International Journal of American Linguistics

VOLUME XIX April, 1953 NUMBER 2

A COMPARISON OF TWO MIXTEC TONEMIC SYSTEMS

CORNELIA MAK

SUMMER INSTITUTE OF LINGUISTICS

0. The tonemic-morphotonemic system of the dialect of Mixtec spoken in the town of San Miguel el Grande, Tlaxiaco district, Oaxaca, Mexico, where K. L. Pike and his colleagues pioneered for a number of years, has been described in some detail.[1] While variations have been evident in the neighboring dialects, no systematic study has been made of any one of them, and therefore comparative phonemic and tonemic studies have not been possible.

The town of San Esteban Atatláhuca is only two hours by foot west of San Miguel el Grande, yet the dialect spoken there necessitates a considerable modification of the tonemic descriptions given for San Miguel.[2]

[1] See Kenneth L. Pike, Analysis of a Mixteco Text, IJAL 10: 113-38 (1944); and idem., Tone Languages, University of Michigan Publications, Linguistics IV (Ann Arbor, 1948), 77–94. In addition to Pike's work on Mixtec, there is the attractive ethnologic-linguistic volume by Leonard Schultze-Jena, Bei den Azteken, Mixteken und Tlapaneken der Sierra Madre del Sur von México, Indiana Vol. III (Publicado bajo los auspicios de la sociedad México-Alemana Alejandro de Humboldt, 1938), describing the Mixtec of the State of Guerrero, particularly the town of Cahuatachi; and a very old grammar attempting to fit Mixtec into the Latin mold: Fray Antonio de los Reyes, Arte en Lengua Mixteca, published in 1593, based on the environs of Tepozcolula. The present paper was prepared under the auspices of the Summer Institute of Linguistics during field trips to San Esteban Atatláhuca during parts of the years 1949 and 1950. The bulk of the data was secured in the Rancho of San Pedro Progreso, about an hour from the center of town. I am greatly indebted to K. L. Pike, both for his extensive editing of the paper and for his aid in the interpretation of some of the data, particularly in the matter of 2-^{1} glides on morpheme-initial syllables, which I had earlier heard as level tones and had postulated as a fifth toneme; and also to William L. Wonderly, who spent considerable time editing and clarifying the paper. Names of the two towns are abbreviated in this paper as follows: San Esteban Atatláhuca, SE; San Miguel el Grande, SM.

[2] The phonemes of these two Mixtec dialects are as follows: voiceless unaspirated stops /p, t, č, k, k^{w}, ʔ/ (/k/ in SE at times very lenis, especially before /u/; /ʔ/ usually very lenis in both dialects); prenasalized voiced stops /^{m}b, ^{n}d, ^{n}ǰ, ^{n}g/; fricatives /b, d, ž, h/ (/b/ very lightly occlusive except after glottal stop or between /ə/ vowels when it becomes [w], but in some dialects in SE the friction is heard in all environments; /ž/ alternating non-phonemically with [y], especially in enclitic position; /h/ varying freely with frictionless velar); sibilants /s, š/ (/š/ in SM retroflexed in certain morphemes with some speakers); nasals /m, n, N, ñ (/N/ has allophone [Nn] morpheme initially, elsewhere [hn]; /N/ is a unit phoneme, occurring in SE only); liquids /l, r/ (/r/ being a flap in the only two enclitics in which it occurs); oral vowels /i, e, a, o, u, ə/ (/i, a, o, u/ approximately as in Spanish mil, mal, mole, mula; /e/ as in Spanish leña, with more open allophone in morphemes with medial glottal stop, medial prenasalized voiced stop, or medial /t/ or /r/; /ə/ high, back, unrounded, often approaching more fronted position following alveolar consonants, especially in SM); nasalized vowels /į, ę, ą, ǫ, ų, ə̨/ (/ę/ appears only in SE); semivowel /y/ (rare, as second member of a consonant cluster); tonemes as described in **1.2.**

Since the tonal system of SM has been described by Pike, we present the SE system throughout this paper in comparison with that of SM. The chief differences concern tonemes (four level tonemes and some single-syllable tone sequences in SE, three level tonemes and no single-syllable tone sequences in SM); perturbing action[3] (from higher to lower: extensively in SE, seldom in SM;[4] from lower to higher: limited to certain classes of morphemes and certain syntactic positions in SE, extensive and almost entirely unrestricted by syntactic position in SM); direction of perturbation (both progressive and regressive in SE; only progressive, with one minor exception to be described later, in SM).

1. General tonemic and morphotonemic structure of morphemes.

1.1. For both SE and SM, the basis of all tonemic analysis is the dissyllabic morpheme, with its minimum of two level tonemes (referred to as TONE COUPLETS), one toneme on each syllable. In SE there are, however, a few tone sequences (actualized phonetically as tone glides) on single syllables; these will be described later. Morphemes in both dialects which have two contiguous vowels are dissyllabic, and the phonetic tone glides (phonemically sequences of two tonemes) spread over such two-mora dissyllabic morphemes differ phonetically, chiefly in speed, from certain one-syllable tone glides (also phonemically sequences of two tonemes) to be described later. Items with three syllables consist of two mor-

---

Forms often differ in the two dialects in one or more of the following ways:

By vowel substitution (SE cited first and then SM): kʷe²ʔe⁴, kʷaʔà *much*; te⁴e²/³, čàa *man*; ke²e², čaà *come*; ʔi²te², ʔičà *grass*; biʔ²ⁿde⁴, biʔⁿjà *nopal cactus*; ⁿde¹e¹, ⁿjáá *blue*; he¹te², háča *dig*; hiʔ¹ni², húʔni *tying*; žo⁴kį¹, žòkǫ́ *hair brush*; le¹ču¹, lečé *milk* (Sp. leche); ña²ə⁴, ñii *salt*; kəʔ²tə⁴-ni², kitì ʔinì *be angry*.

By consonant substitution: Nə¹ñə¹, təñí *mouse*; Nəʔ²ə², tǫǫ *grasp*; tu²Nu², ⁿdukù *firewood*; Ni¹i¹, tíñu *fingernail*; žu²Nu², žunu *tree, wood*; Na²ma², nama *rescue* (but na²ma⁴, namà *soap*); Nų⁴ʔų²/³, tùʔų *word*; mį⁴hį²/³ bìhį *cold*; ku²ko⁴o², huⁿgòo *enter*; že²Nu⁴, hanù *chest, coffin*; že⁴kə¹ ~ ži⁴kə¹, hìkí *fist*; sto¹o², šⁿdóo *leave behind*; stə¹ʔə², šⁿdóʔə *finish*.

By toneme substitution: ba¹ʔu¹, báʔù *coyote*; ką¹ʔą¹ kąʔą *speaking*; tu²tu², tutù *paper*; ʔi²so², ʔisò *rabbit*; ku¹ni¹, kuní *want*; Nə¹ñə¹, təñí *mouse*; liʔ¹li³, líʔli *rooster*; ri¹ki³, ríki *woodpecker*; ti⁴či¹, tìči *avocado*.

By abbreviation of forms in either dialect: žeʔ¹ži¹, žušéʔé *door*; kʷeʔ²ži⁴, kʷeʔè *ailment*; konʔ-so², kuⁿdiso *carry*; ⁿdu²ši⁴, ⁿdubišì *get warm*; ta¹ta¹, táà *father*; ža²bu², žau *maguey*; ka²Nų⁴ʔų¹, kakà tùʔú *ask*.

By apparent substitution of morphemes: la²ⁿji², rəə *sheep*; lo²ⁿde², lélú *lamb*; le¹lu¹, kačíní *hat*; li²ⁿji¹, víló *lizard*; ši²Ni⁴, kutù *nose*; sa²Ne⁴, žučąà *tomorrow*; čų⁴ų¹, sáná *turkey hen*; če¹ⁿgo³, hàko *opossum*; ža⁴ka², kʷažo *rubbish*; kəʔmə², tiñùų šíní *star*; ⁿdu²hi¹ lu¹li¹, tərəə *chick*; (occasionally resulting in homophones: SE kʷeʔ²ʔe⁴ *many*, SM kʷeʔè *ailment*; SE le¹lu¹ *hat*, SM lélú *lamb*; SE ke²e² *come*, SM kee *go* [but always followed by kʷąʔą *go*]).

By shift of meaning: SE kʷiʔ²na⁴ *ugly*, SM kʷiʔnà *demon*; SE čų⁴ų¹ *turkey hen*, SM čùú *fowl*; cf. also fn. 10 on the morphemes šę²ę⁴, šąà and lo¹-ko¹, lokó.

[3] By the terms perturbing action and perturbation we mean the replacement of one or more tonemes of a morpheme by another toneme or tonemes under the influence of the tonemes of neighboring morphemes. In spite of possible objections to the use of such 'cause and effect' or 'process' terminology, we can hardly avoid its use in this paper without making our statements unwieldy, until further developments are made in allomorphic theory.

