme for another. The tonal patterns of the verbs have morphemic status.<sup>12</sup> By means of different tonal

<sup>12</sup>In the light of further examination it seemed advisable to amplify the discussion of the morphotoneme as a unit.

There are two types of morphotonemes, each serving a different purpose. One serves to derive nouns and modifiers from other word classes; the other operates in verbs, principally to indicate aspectual changes.

Structurally these two morphotoneme types are similar in that both have two tone positions as in:  $yúú$  rocky ( $yú$  <sup>1</sup>  $ú$  <sup>2</sup>)  $bākū$  will cry ( $bā$  <sup>1</sup>  $kū$  <sup>2</sup>)  $kāsòkò$  will shoulder, carry on the shoulder ( $kā$  <sup>1</sup>  $sòkò$  <sup>2</sup>). In the case of simple verbs as  $bākū$  will cry, and all derived words as  $yúú$  rocky there are only two tones in the morphotoneme. Thus one tone occurs in each position. In the case of compound verbs as  $kāsòkò$  will shoulder there are more than two tones. These tones are divided between the two positions. Up to two tones occur in the initial position of such verbs, as:  $sākātāhān$  will dispute ( $sākā$  <sup>1</sup>  $tāhān$  <sup>2</sup>). All the remaining tones occur in the final position. Compare  $sākút^vā?ā$  will separate ( $sā$  <sup>1</sup>  $kút^vā?ā$  <sup>2</sup>). The two positions of tone placement in verb morphotonemes are identifiable by the presence of changing vs unchanging tones. The tones of the initial position change to indicate aspect; the tones of the final position remain unchanged (with one exception which will be treated later).

Functionally these two morphotoneme types are dissimilar. While the tones of the two positions of derivational morphotonemes function together as a single unit, the tones of the two positions of verbs, on the other hand, both function together as a unit and function independently of each other.

Thus when viewing the significance of these two types of morphotonemes both similarities and dissimilarities are seen. Both types, however, when viewed as units, signal the class to which items belong. The derivational morphotoneme as a unit also has lexical significance; whereas only the tones of the final position of the verb morphotoneme have such significance. Note  $bākū$  will cry,  $bākū$  will laugh;  $šākū$  crying,  $šākū$  laughing;  $šākū$  cried,  $šākū$  laughed. As a further dissimilarity, the tone of initial position of verbs has aspectual significance as seen in the preceding examples.

As mentioned, the tones of the final position remain unchanged except when the tone pattern signalling the cont neg of certain verbs spreads beyond the initial position. In such instances one of the tones of the final position is replaced by the second tone of the cont neg. Note:  $ndūbā$  will fall,  $ndūbā$  is falling,  $ndūbā$  not falling;  $kānditā$  will jump,  $kānditā$  is jumping.  $ū$   $kānditā$  is not jumping. The significance of this position is not lost in such cases, but the aspectual tone then functions in a dual role. For, the very fact that this type of substitution occurs, assists in the lexical identification of the word involved.

patterns the verbs and verbals (i.e. morphemes basically belonging to another class, but which may occupy verb position and function as verbs) show six aspects. Three of these are affirmative (af) aspects and three are their negative (neg) counterparts. The aspects are: potential (pot), continuative (cont) and completive (comp). The pot af has the most irregular and non-predictable tonal patterns and is the basic form from which other aspectual forms may be predicted. In the case of verbals which show aspectual change, the lexical pattern of their basic form functions as the potential aspect and serves as the basis for predicting other aspects. These verbals are taken from both the noun and modifier classes. To illustrate those derived from nouns:  $t^vā$  man >  $t^vā-rā$  he is manly, valiant; those from modifiers:  $īcī$  dry >  $nī$   $īcī$   $šītā$  the tortillas dried up. In most verbs all the aspects are formed tonally by substitution for the initial tone of the af pot aspect, however in some cases the tonal pattern signalling the neg cont aspect is spread over the entire morpheme.

Tonal substitution is not always the only factor which differentiates the aspects, there may also be phoneme change in the stem of the verb such as  $kūnū$  will run,  $šinū$  running,  $šinū$  ran;  $kòsò$  will mount,  $yòsò$  mounting,  $šī$   $yòsò$  was mounted.