[4] The only instances of perturbation to a lower toneme in the SM dialect are the following: In a close-knit verb phrase consisting of one of the forms of the verbs *go* plus a mid-mid (ˢ) verb, (i.e. a verb which does not cause perturbation of following tonemes), the first toneme of the second verb is lowered. For instance: kįʔì *will go* + ⁿjaka *carry* > kiⁿjàka *will take to*. For a fuller discussion of this see my A Unique Perturbation in Mixteco, IJAL 16: 82–86 (1950). The morpheme ʔinì *in* perturbs one word, beʔe *house*, to a lower tone: ʔinì bèʔe *in the house*. See Tone Languages, 81–2, for Pike's discussion of this phrase. Some morphemes with high-high tone couplets, when following a mid-low morpheme, are usually, though optionally, changed to low-high: ʔità *flower* + kʷąą *yellow* > ʔità kʷàąą *yellow flower*. See Tone Languages, 86, on this.

phemes, the first morpheme being abbreviated by the loss of one of its syllables in a close-knit construction: sa^{1}Ni^{2}ñu^{2} *to work* (<sa^{1}ʔa^{2} *do* + Ni^{2}ñu^{2} *work*).

Abbreviated (monosyllabic) morphemes act like full (dissyllabic) morphemes in that, with few exceptions (1) they condition the perturbation of a following morpheme in the same way as their full form does, and (2) the remaining syllable of the abbreviated morpheme is perturbed in the presence of a preceding conditioning morpheme in the same way as it would be were the morpheme in its dissyllabic form. Hence, unless irregularities are described for specific abbreviated (monosyllabic) morphemes, their action is the same as for the full (dissyllabic) morphemes.

1.2. There are four phonemic levels of tone (=tonemes) in the SE dialect. (Certain prominent sub-phonemic additional tone levels are described under **6.**) Throughout this paper, for SE we show the tonemes with superscript numbers 1 to 4 (1 being the highest and 4 the lowest). Tonemes 1, 2 and 4 correspond roughly to the three SM tonemes of high /ˊ/, mid (unmarked), and low /ˋ/. Note that throughout the paper, SE and SM forms are distinguished orthographically by the different systems of tone marking.

To illustrate the four tonemes of SE, we cite morphemes carrying tone couplets 1–2, 1–3, and 1–4, which show tonal contrasts in an analogous environment (the morpheme -de^{2} *he* preceding the three contrasted couplets belongs to a class of morphemes which do not perturb following tones): k^{w}ą^{2}ą^{2} -de^{2} lu^{1}su^{2} *he will buy a pet dog*: k^{w}ą^{2}ą^{2} -de^{2} bi^{1}či^{3} *he will buy a fan*; k^{w}ą^{2}ą^{2} -de^{2} bi^{1}li^{4} *he will buy a plaything.*

1.3. A toneme sequence occurring on a single morpheme is a TONE COUPLET (see **1.1**). If the tonemes of the couplet have not been perturbed in sandhi, the tone couplet is referred to as BASIC; if they have been perturbed, it is referred to as DEVELOPED. Strictly speaking, morphemes with such developed couplets are bi-morphemes or fused morphemes, but in this paper we speak of them simply as morphemes.[5] Morphemes showing identical tone couplets (i.e. tonemically the same) belong to the same TONE CLASS. Tone classes are basic or developed, depending on the character of their tone couplets.

The following BASIC TONE CLASSES occur in the SE dialect: 1–1, 1–2, 1–3, 1–4; 2–1, 2–2, 2–4; 4–1, 4–2, 4–2/3 (the slant line implies optional occurrence of tone 2 or 3 in all environments); Table 1 lists these together with their morphotonemic types (cf **1.5**). Basic 1–3 couplets are often, but not always, heard with a 3-^{2} glide on their final syllable. (One-syllable toneme sequences cited in the text and abstracted from their vocalic elements, are shown with the second toneme raised.) The optional glide occurring on the final syllable of the basic 1–3 couplets will not be mentioned again, since it is morphotonemically nonsignificant, and is optionally present wherever 1–3 is cited.

TABLE 1—Basic SE Tone Classes and their Morphotonemic Types

1–1 (b, c)	1–2 (a, c)	1–3 (a, c)	1–4 (c)
2–1 (b)	2–2 (a, c)	—	2–4 (c)
4–1 (b)	4–2 (c)	4–2/3 (a)	—

In tone sandhi, the following additional DEVELOPED TONE CLASSES occur: 3–1, 3–2 ~ 3–3, 3–4; 2–^{1}–1, 2–^{1}–2, 2–^{1}–3, 2–^{1}–4; 1–3–^{1}, 1–3–^{2}, 2–^{1}–3–^{1}, 2–^{1}3–^{2}. Alternation symbolized by ~ is optional in contexts where these developed tone classes may occur.

[5] For the purposes of this paper, each of the aspects of a verb stem are considered tonally to be independently basic, since the differences between them are not caused by any immediately apparent morpheme, and morphophonemic statements are simplest from such a starting point. For the possibility that these aspect differences are remains of an older layer of sandhi, however, see Pike's Analysis of a Mixteco Text 123–4, and Tone Languages 82. By basic, therefore, we mean without phonemic substitution as a result of preceding or following morphemes.

Of the sixteen theoretically possible sequences of two tonemes, fourteen occur as single couplets (some as basic, others as developed). Couplets *2–3 and *4–4 do not occur.

1.4. The interaction of tonemes of successive morphemes is sometimes dependent on the syntactic sequence types in which they occur. For purposes of describing this action it is convenient to subsume syntactic sequences of two morphemes under two types: sequences showing regular perturbation patterns, referred to as REGULAR SEQUENCE TYPES, and those showing special perturbation patterns, referred to as SPECIAL SEQUENCE TYPES.

The regular perturbation patterns always appear in certain syntactic sequence types, including subject plus object, subject plus verb, adjective plus noun, adjective plus adjective, verb plus verbal close modifier, and certain other loose-knit constructions. See **2** for perturbations within regular sequence types.

The special perturbation patterns appear instead of the regular patterns in certain sequences of grammatically close-knit phrases, including (1) a head noun plus another noun acting as a descriptive modifier, or plus a non-enclitic possessor, or optionally and very rarely, plus an adjective; (2) a locational or introductory noun plus a dependent clause; (3) a head verb plus a noun modifier; (4) certain verb auxiliaries plus a main verb. The appearance of special patterns is optional in certain specific morpheme sequences, obligatory in others. See **3** for perturbations within special sequence types.

1.5. As indicated in **1.3**, SE morphemes are divided into TONE CLASSES in accordance with their tone couplets. By different criteria they may be further divided into three morphotonemic TYPES, according to their influence on the tonemes of following morphemes in regular syntactic sequence types. In regular sequence types, type (ᵃ) morphemes are those which do not affect the tonemes of the immediately following morpheme, except for a very limited group of tone classes (i.e. are in general NON-PERTURBING); type (ᵇ) morphemes are those which perturb the first syllable of immediately following morphemes of certain tone classes to **higher**; and type (ᶜ) morphemes are those which perturb the first syllable of immediately following morphemes of certain tone classes to **lower**.

In the special sequence types noted in **1.4**, many morphemes of types (ᵃ) and (ᶜ) show a special set of perturbation patterns in which they cause certain following morphemes to be perturbed to higher, but to a set of high patterns different from those developed by perturbation due to (ᵇ) morphemes, which also cause perturbation to higher. Such perturbing (ᵃ) or (ᶜ) morphemes in special sequences will be referred to as type (ᵃˢ) or (ᶜˢ) couplets; see **3.**

Couplets of tone classes 4–1 or 3–1 (basic or developed) may be perturbed regressively by a following toneme 1 to 4–2 and 3–2 respectively; couplets of tone classes 1–2 or 2–^{1}–2 (basic or developed) may be perturbed regressively by a following toneme 1 to 1–1 and 2–^{1}–1 respectively; see **5.**

1.6. To demonstrate the various types of tonal sandhi in groups of two morphemes, we first give a few selected examples from SE; detailed descriptions will be given later.

ʔə^{2}ə^{2} ⁿdə^{2}bə^{4} *one egg.* ʔə^{2}ə^{2} *one* is a type (ᵃ) non-perturbing morpheme, which in regular sequence types does not perturb the tones of ⁿdə^{2}bə^{4}. This particular morpheme never occurs as the first member of a special syntactic sequence, and thus never perturbs the tones of morphemes following it. See **2.1** for detailed description of the action of type (ᵃ) morphemes.

ta^{4}ka^{2} ⁿdə^{1}bə^{4} *each egg;* ta^{4}ka^{2} hi^{1}ka$^{3\text{-}2}$ *each basket.* ta^{4}ka^{1} *each* is a type (ᵇ) morpheme, so it perturbs the first syllable of certain following tone classes to higher. Note than ⁿdə^{2}bə^{4} *egg* and hi^{4}ka^{2} *basket* belong to different basic tone classes and are perturbed differently following ta^{4}ka^{1}. On the other

hand, although ta^{4}ka^{1} *each* is a type (^{b}) morpheme, it is itself perturbed regressively to ta^{4}ka^{2} by the following toneme 1, in a reciprocal tone action. See **2.2** for detailed description of perturbations caused by morphotonemic type (^{b}) morphemes, and **5** for detailed description of regressive perturbations.