With certain verbs there occur other morphemes which aid in identifying the aspects, such as  $šī$  comp of  $kū$  to be-location as seen in  $šī$   $yòsò$  was mounted,  $nī$ /<sup>ndi</sup> completive indicator and  $ū$ /<sup>ū</sup> negative indicator. There is often phonemic lengthening of the initial vowel in the pot neg and cont neg aspects. The lengthening varies from less than one mora of vowel length to more than one mora as in  $bā?ā$  ~  $bāā?ā$  isn't good. In every instance, however, tone seems to be the basic means for conveying aspectual change.

There are both simple and compound verbs. These differ somewhat as to what morphotoneme substitution occurs. Because simple verbs demonstrate more regularity and hence more simplicity in this process they will be treated first.

The pot af aspect of the verb is, as was mentioned, considered to be basic for descriptive purposes. It has the most diversity of tonal pattern of all the aspects, although there are many verbs with a regularized pot aspect pattern. This regularized pot pattern is a mid tone on the initial syllable. All auxiliary verbs for example, either in full or clitic form carry this mid tone in the potential aspect. Examples:  $kānā$  will call;  $kātā$  will itch;  $bākū$  will laugh;  $kòsò$  will mount; with auxiliary clitic:  $sākāndā$  will cause to shake.

The cont af aspect is formed by the substitution of an initial high tone for the initial tone of the potential:  $kānā$  is calling,  $šākū$  is crying,  $šākū$  is laughing,  $yòsò$  is mounted, and  $sākāndā$  is being shaken.

The comp af aspect is represented by an initial low tone:  $kānā$  called,  $šākū$  cried,  $šākū$  laughed, and  $sākāndā$  was shaken.

In certain instances two different aspects have identical tone patterns as  $bākū$  will laugh and  $šākū$  laughed,  $kòsò$  will mount and  $yòsò$  mounted; it should be noted

however, that in such cases one of the pair is always the pot af, which is often irregular, and that there is always a phoneme change to identify the aspect.

#### Negation

The negative aspects are in general formed by the morphotonemic substitution of a high tone for the tone of the initial vowel of the pot af aspect. In both the pot neg and the cont neg aspects there is frequently lengthening of the vowel involved, with a corresponding addition of a second tone. The resultant morpheme pattern may be symbolized as C<sup>h</sup>V<sup>h</sup>V<sup>h</sup> and C<sup>h</sup>V<sup>h</sup>V<sup>h</sup>C<sup>h</sup>V. The vowel length and added tone is particularly important in distinguishing the pot neg from the cont af of many verbs.

The pot neg of simple verbs is usually formed by the substitution of a morphotoneme consisting of a sequence of two high tones for the morphotoneme of the first vowel of the pot af. Thus *kānā will call* becomes *ū káánā will not call* (cf. *kānā calling*); *bākū will cry* > *báákū will not cry*, and *bàkù will laugh* > *báákù will not laugh*.

There are two related morphotonemic patterns for the cont neg aspect of simple verbs; one is a low-high long glide occurring on a lengthened vowel, the other is a sequence of low and high tones occurring on the two vowels of the verb. Thus for example: *kānā will call* > *ū káná not calling*, *bākū will cry* > *ū šákú not crying*; *bàkù will laugh* > *ū šáákù not laughing*. There appears to be an arbitrary classification of verbs which determines which pattern will occur. In certain examples such as the verbal *bàʔā it is good*, both patterns are acceptable: *ū bàáʔā* or *ū bàʔā it is not good*.

The comp neg of simple verbs is formed by the substitution of a morphotoneme consisting of a high tone on a single mora of vowel length for the tone of the first syllable. Further, it is usually signaled by the use of the morpheme *nī/ndī completive indicator*. Thus *kānā will call* > *nī kánā did not call*, *bākū will cry* *nī šákū did not cry*; *bàkù will laugh* *nī šáákù did not laugh*.

#### Aspectual tone in compound verbs

Compound verbs have the same aspectual tone patterns as simple verbs. The placement of these patterns in compound verbs differs somewhat from that of the simple verbs. The placement of the aspectual tones is, in part at least, dependent upon the formation of the compound; hence it is important to examine the types of compounds.

Compound verbs are formed by the addition of preclitics<sup>13</sup> as in *ʔdātyákū will come to life again* < *ʔdā repetitive or habitual* and *ʔʔákū will live*. In the compound *sāʔdātʔákū will cause to come to life again* we observe a second layer of preclitic addition; *sā transitivizer* added to *ʔdātʔákū will come to life again*.