ʔə^{2n}ga^{2} ^{n}də^{3}bə^{4} *another egg*; ʔə^{2n}ga^{2} hi^{4}ka^{2} *another basket*. ʔə^{2n}ga^{2} *another* is a type (^{c}) morpheme, so in regular sequence types it perturbs certain following tone classes, of which ^{n}də^{2}bə^{4} *egg* is a sample, to lower. Note that hi^{4}ka^{2} *basket* is a member of a tone class not perturbed in this way, because it has an initial toneme 4, which is already low and cannot be perturbed lower. ʔə^{2n}ga^{2} never occurs as the first member of a special syntactic sequence, and thus never perturbs following tonemes to higher. See **2.3** for detailed description of perturbations caused by morphotonemic type (^{c}) morphemes.

žu^{2}ku^{2} ^{n}də^{1}ə^{1} *egg mountain* (i.e. *the place where eggs are to be had*); žu^{2}ku^{2} la$^{2\text{-}1n}$ǰi^{2} *sheep mountain* (i.e. *the place where sheep graze*; these forms appear in expressions such as *I am going to go buy some eggs*, or *I am going to the mountain with my sheep*, a common figure of speech in this dialect). žu^{2}ku^{2} *mountain* is a type (^{a}) non-perturbing morpheme in regular syntactic sequence types, but in the above special syntactic sequence it operates as (^{as}), and causes one or both of the tonemes of certain following morphemes to be perturbed to higher; see **3**. The morpheme ^{n}də^{2}bə^{4} *egg* following it is perturbed to 1–1, but the morpheme la^{2n}ǰi^{2} *sheep*, of a different basic tone class, is perturbed to 2–^{1}–2. Following the (^{b}) morpheme ta^{4}ka^{1} *each*, above, ^{n}də^{2}bə^{4} *egg* was given a raised perturbation from 2–4 to 1–4; following the (^{as}) morpheme žu^{2}ku^{2} *mountain* in this special syntactic sequence, it was also raised, but to a different pattern, i.e. 1–1.

nu^{2}u^{4} ^{n}də^{3}bə^{1} ~ ^{n}də^{2}bə^{1} *to the eggs* (e.g. in such phrases as *add some chile to the eggs*); nu^{2}u^{4} žu$^{2\text{-}1}$ku^{2} *to the mountain*. nu^{2}u^{4} *to* is a type (^{c}) morpheme, but appears as a (^{cs}) in the above special sequence type, where it occurs very commonly. It then causes certain following morpheme tone classes to be perturbed to higher. Thus the morpheme ^{n}də^{2}bə^{4} *egg* following it has its tones perturbed to 3–1 ~ 2–1, with a toneme higher than its basic 2–4 couplet, but in a pattern different from the two raised patterns cited above. The morpheme žu^{2}ku^{2} *mountain* following nu^{2}u^{4} *to* in this special syntactic sequence is perturbed to 2–^{1}–2.

The 2–4 tone class, represented by the morpheme ^{n}də^{2}bə^{4} *egg*, may be perturbed in as many as four different ways by immediately preceding morphemes, as we have just seen; this is the only tone class which has so many perturbation possibilities.

From the above illustrations we see that the perturbation of a SE morpheme is dependent (1) on the morphotonemic type and basic tone class of the morpheme preceding or following it, (2) on the basic tone class of the morpheme itself, and (3) on its particular syntactic position.

In SM, on the other hand, certain morpheme tone classes are almost always perturbed to a higher toneme,[6] and always to the same higher tone pattern, regardless of the pattern of the perturbing morpheme preceding them, and regardless of their syntactic position. Furthermore, all SM morphemes with one or more high tones, except pattern low-high, are stable and remain unperturbed in every environment, whereas in SE no tone couplet is stable.

In SM, of the five corresponding phrases with the morpheme ^{n}dəbə̀ *egg* listed above, only in the last two would it be perturbed, and in those two the perturbing morpheme would cause ^{n}dəbə̀ to be perturbed in the one way only. The SM morphemes žuku *mountain* and nuù *to* are always (^{b}) morphemes, and do not show special perturbation patterns as in SE; they always perturb certain following morphemes to higher,

[6] See fn. 4.

regardless of their syntactic position: ʔǫ̀ǫ̀ ⁿdəbə̀ *one egg* (ʔǫ̀ǫ̀ is a type (ᵃ) morpheme); tàká ⁿdəbə̀ *each egg* (tàká is a type (ᵃ) morpheme); ʔəⁿgà ⁿdəbə̀ *another egg* (ʔəⁿgà is a type (ᵃ) morpheme); žuku ⁿdəbé *egg mountain* (this phrase, however, is not used as a common figure of speech as in SE) (žuku is a type (ᵇ) morpheme); nuù ⁿdəbé *to the eggs* (nuù is a type (ᵇ) morpheme). Note that SM ⁿdəbə̀ is perturbed to mid-high following both of these type (ᵇ) morphemes, whereas in SE 2–4 couplets are perturbed to 1–4 following type (ᵇ) morphemes, to 1–1 following 2–2 type (ᵃˢ) and (ᶜˢ) morphemes, and to 3–1 ∼ 2–1 following 2–4 type (ᶜˢ) morphemes.

2. Progressive perturbation in phrases showing regular perturbation patterns.

In order for the reader to understand the general character of the tonemic system of SE, and to have a preliminary idea of its intricate detail, the general classes of perturbation have been illustrated above. We turn now to a more detailed description of the tonemic and morphotonemic classes of that system.

SE morphemes of type (ᵃ), (ᵇ) and (ᶜ) may precede morphemes of ANY BASIC TONE CLASS (see Table 1). The basic tonemes of the second morpheme in regular sequences remain unchanged or undergo certain perturbations, depending on the type of the preceding morpheme. (Perturbations in certain special syntactic sequences are discussed under **3.**)

2.1. SE type (ᵃ) morphemes include certain morphemes of basic tone classes 1–2, 1–3, 2–2, and all morphemes of class 4–2/3; cf. Table 1. Note that these tone couplets are those with final toneme 2 or 3 (except couplet 4–2). One group of tone couplets is designated as 4-2/3, since for these, their final tone fluctuates freely between 2 and 3 in all environments. The 4–2/3 couplets are all (ᵃ) morphemes, whereas 4–2 couplets are all (ᶜ) morphemes; see Table 4. The (ᶜ) couplets are 4–2 and not 4–2/3 because their final tone is always higher than a following developed toneme 3 (from basic tonemes 1 or 2).

SM type (ᵃ) morphemes include forms with all tone couplets.[7]

The basic tonemes of morphemes that follow SE type (ᵃ) morphemes remain unchanged except for the optional lowering of toneme 2 to toneme 3 in 2–1 and 2–2 couplets, after an (ᵃ) morpheme with a final toneme 3 (i.e. 1–3 (ᵃ) and the 4–3 form of 4–2/3 (ᵃ) couplets). We have, for instance, the following variations of tone in a phrase with the 4–2/3 (ᵃ) morpheme te⁴e² ∼ te⁴e³ *man* plus the 2–2 morpheme ⁿdu²te² *water*: ko²ʔo² te⁴e² ⁿdu²te² ∼ ko²ʔo² te⁴e³ ⁿdu²te² ∼ ko²ʔo² te⁴e³ ⁿdu³te³ *the man will drink water*. After the 1–3 (ᵃ) morpheme če¹ⁿgo³ *opossum*,

TABLE 2—Perturbation of couplets following (ᵃ) couplets in SE

After basic:	Basic:	Appears as:
1–3 (ᵃ)	2–1	2–1 ∼ 3–1
4–3 (ᵃ)	2–2	2–2 ∼ 3–3

All other tone classes appearing after type (ᵃ) couplets in regular sequences remain unchanged. See text for explanation of variants.

the morpheme ʔi²na² *dog* may or may not be lowered to 3–3: žu¹ʔu¹ če¹ⁿgo³ ʔi²na² ∼ žu¹ʔu¹ če¹ⁿgo³ ʔi³na³ *the opossum is afraid of the dog.*

Table 2 shows the effect that SE type (ᵃ) morphemes with final toneme 3 have

[7] However, type (ᵃ) morphemes in the high-high class in SM are rare. Exceptions are: ñáá *bad*; sóʔó *female*; žíí *male*; ⁿdáʔú *poor*; šⁿdáʔú *deceive* [lit. *cause to be poor*]; lúlí *small*; žúʔú *to fear*; šą́ą́ *very much so in a good sense*; náá *I*, polite; nší *you*, polite; róó *you*, familiar; žóó *we*, inclusive; none of which have perturbing influence though they are high-high morphemes. Of the short enclitic forms of these pronouns, −ná, −ní, −ró and −žó, the first two are (ᵃ) morphemes and do not cause perturbation, and the second two are (ᵇ) morphemes and do cause perturbation of a following morpheme. Most of the remainder of the morphemes in the above list are adjectives derived from non-perturbing nouns in other tone classes.

upon those immediately following couplets which are subject to their perturbing influence. The tone couplets shown in the third column are the tone patterns taken by the second of a sequence of two morphemes, the first morpheme of the sequence being a type (^{a}) morpheme carrying either of the tone couplets listed in the first column of the table. (See **3** for perturbing action of type (^{a}) morphemes in special syntactic sequence types.)

2.2. SE type (^{b}) morphemes include certain morphemes of basic tone classes 1–1, and all morphemes of tone classes 2–1 and 4–1; cf. Table 1. Note that these tone couplets are all the basic ones with final toneme 1.

SM type (^{b}) morphemes include forms with all tone couplets except low-mid, mid-high, and high-low.

SE type (^{b}) morphemes always cause perturbation of certain following morphemes in the same way, regardless of their syntactic position; i.e. their perturbing action is never modified in special syntactic sequences. Type (^{b}) morphemes perturb all those couplets immediately following them which have a toneme 4, by a raising of their initial toneme to 1 (unless already 1) and a lowering of their final toneme to 3 (unless already 3 or 4), with or without a monosyllabic glide back to the final toneme of the basic couplet. (Such tone glides on single syllables are never found in SM.) For example, we have the following contrast after the morpheme -ni^{1} (^{b}) *you* > -ni$^{3\text{-}2}$ (^{b}) after hi^{1}ni^{1} (^{c}) *know*: hi^{1}ni^{1}-ni$^{3\text{-}2}$ są^{1}ʔą^{4} (<są^{2}ʔą^{4} *genteel words*) *you know the genteel words*; but hi^{1}ni^{1}-ni$^{3\text{-}2}$ są^{1}ʔą$^{3\text{-}1}$ (<są^{4}ʔą^{1} *me*) *you know me*. However, in SE a developed 1–3–^{1} or 1–3–^{2} couplet often alternates with 1–3 in fast speech, the glide being lost, especially on a morpheme with intervocalic consonant other than glottal stop.

Table 3 shows the basic tone classes of SE type (^{b}) morphemes and the effect they have upon those immediately following couplets which are subject to their perturbing influence in any syntactic environment.

2.3. SE type (^{c}) morphemes include all morphemes of basic tone classes 1–4, 2–4, and 4–2, and certain morphemes of basic tone classes 1–1, 1–2, 1–3, and 2–2; cf. Table 1. The (^{c}) group comprises the largest number of morphemes in the dialect, and has the most far-reaching perturbing effect on following morphemes.

In SM such (^{c}) action is extremely limited.[8]

As regards the correlation of SE morpheme types ($^{a, b, c}$) with the basic tone classes, note in Table 1 that morphemes of both types (^{a}) and (^{c}) appear in tone classes 1–2, 1–3 and 2–2. Morphemes of both types (^{b}) and (^{c}) appear in tone class 1–1. No tone class is represented by both types (^{a}) and (^{b}) morphemes. Appearing exclusively with type (^{a}) are 4–2/3 morphemes. Appearing exclusively with type (^{b}) are 2–1 and 4–1 morphemes.

TABLE 3—Perturbation of couplets following (^{b}) couplets in SE

After basic:	Basic:	Appears as:
1–1 (^{b}), 2–1 (^{b}), 4–1 (^{b})	2–4	1–4
	4–1	1–3–^{1} ~ 1–3
	4–2	1–3–^{2} ~ 1–3
	4–2/3	1–3–^{2} ~ 1–3

Other tone classes appearing after type (^{b}) couplets remain unchanged. See text for explanation of variants.

In the 1–1 (^{c}) group are found certain verbs in the continuative aspect,[9] almost all of which are 2–4 (^{c}) in their potential aspect. The 1–2 (^{c}) group consists exclusively of verbs in the continuative aspect, which are 2–2 (^{c}) in their potential aspect. Most Spanish loans in SE are adapted to the 1–1 (^{c}) pattern. A few which in Spanish are monosyllabic or accented on the last syllable fall into pattern 1–4 (^{c}). In SM, however, Spanish loans fall into patterns mid-high (^{a})

[8] See fn. 4.

[9] See fn. 5.

and high-low (ª). Compare: SE sk^{w}e^{l}la^{1} (ᶜ), SM sk^{w}elá (ª) *school* (Sp. escuela); SE k^{w}e^{ln}du^{1} (ᶜ), SM k^{w}e^{n}dú (ª) *story* (Sp. cuento); SE ho^{l}si^{4} (ᶜ), SM hósò (ª) *sickle* (Sp. hoz); SE re^{l}i^{1} (ᶜ), SM réî (ª) (Sp. rey).[10]

Type (ᶜ) morphemes usually lower the initial basic toneme of a following morpheme in regular sequence types (unless its initial basic toneme is already 4). Basic couplets 1–1, 2–1, 2–2, and 2–4 have their initial tonemes lowered to 3. A developed 3–2 tone couplet (derived by lowering of a basic 2–2 couplet) varies freely to 3–3. Other basic couplets with initial toneme 1 have this toneme replaced by a 2–^{l} monosyllabic glide.

Following 1–4 (ᶜ) and 2–4 (ᶜ) couplets, basic 2–1 and 2–2 couplets often remain unperturbed: sa^{2}Ne^{4} (ᶜ) k^{w}ą^{2}ą^{2} ∼ k^{w}ą^{3}ą^{2} (ª) -na^{1} *tomorrow I will buy (it).*

In some idiolects, (ᶜ) morphemes of basic tone classes 1–1 and 2–2 (more frequently the latter) vary freely to 1–1–^{4} and 2–2–^{4}, and in this form are occasionally but rarely followed by the unperturbed forms of basic tone patterns 1–2, 1–3, 1–4, 2–1 and 2–2. For instance, when a 1–1 (ᶜ) basic couplet is followed by a 1–2 basic couplet, we may hear the following developed variations in the speech of close neighbors or in the speech of the same individual: 1–1 (ᶜ) + 2–^{l}–2 ∼ 1–1–^{4} (ᶜ) + 2–^{l}–2 ∼ 1–1–^{4} (ᶜ) + 1–2: hi^{l}ni^{1} (ᶜ) bi$^{2\text{-}l}$lu^{2} ∼ hi^{l}ni$^{1\text{-}4}$ (ᶜ) bi$^{2\text{-}l}$lu^{2} ∼ hi^{l}ni$^{1\text{-}4}$ (ᶜ) bi^{l}lu^{2} (extremely rarely) *the cat sees* (lit. *sees cat*). When a 2–2 (ᶜ) couplet is followed by another 2–2 couplet, we may hear the following variations: 2–2 (ᶜ) + 3–2 ∼ 2–2 (ᶜ) + 3–3 ∼ 2–2–^{4} (ᶜ) + 3–2 ∼ 2–2–^{4} (ᶜ) + 3–3 ∼ 2–2–^{4} (ᶜ) + 2–2: ʔi^{l}ne^{2} (ª) ʔi^{2}na^{2} (ᶜ) be^{3}ʔe^{2} ∼ ʔi^{l}ne^{2} (ª) ʔi^{2}na^{2} (ᶜ) be^{3}ʔe^{3} ∼ ʔi^{l}ne^{2} (ª) ʔi^{2}na$^{2\text{-}4}$ (ᶜ) be^{3}ʔe^{2} (rarely) ∼ ʔi^{l}ne^{2} (ª) ʔi^{2}na$^{2\text{-}4}$ (ᶜ) be^{3}ʔe^{3} (rarely) ∼ ʔi^{l}ne^{2} (ª) ʔi^{2}na$^{2\text{-}4}$ (ᶜ) be^{2}ʔe^{2} (rarely) *the dog is in the house* (lit. *is-in dog house*).