Compound verbs may be formed by uniting two or more free forms such as *kāʔāʔ will talk* and *kʔāčī sin, fault*; *kāʔāʔ kʔāčī* meaning *will complain (to another)*,

<sup>13</sup> The preclitics are bound verbs. They occur only in verb compounds. Such compounds may have a verb or non-verb morpheme as the second member. If the second member is a non-verb morpheme the preclitic makes a verb of the compound.

*will make demands for rectification*. Compare also *kāʔāʔ kʔāčī īnī will feel hurt inside, will complain within one's self, will make demands secretly within one's heart for rectification*. Compare *tīšī bàʔā will guard (something)* < *tīšī stomach, or beneath, below* when filling the modifier spot + *bàʔā intensifier*. This compound literally means *keep beneath well* i.e. *out of sight and reach*.

Compounds may include both preclitics and free forms in several layers of additions as in *sākáʔdyā kʔāčī will cause to cut up in bits* < *sā transitivizer, causative*, *kāʔdyā will cut*, *kʔāčī small*; also *kākáší šítō scrutinizing* < *kā activizer* + *káší hard* + *šítō looking at* (*kōtō potential*).

In a compound, the serially initial member whether preclitic or free form is always a verb, as in *sāičī will dry* (transitive) from *sā transitivizer, (verb)* + *ičī dry* (modifier). In compounds consisting of several layers, preclitics may only occur preceding free forms, except when they occur as part of an inner layer compound. Thus in the compound *kāʔāʔ ʔdībàʔā will curse* the clitic form *ʔdī thing (?)* follows *kāʔāʔ talk* because it is part of the root member. Non-verbal morphemes may occupy any but the initial position, but most often occur finally as *kāʔāʔ īnī to think* < *kāʔāʔ talk* (verb) + *īnī inside (one's self)* (modifier). Not more than one non-verbal morpheme occurs in a verb compound unless the non-verbals form in inner layer compound within the verb compound, as in *kāsā štà báʔā to make bread* < *kāsā make or do* (verb) + *štà báʔā bread* (noun) < *šítà tortilla* + *bàʔā good* (modifier).

In the tonal system, the positions of additions in compounds are considered serially, the first in order being the initial position, then the second, and third. Substitutions of morphotonemes are made on this basis rather than on the actual morphological order of additions. Note, for example, the compound *sāʔdātʔákū will cause to live again*; the position occupied by *sā* as the initial position carries aspectual tone; the second position occupied by *ʔdā repetitive* figures significantly in aspectual differentiation only in cont neg aspect. The third and fourth positions occupied by *ʔʔákū* have no aspectual differentiation significance in this compound. In the compound *ʔdātʔákū will live again*, the initial position occupied by *ʔdā* carries aspectual tone; the second position occupied by the first syllable of *ʔʔákū to live* differs significantly only in the cont neg. When the root member *ʔʔákū to live* occurs as a simple verb the initial position filled by the first syllable carries the aspectual tone in all aspects. By contrast note *kākáší kōtō will scrutinize*. The positions occupied by *kā activizer* (verb) and *káší hard* (modifier) have no significance in aspectual differentiations. The position filled by the first syllable of *kōtō will look* carries the aspectual tone except in cont neg. In cont neg, the tone of the second syllable is significant. In the class of verbs to which *kōtō to look* belongs, the tonal pattern of the cont neg is confined to the first position alone. Compounds of the *kākáší kōtō* type are relatively rare.

In compounds formed exclusively by the addition of preclitics, the initial member almost invariably carries the aspectual tone, except in cont neg. Note for example:

kā<sup>n</sup>dītā *jump* pot, ká<sup>n</sup>dītā cont, kà<sup>n</sup>dītā comp; ū ká<sup>n</sup>dītā pot neg, ū kà<sup>n</sup>dītā cont neg, nī ká<sup>n</sup>dītā comp neg. Compare kũ<sup>n</sup>dʷáyũ *will take leave of* pot, kũ<sup>n</sup>dʷáyũ cont and nī kũ<sup>n</sup>dʷáyũ comp neg. An exception is seen in the compound kã<sup>n</sup>dákã<sup>n</sup> *will fall* in which the tone of kã remains mid in all aspects. The tone of <sup>n</sup>dã remains unchanged in all aspects and the root member kã<sup>n</sup> *fall* carries the aspectual tone.