From the above we observe that the unperturbed alternants occur only after (ᶜ) morphemes with a final toneme 4, and (rarely) after (ᶜ) morphemes with a downward glide to toneme 4 on their final syllable as just described.[11]

Table 4 shows the basic tone classes of SE type (ᶜ) morphemes, and the effect they have upon those immediately following

[10] One Spanish loan, SE lo^{l}ko^{1}, SM lokó *crazy* (Sp. loco), is especially interesting. In SM this word is confined to its Spanish meaning and is often spoken in jest, much as our English word is used. In SE, however, this loan has taken on a much more extended meaning, being very frequently used as a superlative with the meaning *much, very*. It is paralleled by šąą *much, very* in SM, but in SE this morpheme, šę^{2}ę^{4}, is completely incongruous as a superlative unless used with its primary meaning, *fierce, sharp, angry*, which meaning it also has in SM. Note the following: SE he^{l}tu^{1} lo^{3}ko^{1}, SM hatú šąą *it hurts very much*; SE ba^{4}ʔa^{2} lo^{l}ko^{1} ʔi^{3}o^{2} –tə^{1}, SM bàʔa šąą ʔíó-tə *the animal is a very good one.* In SE one cannot couple the morphemes ba^{4}ʔa^{2} *good* and šę^{2}ę^{4} *fierce* because their meanings are contradictory. In SM, on the other hand, the Spanish loan to^{n}dó *so much* (Sp. tanto) is very common, whereas in SE it is less often used.

[11] This observation leads me to the hypothesis that (ᶜ) morphemes are those which historically perhaps ended on a tone 4, whatever their present form, and that this low toneme now usually transfers itself to the following morpheme. When the (ᶜ) morpheme itself ends with a toneme 4, or actualizes with a syllable final down glide, the following morpheme sometimes remains unperturbed. So after 1–4(ᶜ) and 2–4(ᶜ) morphemes, and after 1–1(ᶜ) and 2–2(ᶜ) morphemes when they are actualized as 1–1–^{4} and 2–2–^{4}, we sometimes observe following couplets in their original unperturbed forms, except for 1–1 and 2–4 couplets, which are always perturbed to lower. In other words, (ᶜ) morphemes give the impression of possessing a strong downward pull on their final syllable, which now usually affects the following morpheme, but sometimes is actualized on the final syllable of the (ᶜ) morphemes themselves.

One feature which may tend to corroborate the above hypothesis is that many morphemes which are 2–2(ᶜ) in SE are mid-low(ª) in SM, and many which are 1–1(ᶜ) in SE are high-low (ª) in SM. Certain verbs which carry the same tones in their potential aspect in both dialects (2–4 in SE, mid-low in SM), in the continuative aspect are 1–1(ᶜ) in SE and high-low(ª) in SM. In SM these morphemes have a final low tone and do not affect following tones, but in SE the corresponding morphemes have a higher final tone and cause the initial syllable tone of a following morpheme to be lowered either to a 2–^{l} glide or to tone 3.

couplets which are subject to their perturbing influence in regular syntactic sequence types. (See **3** for perturbing action of type (c) morphemes in special syntactic sequence types.)

3. Progressive perturbation in special sequence types.

When (a) or (c) morphemes cause perturbation to higher tone patterns in special sequences (see **1.4**), we show after them the formula (as) or (cs); (a) or (c) indicates the original basic tone class of the morpheme, and the symbol (s) indicates that they have a specialized action in special sequence types. In certain close-knit phrases they cause perturbation of certain following tone couplets to higher tone patterns, different from those already described.

Patterns 1–1, 1–2, 1–3, 1–4, and 2–1 (all those with a toneme 1 except 4–1 couplets) are perturbed in the regular way always, i.e. only after (c) morphemes, which perturb them to lower tone patterns. The special perturbing action is in effect only preceding the lower basic tone classes (2–2, 2–4, 4–1, 4–2 and 4–2/3 couplets) when it perturbs them to higher.

We will see below that specialized action is unpredictable and inconsistent in some of the special syntactic groupings, and that there are many subgroupings and alternants in the resultant tone patterns. 2–2 (a) and 2–4 (c) morphemes cause specialized perturbation more commonly and regularly than morphemes of other tone patterns. The majority of specialized perturbations occur following these two basic patterns. Rarely and optionally, specialized perturbation has been observed following other (c) and (a) morphemes, chiefly patterns 1–1 (c), 1–4 (c), 2–2 (c), and 4–2/3 (a).

Specialized perturbations occur as follows:

Most morphemes of tone class 2–2 are perturbed to 2–^{1}–2 in a special sequence: ^{n}da^{2}ža$^{2\text{-}1}$bu^2 *branch of maguey* (<^{n}da^{2}ʔa^2 (as) *hand* + ža^{2}bu^2 *maguey*).

There is, however, a sub-grouping of basic 2–2 morphemes which are perturbed to 2–^{1}–4 in contrast to the major group of 2–2 morphemes which are perturbed to 2–^{1}–2. We have such contrasts as: ma^{2}a^4 ku$^{2\text{-}1}$u^4 -de^3 *he won't die* (<ma^{2}a^4 (cs) *will not* + ku^{2}u^2 (c) *will die* + -de^2 *he*); but ma^{2}a^4 ku$^{2\text{-}1}$u^2 -de^2 či^{2}lo?^{3}lo^4 *he won't be a masquerader* (<ma^{2}a^4 (cs) *will not* + ku^{2}u^2 (a) *will be* + -de^2 (a) *he* + či^{2}lo?^{3}lo^4 *masquerader*). So ku^{2}u^2 *will die* and ku^{2}u^2 *will be* are perturbed to 2–^{1}–4 and 2–^{1}–2 respectively. A few other 2–2 (c) morphemes act like ku^{2}u^2 (c) *will die* when perturbed to higher.[12]

TABLE 4—Perturbation of couplets following (c) couplets in SE

After basic:	Basic:	Appears as:
1–1 (~ 1–1–^{4}) (c)	1–1	3–1
1–2 (c)	1–2	2–^{1}–2 (~ 1–2)
1–3 (c)	1–3	2–^{1}–3 (~ 1–3)
1–4 (c)	1–4	2–^{1}–4 (~ 1–4)
2–2 (~ 2–2–^{4}) (c)	2–1	3–1 ~ 2–1
2–4 (c)	2–2	3–2 ~ 3–3 ~ 2–2
4–2 (c)	2–4	3–4

Unperturbed forms in parentheses in column 3 are idiolectal forms or infrequent alternants which occur only after rare forms in parentheses in column 1. See text for explanation of variants. Other tone classes appearing after type (c) couplets remain unchanged in regular sequences.

Morphemes of tone pattern 2–4 are perturbed to 3–1 ~ 2–1 following specialized morphemes with a final 4 toneme, and to 1–1 following other specialized morphemes: kə^{2}bə^4 ʔu^{3}ni^1 ~ ʔu^{2}ni^1 *third day* (<kə^{2}bə^4 (cs) *day* + ʔu^{2}ni^4 *three*). One 2–4 morpheme has a unique perturbation, becoming 1–4 after derived (as) morphemes: ^{n}du^{2}te^2 stə^{1}kə^4 *the ox's water* (<^{n}du^{2}te^2 (as) *water* + stə^{2}kə^4 *ox*).

Morphemes of tone patterns 4–1, 4–2 and

[12] Other 2–2 morphemes which have been observed to act like ku^{2}u^2 *will die* when perturbed to higher are: ñu^{2}u^2 *town*; na^{2}a^2 *lose*; also na^{2}a^2 -ni^3 *forget*; ką^{2}ą^2 *dig*. These are all (c) morphemes with the 'downward pull' on their final syllable, and it is possible that they still bear traces of a former 2–4 basic pattern; cf. fn. 11.

4–2/3 (i.e. all those with a basic toneme 4 on their initial syllable) are perturbed as they would be under (b) influence, except that they develop a 2–1 glide rather than simple tone 1 on their initial syllable. The 3–1 or 3–2 sequence on their final syllable may in fast speech be abbreviated simply to toneme 3: nu²u⁴ ši²⁻¹ko³⁻¹ -de² ~ nu²u⁴ ši²⁻¹ko³ -de² *where he will sell it* (<nu²u⁴ (cs) *where* + ši²⁻¹ko³ -de² *where he will sell it* (<nu²u⁴ (cs) *where* + ši⁴ko¹ (b) *will sell* + -de² *he*).

TABLE 5—Perturbation of couplets in special syntactic sequences in SE

After specialized morphemes:	Basic:	Appears as:
More commonly and regularly following: 2–2 (as)	2–2	2–1–2 or 2–1–4
2–4 (cs)	2–4	1–1 or 1–4 (unique) or 3–1 ~ 2–1
Rarely and optionally following certain other (as) or (cs) tone couplets; see text		
	4–1	2–1–3–1 ~ 2–1–3
	4–2	2–1–3–2 ~ 2–1–3
	4–2/3	2–1–3–2 ~ 2–1–3

Alternants separated by 'or' are conditioned by preceding morphemes, or by the sub-groupings, explained in the text. Alternants separated by ~ vary freely in special sequences.

Perturbations in special syntactic sequences are seen in Table 5. Alternants separated by ~ vary freely in special sequences, but alternants separated by "or" are conditioned either by the tone class of the preceding specialized morpheme or by the sub-grouping of the morpheme being perturbed, as described above. Description of special sequence types follows the table.

We now examine the special sequence types in which perturbation to higher tone patterns after specialized (as) or (cs) morphemes may occur:

(1) Head noun plus another noun acting as descriptive modifier: hi²ka⁴ be²⁻¹ʔe² *the wall of the house* (<hi²ka⁴ (cs) *side* + be²ʔe² *house*); heʔ²e⁴ biʔ³ⁿde¹ ~ biʔ²ⁿde¹ *foot of the nopal cactus* (<heʔ²e⁴(cs) *foot* + biʔ²ⁿde⁴ *nopal cactus*.).

When a modifier precedes the head noun (usually a numeral, demonstrative noun or adjective), the sequence does not constitute a special sequence: ʔo²ko⁴ na³ma⁴ *twenty [pieces of] soap* (<ʔo²ko⁴ (c) *twenty* + na³ma⁴ *soap*); but na²ma⁴ ʔo³ko¹ ~ ʔo²ko¹ *twenty-cent soap* (<na²ma⁴ (cs) *soap* + ʔo²ko¹ *twenty-cent soap* (<na²ma⁴ (cs) *soap* + ʔo²ko⁴ *twenty*).

There are some sequences which show arbitrary choice of regular or special perturbation patterns: kʷeʔ²ži⁴ ši³Ni¹ ~ ši²Ni¹ *illness of the nose*, i.e. *a cold* (<kʷeʔ²ži⁴ (cs) *illness* + ši²Ni⁴ *nose*); but kʷeʔ²ži⁴ nu³u⁴ *illness of the eyes*, i.e. *even inflammation* (<kʷeʔ²ži⁴ (c) *illness* + nu²u⁴ *eyes*). Here both ši²Ni⁴ and nu²u⁴ are of the same basic tone class and both are in the same syntactic position, but the first is consistently perturbed in this position and the second is not.

(2) Noun plus non-enclitic possessor: When a noun acting as possessor follows another noun, the special perturbation is optional, and so we have alternation between regular and special sequence types: ⁿdə²kə² ʔi²⁻¹su² ~ ʔi²su² *the deer's horns* (<ⁿdə²kə² (as) or (a) *deer* + ʔi²su² *horns*). After 2–2 (a) and 2–4 (c) noun morphemes, following nouns acting as possessors and carrying basic tone patterns which may be specially perturbed show this special perturbation in perhaps a little more than half the utterances; after other tone couplets this perturbation takes place only occasionally: kə⁴sə²/³ ña²ʔa² -ų⁴⁻¹; rarely kə⁴sə²/³ ña²⁻¹ʔa² -ų⁴⁻¹ *that woman's cooking pot* (<kə⁴sə²/³ (a) or rarely (as) *cooking pot* + ña²ʔa² (a) *woman* + ų⁴⁻¹ *that*).[13]

[13] The full form of the enclitic -ų⁴⁻¹ is presumably žu⁴kʷą¹ *that thing*. In its one-mora enclitic form it retains the tone couplet of the full form, 4–1. This enclitic is never perturbed to higher by preceding morphemes, but is, however, perturbed regressively in keeping with other 4–1 morphemes.

(3) Noun plus descriptive adjective: Very rarely an adjective following a noun is optionally specially perturbed: le^{1}lu^{1} ba$^{2\text{-}1}$ʔa$^{3\text{-}2}$ *good hat* (<le^{1}lu^{1} (cs) *hat* + ba^{4}ʔa$^{2/3}$ *good*); but more often le^{1}lu^{1} ba^{4}ʔa$^{2/3}$ without the special perturbation. In a few common phrases with an adjective comprising the second morpheme, perturbation is consistent: ta^{2}či^{4} nį$^{2\text{-}1}$ʔį$^{3\text{-}2}$ *strong wind*, i.e. *storm* (<ta^{2}či^{4} (cs) *wind* + nį^{4}ʔį^{2} *strong*).

(4) Locational or introductory noun plus dependent clause: There is a group of nouns which often act as locationals or introducers of a dependent clause. As the center of a noun construction they are as follows: nu^{2}u^{4} (c) *face, eye*; sə^{2}kə^{4} (c) *spine*; he^{2}ʔe^{4} (c) *foot*; ža^{2}ta^{4} (c) *back*; ʔi^{2}či^{2} (a) *road*; žu^{2}ʔu^{2} (a) *mouth*. As locationals or introducers of a dependent clause where they cause specialized perturbation, they take on specialized meanings as follows: nu^{2}u^{4} *to, at, from, where*; sə^{2}kə^{4} *on top of, against (someone)*; he^{2}ʔe^{4} *at the foot of, in behalf of*; ža^{2}ta^{4} *in back of*; ʔi^{2}či^{2} *toward, to or from the direction of*; žu^{2}ʔu^{2} *at the mouth of*. One such morpheme is limited to the position of introducer of a dependent clause: he^{2}e^{4} *that, that thing*. A few such locational or introductory morphemes, however, constitute a sub-group which does not cause special perturbation in this position. They are: ʔi^{2}ni^{2} (c) *in*; či^{4}hi$^{2/3}$ (a) *inside of, underneath*; hi^{2}o^{2} (a) *by the side of*; la^{1}do^{1} (c) *one side of* (Sp. lado).

Examples are: ʔi^{2}či^{2} ñu$^{2\text{-}1}$u^{4} *toward town* (<ʔi^{2}či^{2} (as) *toward* + ñu^{2}u^{2} *town*); he^{2}e^{4} ni$^{3\text{-}1}$ hę^{2}ę^{2} -ro^{1} -tə^{1} *that you bought the animal* (<he^{2}e^{4} (cs) *that* + ni^{2}i^{4} *completed action* + hę^{2}ę^{2} *bought* + -ro^{1} *you* + -tə$^{2\text{-}4}$ *animal*).

(5) Head verb plus noun modifier: ka^{2}ta^{2} he^{1}ʔe^{1} *will dance* (<ka^{2}ta^{2} (as) *sing* + he^{2}ʔe^{4} *feet*); he^{2}k^{w}i^{2}ñə^{4} žə^{3}tə^{1} ~ žə^{2}tə^{1} *kneel* (<he^{2}k^{w}i^{2}ñə^{4} (cs) *stand* + žə^{2}tə^{4} *leg below knee*). In this context there are many sequences in which special perturbation does not take place: ku^{2}ni^{2} so^{4}ʔo^{2} *listen, hear* (<ku^{2}ni^{2} (a) *hear* + so^{4}ʔo^{2} *ear*); sk^{w}a^{1}ʔa^{2} ši^{2}ni^{4} *memorize* (<sk^{w}a^{1}ʔa^{2} (a) *study* + ši^{2}ni^{4} *head*).

(6) Certain verb auxiliaries plus main verb: Two morphemes (ma^{2}a^{4} negative, prohibitive; and na^{2} deliberative, imperative) are the only verb auxiliaries which cause perturbation of a following verb. (The remaining verb auxiliary morphemes do not cause special perturbation.) Examples are: ma^{2}a^{4} k^{w}a$^{2\text{-}1}$ʔa$^{3\text{-}2}$ -de^{2} *he won't give (it)* (<ma^{2}a^{4} (cs) *won't* + k^{w}a^{4}ʔa$^{2/3}$ (a) *give* + -de^{2} *he*); na^{2} ki$^{2\text{-}1}$hi^{2} -i^{2} *well then, let him come* (<na^{2} (as) deliberative + ki^{2}hi^{2} (a) *come* + -i^{2} third person familiar).

From the above it will be seen that special perturbation is unpredictable and irregular. The SE dialect may be undergoing a modification in certain respects, which may account for this phenomenon.

As has already been observed, in SM perturbation to higher is extensive and perturbation to lower very limited. Perturbation to higher in SM is not irregular nor limited to close-knit phrases, as in SE,[14] and morphemes are almost always[15] perturbed in the same way, irrespective of the tones of the preceding perturbing morpheme.

[14] A few rare exceptions in SM are: The morpheme te *and, then*, is never perturbed by preceding (b) morphemes; the morpheme tuku *again* is perturbed only following high-mid(b), mid-mid(b), and mid-low(b) morphemes; in the sequence šĺ ⁿdasa *or how?* the second morpheme is optionally perturbed or not perturbed, though the first is a (b) morpheme; in the sequence máá-na *just that much more* the second morpheme is not perturbed, though the first is a (b) morpheme. The latter two instances were pointed out to me by Pike, who suggests that the few irregularities here may be residues of an earlier stage more like SE, but now largely levelled out analogically. Similarly, the SM derived adjective tones of fn. 7 may reflect earlier perturbation in close phrases of noun plus noun modifier. The rare instances of lowering mentioned in fn. 4 are perhaps reflexes of an older stage somewhat like SE type (c); compare also fn. 11.

[15] For irregularities, see fn. 4. In addition a 'calling' or 'addressing' pattern may override all basic tone patterns; see Tone Languages 87.