In compounds composed of only free forms, the initial member carries the aspectual tone as: <sup>n</sup>dõtõ sãnã *will be somnambulant* < <sup>n</sup>dõtõ *awaken* pot + sãnã *crazy, insane* (modifier). Compare <sup>n</sup>dõtõ sãnã cont, <sup>n</sup>dõtõ sãnã comp. In forms including both preclitics and free forms added to the root, the initial preclitic usually carries the aspectual tone, as in the verb <sup>n</sup>dákã<sup>n</sup>dã inĩ *to be amazed* < <sup>n</sup>dã *repetitive*, kã<sup>n</sup>dã *to move about, shake*, inĩ *inside, the ego*; <sup>n</sup>dákã<sup>n</sup>dã inĩ cont, <sup>n</sup>dákã<sup>n</sup>dã inĩ comp.

Because the process of forming the cont neg of compounds is somewhat more complicated, it will be discussed more fully. The process is one of distributing the tones of the cont neg tonal pattern. The basic factors regulating the tonal pattern of root members of compounds, which in turn regulates the distributions of the cont neg tones, remain undetermined. The types of distributions are relatively simple.

When a free form is the initial member, the full tone pattern occurs on it in the regular manner, i.e., as a low-high long glide on the first syllable: kã<sup>n</sup>ã<sup>n</sup>ã<sup>n</sup> <sup>n</sup>dibã<sup>n</sup>ã<sup>n</sup> *not cursing*, or as a low high tone pattern spread over both syllables: kã<sup>n</sup>dʷã<sup>n</sup> kʷã<sup>n</sup>ĩ *not cutting into pieces*.

When a single preclitic precedes a free form, root member or otherwise, the preclitic usually carries either a low tone or the entire low-high long glide pattern. If the free form does not show aspectual tone, nor have a high tone on the initial syllable, then the preclitic carries the entire tonal pattern. Note: kũ<sup>n</sup>dʷáyũ *not taking leave of*, and ū <sup>n</sup>dãkã<sup>n</sup>ã<sup>n</sup>mã<sup>n</sup> *not mending*. In all other cases the preclitic carries a low tone. Thus in compounds where the free form shows regular aspectual tone in all aspects, the preclitic shows identical aspect tone in all aspects except the cont neg where it carries only a low tone. Note <sup>n</sup>dãkã<sup>n</sup>ã<sup>n</sup>ĩ *not explaining, disentangling* also ū <sup>n</sup>dãkã<sup>n</sup>sã<sup>n</sup> *not making*. In compounds in which the root member has a high initial tone in all aspects, in all negative aspects, or in the cont neg aspect alone, the preclitic has a low tone: kũ<sup>n</sup>ũ<sup>n</sup>mã<sup>n</sup> *not becoming smoked* (initial high tone on root in all aspects), kã<sup>n</sup>ĩ<sup>n</sup> *not picking up* (with instruments) (initial high tone on root in all negative aspects), kũ<sup>n</sup>kĩ<sup>n</sup> *not getting dirty* (initial high tone on root in cont neg only). In all cases such as these, the high tone on the initial syllable of the free form completes the low high tonal pattern which signals the cont neg.

When there are two or more preclitics in a compound, the initial clitic carries the low tone and the second carries the high tone to indicate the cont neg. Note <sup>n</sup>dákã<sup>n</sup>dũ<sup>n</sup>ũ<sup>n</sup> *not lying down* and ū kã<sup>n</sup>tãkã<sup>n</sup> *not hanging*.

There are three distinct types of tonal processes observable as occurring on the second position. Members occupying this position may: (1) show aspectual tone in all aspects—as does the member in the initial position, (2) show aspectual tone in

some aspects only, e.g. all the negative aspects, the cont neg only, or the comp af only, (3) show an unchanging tone pattern in all aspects.

Those compounds showing tonal process (1) have as the second member preclitics, verbs and non-verbal morphemes. Those with a preclitic as the second member:

kũ<sup>n</sup>tãkã<sup>n</sup> *will hang*  
ĩ<sup>n</sup>tãkã<sup>n</sup> *is hanging*  
šĩ<sup>n</sup>tãkã<sup>n</sup> *is hung*

sã<sup>n</sup>dãkã<sup>n</sup> *will stretch, spread out*  
sã<sup>n</sup>dãkã<sup>n</sup> *stretching*  
sã<sup>n</sup>dãkã<sup>n</sup> *was stretched*

ũ kũ<sup>n</sup>tãkã<sup>n</sup> *will not hang*  
ũ ĩ<sup>n</sup>tãkã<sup>n</sup> *is not hanging*  
nĩ šĩ<sup>n</sup>tãkã<sup>n</sup> *is not hung*