4. Progressive perturbation of and by pronoun enclitics.

Certain of the pronoun enclitics (monosyllabic) have unique tonal rules, and so we treat the entire group separately from their corresponding full forms, which follow the pattern of full morpheme types (ᵃ), (ᵇ), and (ᶜ) already described (cf. **2**). In isolation, as objects of verbs, and in a few other places, the full forms occur. The enclitic forms occur as subjects of verbs (kį²ʔį⁴ -de³⁻² *he will go*), possessors (be²ʔe² -ri² *my house*), and in locational phrases (nu²u⁴ -ni³⁻¹ *to you*). The enclitics fall into the following classes:

GROUP 1: -na¹ (ᵇ) 1st person polite, sing. or pl.; and -ni¹ (ᵇ) 2nd person polite, sing. or pl. (full forms: sa⁴ña¹ (ᵇ) or są⁴ʔą¹ (ᵇ); and ni¹ʔi¹ (ᵇ)). These act tonally like (ᵇ) morphemes unless they immediately follow another morpheme having the same general type of tonal action as themselves, i.e. type (ᵇ), when they lose their (ᵇ) character and become (ᶜ). The symbol (ᶜ<ᵇ) is used to indicate that the basic (ᵇ) character of the morpheme has been changed to (ᶜ); thus: ko²ʔo² (ᵃ) -na¹ (ᵇ) ta¹Na⁴ *I will drink the medicine* (<ta²Na⁴ *medicine*); but žu¹ʔu¹ (ᵇ) -na¹ (ᶜ<ᵇ) ta³Na⁴ *I fear the medicine.*

After (ᶜ) morphemes these enclitics become 3–1: le¹lu¹ (ᶜ) -ni³⁻¹ (<-ni¹) *your hat.* They are then eligible for regressive perturbation to 3–2 before a following toneme 1 in longer phrases (see **5**). So we have že¹hi² -na³⁻¹ ⁿde²žu² *I am eating cooked food* (<že¹hi² (ᶜ) *eating* + -na¹ > -na³⁻¹ (ᵇ) *I* + ⁿde²žu² *cooked food*); but že¹hi² -na³⁻² čų¹ų³⁻¹ *I am eating turkey* (<že¹hi² (ᶜ) *eating* + -na¹ > -na³⁻¹ > -na³⁻² (ᵇ) *I* + čų⁴ų¹ *turkey*).

In SM these are always (ᵃ) non-perturbing morphemes, and being high, they are never perturbed by preceding or following morphemes.

GROUP 2: -ro¹ (ᵇ) 2nd person familiar sing. or pl.; and -žo¹ (ᵇ) 1st person pl. inclusive (full forms: ro¹ʔo¹ (ᵇ); and žo¹ʔo¹ (ᵇ)). In their basic unperturbed form these act like (ᵇ) morphemes, unless they immediately follow another morpheme having the same action as themselves, i.e. type (ᵇ), when they lose their (ᵇ) character and become (ᶜ), as described for group 1 enclitics above. They are perturbed to toneme 4, however, after all (ᶜ) morphemes. When they are perturbed to toneme 4 they take the character of (ᶜ) morphemes. Thus we have: kʷą²ą² -ro¹ nu¹ni⁴ *you buy the corn* (<kʷą²ą² (ᵃ) *buy* + -ro¹ (ᵇ) *you* + nu²ni⁴ *corn*); but ka²hi² -ro⁴ nu²ni⁴ *you eat the corn* (<ka²hi² (ᶜ) *eat* + -ro¹ > -ro⁴ (ᶜ<ᵇ) *you* + nu²ni⁴ *corn*).

In SM these enclitics are -rò (ᵇ) and -žò (ᵇ) respectively. They are perturbed to high tone by preceding high-mid (ᵃ), mid-mid (ᵃ), low-mid (ᵃ), high-high (ᵇ) and low-high (ᵇ) morphemes; and to mid tone by preceding high-mid (ᵇ) and mid-mid (ᵇ) morphemes.

GROUP 3: -ri² (ᶜ) ~ -ri²⁻⁴ (ᶜ) 1st person familiar sing. or pl.; -tə² (ᶜ) ~ -tə²⁻⁴ (ᶜ) *the animal*; -ža² (ᶜ) ~ -ža²⁻⁴ (ᶜ) *deity or sacred personage* (full forms: ru²ʔu⁴ (ᶜ); kə²tə² (ᵃ); ža²a⁴ (ᶜ)). These morphemes are always (ᶜ) in their perturbing effect. They carry toneme 2 ~ 2–⁴ after (ᵃ) morphemes, toneme 4 after (ᶜ) morphemes, and toneme 1 ~ 1–⁴ after (ᵇ) morphemes: žu¹ʔu¹ -ri¹ -to⁴ *I am afraid of the animal* (<žu¹ʔu¹ (ᵇ) *be afraid* + -ri²⁻⁴ > -ri¹ (ᶜ) *I* + -tə²⁻⁴ *animal*); ma²a⁴ ka²⁻¹hi² -tə⁴ ⁿde³ʔe⁴ *the animal mustn't eat the fruit* (<ma²a⁴(ᶜˢ) *mustn't* + ka²hi² (ᶜ) *eat* + -tə²⁻⁴ > -tə⁴ (ᶜ) *animal* + ⁿde²ʔe⁴ *fruit*); ʔi¹o¹ be²ʔe² -ža²⁻⁴ *the sacred personage has a house* (<ʔi¹o¹ (ᵇ) *there is* + be²ʔe² (ᵃ) *house* + -ža²⁻⁴ *sacred personage*).

In SM -rì is always (ᵃ); -tò and žà are (ᵇ) when they themselves are unperturbed, but (ᵃ) when they have been perturbed. They are perturbed to high following all (ᵇ) morphemes, following general perturbation rules.

GROUP 4: -de² (ᵃ) 3rd person masculine sing. or pl.; -i² (ᵃ) 3rd person familiar sing. or pl., human or inanimate; -ña² (ᵃ) 3rd person feminine sing. or pl. (full forms: te⁴e²/³ (ᵃ); su⁴či¹ (ᵇ); ña²ʔa² (ᵃ)). These act like 2–2 (ᵃ) morphemes, never causing

perturbation. They are perturbed to tone 3 ~ 3–^{2} after those morphemes which cause perturbation of 2–2 couplets, in accordance with regular (^{c}) action. Examples are: ką^{1}ą^{2} -de^{3} ža^{2}bu^{4} *he is digging a hole* (<ką^{1}ą^{2} (^{c}) *is digging* + -de^{2} (^{a}) *he* + ža^{2}bu^{4} *hole*); be^{2}tu^{4} žə$^{2\text{-}1}$ʔə^{2} -i^{2} *the child is wearing a palm girdle* (<be^{2}tu^{4} (^{c}) *palm girdle* + žə^{1}ʔə^{2} (^{a}) *is wearing* + -i^{2} 3rd person familiar); k^{w}i^{4}ku^{2} -ña^{2} saʔ^{2}ma^{2} *she will sew the cloth* (<k^{w}i^{4}ku$^{2/3}$ (^{a}) *will sew* + -ña^{2} (^{a}) *she* + saʔ^{2}ma^{2} *cloth*).

In SM -de and -i are (^{a}) in character; -ña is (^{b}) when it itself is unperturbed but (^{a}) when it is perturbed.[16] These morphemes are perturbed to high following high-mid (^{b}), mid-mid (^{b}) and mid-low (^{b}) couplets.

Table 6 shows the pronoun enclitics in their basic tone patterns and perturbing types after (^{a}) morphemes, and the tone patterns and perturbing types they develop after (^{b}) and (^{c}) morphemes:

TABLE 6—Pronoun Enclitics in SE

Group	Basic tone patterns and types after type (^{a}) morphemes	Developed tone patterns and types after type (^{b}) morphemes	Developed tone patterns and types after type (^{c}) morphemes
1	–na^{1} (^{b}) –ni^{1} (^{b})	–na^{1} ($^{c<b}$) –ni^{1} ($^{c<b}$)	–na$^{3\text{-}1}$ (^{b}) –ni$^{3\text{-}1}$ (^{b})
2	–ro^{1} (^{b}) –žo^{1} (^{b})	–ro^{1} ($^{c<b}$) –žo^{1} ($^{c<b}$)	–ro^{4} ($^{c<b}$) –žo^{4} ($^{c<b}$)
3	–ri^{2} (^{c}) ~ –ri$^{2\text{-}4}$ (^{c}) –tə^{2} (^{c}) ~ –tə$^{2\text{-}4}$ (^{c}) –ža^{2} (^{c}) ~ –ža$^{2\text{-}4}$ (^{c})	–ri^{1} (^{c}) ~ –ri$^{1\text{-}4}$ (^{c}) –tə^{1} (^{c}) ~ –tə$^{1\text{-}4}$ (^{c}) –ža^{1} (^{c}) ~ –ža$^{1\text{-}4}$ (^{c})	–ri^{4} (^{c}) –tə^{4} (^{c}) –ža^{4} (^{c})
4	–de^{2} (^{a}) –i^{2} (^{a}) –ña^{2} (^{a})	–de^{2}(^{a}) –i^{2} (^{a}) –ña^{2} (^{a})	–de^{3} (^{a}) ~ –de$^{3\text{-}2}$ (^{a}) –i^{3} (^{a}) ~ –i$^{3\text{-}2}$ (^{a}) –ña^{3} (^{a}) ~ –ña$^{3\text{-}2}$ (^{a})

5. Regressive perturbation: tonemes affected before a following toneme 1.

Most morphemes of phonemic pattern 4–1 become 4–2 before a following toneme 1: su^{4}či^{2} lu^{1}li^{1} *child* (<su^{4}či^{1} *child* + lu^{1}li^{1} *little*).