ũ sã<sup>n</sup>dãkã<sup>n</sup> *will not stretch*  
ũ sã<sup>n</sup>dãkã<sup>n</sup> *not stretching*  
nĩ sã<sup>n</sup>dãkã<sup>n</sup> *was not stretched*

With verb morpheme as the second member:

<sup>n</sup>dãkũ<sup>n</sup>ĩ *will know, be acquainted with* < <sup>n</sup>dã *repetitive*; kũ<sup>n</sup>ĩ *to see*  
ũ <sup>n</sup>dãkũ<sup>n</sup>ĩ *will not know*  
<sup>n</sup>dãkũ<sup>n</sup>ĩ *knowing*  
<sup>n</sup>dãkũ<sup>n</sup>ĩ *knew*  
ũ <sup>n</sup>dãkũ<sup>n</sup>ĩ *not knowing*  
nĩ <sup>n</sup>dãkũ<sup>n</sup>ĩ *did not know*

With a non-verbal morpheme as the second member: kũ<sup>n</sup>ũ<sup>n</sup>ĩ *to become clean or clear* (as of water) < kũ *to become* + kʷĩ *clean*

kũ<sup>n</sup>ũ<sup>n</sup>ĩ *will become clean*  
kũ<sup>n</sup>ũ<sup>n</sup>ĩ *becoming clean*  
kũ<sup>n</sup>ũ<sup>n</sup>ĩ *became clean*

ũ kũ<sup>n</sup>ũ<sup>n</sup>ĩ *will not become clean*  
ũ kũ<sup>n</sup>ũ<sup>n</sup>ĩ *not becoming clean*  
nĩ kũ<sup>n</sup>ũ<sup>n</sup>ĩ *did not become clean*

Examples of compounds showing tonal process type (2) have as the second member preclitics, verbs and non-verbal morphemes. Within this type of limited aspectual tones, there appear to be certain restrictions as to what type of morpheme may occur in each of the subdivisions. Thus only verbs have been observed as showing aspectual tone in all the negative aspects, but not in the affirmative. There are examples of preclitics, verbs and non-verbs all showing aspectual tone only in the cont neg. In those instances in which a morpheme displays aspectual tone only in the cont neg, only nonverbals, i.e. nouns and modifiers, have been observed.

Examples of second position member showing aspectual tone in all the negative aspects, but not in the affirmatives:

kã<sup>n</sup>ũ<sup>n</sup>ũ<sup>n</sup>ũ<sup>n</sup> *will drag (something)*  
kã<sup>n</sup>ũ<sup>n</sup>ũ<sup>n</sup>ũ<sup>n</sup> *is dragging*  
kã<sup>n</sup>ũ<sup>n</sup>ũ<sup>n</sup>ũ<sup>n</sup> *dragged*

ũ kã<sup>n</sup>ũ<sup>n</sup>ũ<sup>n</sup>ũ<sup>n</sup> *will not drag*  
ũ kã<sup>n</sup>ũ<sup>n</sup>ũ<sup>n</sup>ũ<sup>n</sup> *not dragging*  
nĩ kã<sup>n</sup>ũ<sup>n</sup>ũ<sup>n</sup>ũ<sup>n</sup> *did not drag*

Examples of second position members showing aspectual tone only in the cont neg: kã<sup>n</sup>dãkã<sup>n</sup> *not falling* (with preclitic), <sup>n</sup>dãkũ<sup>n</sup>ũ<sup>n</sup>ĩ *not knowing* (with verb), and kũ<sup>n</sup>ãã<sup>n</sup>ũ<sup>n</sup> *not going to pieces* (with noun). Note the following example of a complete conjugation of kã<sup>n</sup>bĩšĩ *to gossip, joke* < kã<sup>n</sup> *talk* (bound form) + bĩšĩ *sweet* perturbed from bĩšĩ (modifier):

kábíši will gossip  
kábíši gossiping  
kábíši gossiped

ū kábíši will not gossip  
ū kábíši not gossiping  
nī kábíši didn't gossip

Examples of second position members showing aspectual tone in the comp af are: kúk<sup>w</sup>á<sup>n</sup> became yellow < kúk<sup>w</sup>á<sup>n</sup> pot af (with modifier as second member) and kú<sup>n</sup>dú<sup>u</sup> became hard < kú<sup>n</sup>dú<sup>u</sup> pot af (with noun) < kú become + <sup>n</sup>dú a fruit pit (as of a peach). In examples with modifiers the regular perturbed form appears in the comp af; in all other aspects the non-perturbed form is used. In examples with nouns, the non-perturbed form appears in the comp af and the perturbed form in all other aspects. Note the following: kú<sup>n</sup>d<sup>y</sup>áá become black < kú become (state or condition) + <sup>n</sup>d<sup>y</sup>áá black (modifier).

kú<sup>n</sup>d<sup>y</sup>áá will become black  
kú<sup>n</sup>d<sup>y</sup>áá becoming black  
kú<sup>n</sup>d<sup>y</sup>áá became black

ū kú<sup>n</sup>d<sup>y</sup>áá will not become black  
ū kú<sup>n</sup>d<sup>y</sup>áá not becoming black  
nī kú<sup>n</sup>d<sup>y</sup>áá did not become black

Examples of compounds exhibiting tonal process (3) have as the second member preclitics, verbs and non-verbal morphemes.

With a preclitic as the second member: kútákāā will be hanging < kú to be + tá (?) + kāā will stretch.

kútákāā will be hung  
kútákāā is hung  
kútákāā was hung

ū kútákāā will not be hung  
ū kútákāā is not hung  
nī kútákāā was not hung

With a verb as the second member: kú<sup>n</sup>d<sup>y</sup>à<sup>y</sup> take leave of and ká<sup>n</sup>dá<sup>c</sup>ī ñ<sup>u</sup> fire to flare up < ká activizer + <sup>n</sup>dá<sup>c</sup>ī fly, flap wings (as a hen) + ñ<sup>u</sup> fire.

ká<sup>n</sup>dá<sup>c</sup>ī ñ<sup>u</sup> it will flare up  
ká<sup>n</sup>dá<sup>c</sup>ī ñ<sup>u</sup> it is flaring up  
nī ká<sup>n</sup>dá<sup>c</sup>ī ñ<sup>u</sup> it flared

ū ká<sup>n</sup>dá<sup>c</sup>ī ñ<sup>u</sup> it will not flare up  
ū ká<sup>n</sup>dá<sup>c</sup>ī ñ<sup>u</sup> it isn't flaring up  
nī ká<sup>n</sup>dá<sup>c</sup>ī ñ<sup>u</sup> it did not flare

With a non-verbal, i.e. modifier or noun, as the second member: kú<sup>n</sup>áá will become dark (modifier) and ká<sup>n</sup>á<sup>n</sup> inī will hiccup (with noun) and kátà<sup>n</sup> will arrange (noun) < ká activizer + tà<sup>n</sup> companion.

kátà<sup>n</sup> will arrange  
kátà<sup>n</sup> arranging  
kátà<sup>n</sup> is arranged

ū kátà<sup>n</sup> will not arrange  
kátà<sup>n</sup> not arranging  
nī kátà<sup>n</sup> was not arranged

In compounds containing three or more additions, two processes are operable governing the tone of these levels. There is either no tonal change, i.e., in the case of verbs the potential form would appear and in the case of non-verbal morphemes the basic tonal pattern would be used; or there is change. In the case of verbs, tonal change is always to an initial high tone. In the case of non-verbals, change is always to the regular perturbation pattern.

Examples of verbs with no tonal change: kútákāā hang < kú to be, tá (?) kāā stretch; čí<sup>n</sup>dēē kōō gather or pile up < čí place + <sup>n</sup>dēē to be (location of plural subject) + kōō to be (exist). Examples of non-verbs with no tonal change: kūsūčī inī to be sad < kú to be + sūčī sad + inī inside one's self; <sup>n</sup>dákí<sup>n</sup>d<sup>y</sup>éé to rest < <sup>n</sup>dā repetitive kí<sup>n</sup> receive, take + <sup>n</sup>d<sup>y</sup>éé strength.

Examples of verbs showing tonal change: sá<sup>n</sup>dákāā stretch < sá transitivizer, <sup>n</sup>dā repetitive, kāā stretch (cf. kútákāā hang in which there is no such change); sá<sup>n</sup>dúkášī tū<sup>n</sup> to define words < sá causative, <sup>n</sup>dū become, kášī choose, separate tū<sup>n</sup> word.

Examples with non-verb showing tonal change: kú<sup>n</sup>dūbá<sup>n</sup> be well, be secure < kú to be, <sup>n</sup>dū become, bá<sup>n</sup> good; <sup>n</sup>dā<sup>n</sup>í<sup>n</sup> ší<sup>n</sup> understand or resolve a problem < <sup>n</sup>dā repetitive, nī<sup>n</sup> receive, obtain, šinī head. Note that where there is tonal change it carries through all aspects.

#### Tonal substitution in the derivation of morphemes

Tone substitution as a morphologically significant process plays an important part in the derivation of an item of one morpheme class from another. Such derivations are common. Many, though not all of them, are identifiable by tonal substitutions. Modifiers may be derived from nouns and nouns from modifiers. Verbs are derived from modifiers. Some derived verbs were originally nouns, but first became modifiers, then verbs based upon the modifier. There are also examples of modifiers derived from verbs.

In derivations of noun from modifier, or modifier from noun, which involve tone substitution, the substitution pattern is always to high high. For example yášín thin, flat (as paper) < yásín gourd; k<sup>w</sup>ínú jealous < k<sup>w</sup>ínú a swelling. Examples of nouns from modifiers: bíšī pineapple < bíšī sweet; tūmí fuzz, down (as of fruit, caterpillar) < tūmí soft, velvety, feather. Feather may be a derived noun in which there has been no tonal substitution or soft may be a derived modifier.

Derived verbs are taken from both noun and modifier classes. Some occur as simple verbs, such as t<sup>y</sup>āā man > t<sup>y</sup>āā will be manly, brave, t<sup>y</sup>āā-ní-rà he is very manly; see also bá<sup>n</sup> good > bá<sup>n</sup> will be good or bá<sup>n</sup> sāā it is not good that way. Such derived verbs display regular aspectual morphotone substitution. It appears that nouns which become simple verbs or the root member in initial position as tíšī bá<sup>n</sup> to guard become first modifiers then verbs. Thus t<sup>y</sup>āā man > t<sup>y</sup>āā manly as seen in rá-t<sup>y</sup>āā kúbī-rà literally he-manly is he < rá- he, kúbī to be (character). With the developed meaning of manly, brave, valiant it then becomes the stative verb.

Most derived verbs occur as compounds, such as kúnū will become thin < kú become + nū thin (modifier); kúnū<sup>m</sup> become smoked < kú to become + nū<sup>m</sup> smoke (noun), and čičín will pinch < čí put, place + čín<sup>n</sup> fingernail.

In the derivation of modifiers from verbs, the substitution tonal pattern is the regular high high pattern, or high mid pattern. It is sometimes incidentally the cont af aspect of the verb as in čítú full (modifier) < čítú is full. Note the further



examples which occur in noun compounds:  $t\bar{i}^n d\bar{a}^? y\bar{u}$  *screaming (type) animal* e.g. *donkey, dog* <  $t\bar{i}$  *animal indicator* +  $d\bar{a}^? y\bar{u}$  *screaming (modifier)* <  $d\bar{a}^? y\bar{u}$  *screaming (verb)*;  $t\bar{i} k\bar{a} t\bar{a}$  *mange, scabies* <  $t\bar{i}$  *animal indicator* +  $k\bar{a} t\bar{a}$  *itching (?) (modifier)* <  $k\bar{a} t\bar{a}$  *itching (verb)*.

#### Fusion Glides

Fusion glides, as mentioned previously, unlike regular glides, are a bi-MPTU phenomenon. They are produced when two morphemes fuse into a morpheme pattern unit similar in shape to a single morpheme, but retaining the tones of both morphemes. Unlike regular glides, which are a structural phenomenon, fusion glides are a functional phenomenon. That is, the function resulting in their formation is important. As a structural entity they have no significance in the perturbation system. They are always short glides and there are comparatively few.

In some instances, this process consists only of tonal fusion as  $m\bar{a} s\bar{o}'$  *our mallet* (regularly  $m\bar{a} s\bar{o}$  in context) <  $m\bar{a} s\bar{o}'$  +  $y\bar{o}o$  *our inclusive* >  $m\bar{a} s\bar{o}'$  *our mallet*;  $d\bar{i} c\bar{i}$  *string bean* +  $\cdot i$  *my* >  $d\bar{i} c\bar{i}$  *my string bean*;  $\check{s}\bar{i} n' \bar{i} n$  *side* +  $\cdot i$  *my* >  $\check{s}\bar{i} n' \bar{i} n$  *my side*.

At times this process includes replacement of the final vowel of the root member by the vowel of the following member, as in  $d\bar{a}^? \bar{a}$  *hand* +  $\cdot \bar{u}^n$  *your* >  $d\bar{a}^? \bar{u}^n$  *your hand* and  $d\bar{i} c\bar{i}$  *string bean* +  $\cdot \bar{u}^n$  *your* >  $d\bar{i} c\bar{u}^n$  ( $\cdot \bar{u}^n$  perturbed from) *your string bean*.

In some instances this process includes diphthongization of the final vowel of the root member and the vowel of the following member. (Such phenomena are strictly confined to bi-MPTU's). The resultant diphthong is perceptibly the same length as a simple one mora vowel. Note  $k\bar{o} t\bar{o}$  *shirt* (in context  $k\bar{o} t\bar{o}$ ) +  $\cdot \bar{u}^n$  *your* (perturbed from  $\cdot \bar{u}^n$ ) >  $k\bar{o} t\bar{o} \bar{u}^n$  *your shirts*;  $t\bar{i} k\bar{u}$  *needle* +  $\cdot i$  *my* > (phonetically)  $t\bar{i} k^w \bar{i}$  *my needle*; also  $k\bar{o} s\bar{t}\bar{a}$  (Spanish *costal*) *palm bag* +  $\cdot i$  >  $k\bar{o} s\bar{t}\bar{a} i$  *my bag*.

At times this process includes fusion of the final vowel of the root member and the vowel of the following member (with loss of medial consonant):  $\bar{r}\bar{a}$  *he, his* +  $\bar{n}\bar{a}^n$  *thing* (perturbed form of  $\bar{n}\bar{a}^n$ ) >  $\bar{r}\bar{e}$  *his thing*; also  $\bar{k}\bar{u}^n$  *your* +  $\bar{n}\bar{a}^n$  *thing* > (phonetically)  $k^w \bar{e}^n$  *your thing*;  $\bar{y}\bar{o}$  short form of  $y\bar{o}o$  *our inclusive* +  $\bar{n}\bar{a}^n$  *thing* >  $y\bar{e}$  *our thing*. In all but these last two examples the glides retain the normal sequences of tones.

México, D.F.

## HUAVE: A STUDY IN SYNTACTIC TONE WITH LOW LEXICAL FUNCTIONAL LOAD

By Kenneth L. Pike and Milton Warkentin

### Introduction

Twenty years ago one of the authors (KLP), in a very brief study of Maya, was puzzled to find a half dozen or so pairs of words, and no more, differing by tone only. Even these few were found to change in character within the phrase. The question raised was how a tone system should appear to be so scanty, and yet solid empirically (since **some** pitches clearly contrasted without stress conditioning them). Nearly a decade later these data were published<sup>1</sup> in the hopes of stimulating others to investigate the problem, but no detailed studies seem to have followed this preliminary effort.

Now, in another language — Huave<sup>2</sup> — we seem to have found a situation which suggests a theoretical solution that may generalize to point the way to a kind of approach which might serve for Maya — and perhaps for some of the Otomi dialects as well.<sup>3</sup>

The pertinent theoretical observation is this: We have in the past tacitly assumed as a norm for tone languages in Mexico that they are likely to use pitch contrasts extensively for lexical functional load, but only incidentally for syntactic<sup>4</sup> purposes; we must now leave room in our thinking for languages in which tone is used extensively for syntactic purposes, but only incidentally for lexical contrasts. Huave contains such a system, with no pairs yet discovered of isolated morphemes differing only by tone, but with a highly developed syntactic tone arrangement.

### Historical Note

One may speculate as to the historical origin of this kind of system. If

<sup>1</sup> Kenneth L. Pike, *Phonemic Pitch in Maya*, *IJAL* 12.82-88 (1946).

<sup>2</sup> Distantly related to Mayan, via Macro-Penutian, according to Norman A. McQuown in *The Indigenous Languages of Latin America*, *American Anthropologist* 57.512 (1955). For older materials suggesting a relationship between them, note Nicolás León, *Catálogo De La Colección de Antigüedades Huavis* (México, 1904).

<sup>3</sup> Note the lack of pitch contrasts at certain points in the sentence: Donald S. Sinclair and Kenneth L. Pike, *The Tonemes of Mezquital Otomi*, *IJAL* 14.94,96 (1948). Katherine Voigtlander has mentioned unpublished data for the dialect of Eastern Otomi in San Gregorio which seem to make even more probable such a conjecture.

<sup>4</sup> Yet syntactic tone has been reported, to some degree. Gleason and Welmers tell us that somewhat similar instances have been reported for some time in literature on African languages. See also Hagu, Bien Ming's material referred to in Pike, *Tone Languages* (Ann Arbor, 1948), pp. 34, 82-84.