After a 4–1 morpheme, the couplets 2–4, 4–1, 4–2 and 4–2/3 have their first syllables perturbed to toneme 1 by regular (^{b}) action. This second morpheme then also perturbs the 4–1 morpheme regressively to 4–2. Thus we have a reciprocal action; the morpheme which has its tone perturbed to 1 by the 4–1 (^{b}) couplet then causes a lowering of the 4–1 morpheme to 4–2.[17] Compare: bi^{4}ta^{1} (^{b}) ^{n}di^{2}ka^{2} *the banana is soft* (<^{n}di^{2}ka^{2} *banana*); and bi^{4}ta^{2} (^{b}) ti^{1}či$^{3\text{-}1}$ *the avocado is soft* (<ti^{4}či^{1} *avocado*).

However, three of these 4–1 morphemes have been found which seem to differ from the others of their class in that they are only rarely perturbed to lower before a following toneme 1. They are: ča^{4}ka^{1} *fish*; čo^{4}ko^{1} *ant*; čų^{4}kų^{1} *fly*. Only these three 4–1 morphemes have been observed to remain

[16] Pike suggests that this may prove to be one of the instances in which SE shows analogical leveling, whereas SM reflects an older difference of pattern within the group.

[17] This 'descriptive order' represents an extremely convenient descriptive device, even though the speaker does not, of course, first pronounce the form in one way and then repeat it in several different tone patterns before finishing the sentence. In order to avoid such statements, process terminology and techniques would have to be eliminated and a rigid allomorphic distributional statement substituted for it, without reference to 'basic' versus 'developed' forms. For problems involved in such a procedure, see fn. 3.

unperturbed before a toneme 1, and sometimes, though rarely, they are also perturbed to lower: čų^{4}kų^{1} lu^{1}li^{1} *species of small fly*; rarely, čų^{4}kų^{2} lu^{1}li^{1}.

1–1 morphemes with contiguous vowels or with intervocalic glottal stop, when they are perturbed to 3–1 by (c) action, also have their final tone lowered before a following toneme 1; 1–1 morphemes with intervocalic consonant other than glottal stop, however, are not so affected. Compare the tones of ma^{1}a^{1} demonstrative in the following: ʔi^{2}na^{2} (c) ma^{3}a^{1} (b) -de^{2} *his dog* (here ma^{1}a^{1} is perturbed to ma^{3}a^{1} by regular (c) action); and ʔi^{2}na^{2} (c) ma^{3}a^{2} (b) te^{1}e$^{3\text{-}2}$ (a) -ų$^{4\text{-}1}$ *that man's dog* (here ma^{1}a^{1} is perturbed to ma^{3}a^{1} by regular (c) action, and is then in condition to be further modified to 3–2 by the following developed toneme 1).

In addition to the perturbation to lower, described above, there is also a limited and optional regressive perturbation to higher. This occurs when a 1–2 basic or a 2–^{1}–2 developed (from 2–2 by (c) action) couplet with contiguous vowels or intervocalic glottal stop, precedes a toneme 1. These couplets may then, optionally but usually, become 1–1 and 2–^{1}–1 respectively. The optional perturbation of the final syllable of these couplets to 1 before another toneme 1 is in effect in SM as well as in SE. žə^{2}kə^{2} žu$^{2\text{-}1}$ʔu^{1} -žo^{1} *chin* [lit. *bone mouth our*] (<žə^{2}kə^{2} (as) *bone* + žu^{2}ʔu^{2} *mouth* + -žo^{1} *we incl.*).

When 1–2 basic and 2–^{1}–2 developed couplets become 1–1 and 2–^{1}–1 respectively by regressive perturbation to higher, they are then in condition to have the lowering influence, described above, superimposed upon the raising influence. Thus, for example: sa^{1}ʔa^{2} *make, do* becomes sa^{1}ʔa^{1} in the following: sa^{1}ʔa^{1} (a) -na^{1} (b) bi^{2}ko^{2} *I will make a fiesta.* In SE this developed 1–1 form may then be lowered to 3–1 following (c) morphemes. It is then in condition to have its final tone lowered to 3–2 by regressive action as described above: ma^{2}a^{4} (c) sa^{3}ʔa^{2} (a) -na^{1} (b) bi^{2}ko^{2} *I won't make a fiesta.* Therefore we have the following process at work upon the morpheme sa^{1}ʔa^{2} and others of its class: 1–2 > 1–1 > 3–1 > 3–2.

Sometimes we have what at first appears to be noncontiguous perturbation in a sequence of a 2–4 (cs) morpheme plus the morpheme ni^{2}i^{4} (c) completed action (in fast speech usually ni^{2}) plus a verb. When ni^{2}i^{4} (c) is perturbed to a higher tone pattern it changes its character from (c) to (b): ni^{3}i^{1} (b).[18] It is then also in condition to have its final developed toneme 1 lowered regressively preceding another toneme 1. So ni^{2}i^{4} (c) > ni^{3}i^{1} (b) > ni^{3}i^{2} (b) > ni^{2} (b) in fast speech. The couplet following it is then perturbed according to type (b): he^{2}e^{4} ni^{2} ką^{1}ʔą^{4} -de^{3} *that he spoke* (<he^{2}e^{4} (cs) *that* + ni^{2}i^{4} (c) > ni^{3}i^{1} (b) > ni^{3}i^{2} (b) > ni^{2} (b) *completed action* + ką^{2}ʔą^{4} (c) *speak* + -de^{2} *he*); nu^{2}u^{4} ni^{2} ʔi^{1}o^{3} ^{n}du^{2}te^{2} *where there was water* (< nu^{2}u^{4} (cs) *where* + ni^{2}i^{4} (c) > ni^{3}i^{1} (b) > ni^{3}i^{2} (b) > ni^{2} (b) *completed action* + ʔi^{4}o^{2} (a) *there is* + ^{n}du^{2}te^{2} *water*).

In SM there are no instances of regressive perturbation to lower, but the limited regressive perturbation to higher is in effect, as described above, for both the SE and SM dialects.

6. Sub-phonemic tone modifications.

In addition to the above described tonal phenomena, there is a marked lowering of tones 1, 3 and 4 in certain contexts, which is non-phonemic and for which the conditioning environments and conditioned changes are now given.

When a morpheme has a 2–^{1} tone glide on the first syllable (developed after (c) or (s) morphemes), the toneme 1 of the sequence is optionally and non-phonemically slightly lowered. This lowering of the toneme

[18] ni^{2}i^{4} completed action is a SE morpheme unique in several ways. This is the only morpheme known to change its character from (c) to (b) when it is perturbed to higher. Also, though it seems to be a 2–4 rather than a 2–2 couplet, being often heard with a downward glide, it always perturbs a following 2–2 couplet to 3–2, whereas following other 2–4(c) morphemes, 2–2 couplets often remain unperturbed.

1 of the 2–1 glide practically always takes place when the perturbing morpheme causing this glide has a 1–1 or 1–4 tone couplet. Elsewhere it varies freely with the non-lowered high tone: lo^{1}ko^{1} hi$^{2\text{-}1}$nu^{2} -de^{2} *he is running very much*, i.e. *very fast* (<lo^{1}ko^{1} (c) *very much* + hi^{1}nu^{2} (a) *is running* + -de^{2} *he*); here the 1 toneme on the first syllable of developed hi$^{2\text{-}1}$nu^{2} is almost always lowered to [1-], (read the raised hyphen here as 'minus'). ʔə^{2}^{n}ga^{2} hi$^{2\text{-}1}$nu^{2} *another time* (<ʔə^{2}^{n}ga^{2} (c) *another* + hi^{1}nu^{2} *time*); here the toneme 1 on the first syllable of developed hi$^{2\text{-}1}$nu^{2} is sometimes lowered to [1-], and sometimes is as high as preceding tonemes 1 in the utterance.

In sequences of two morphemes, when the second is a basic 4–1 or a developed 3–1 couplet (especially where the developed couplet contains contiguous vowels or intervocalic glottal stop), the toneme 1 on the final syllable of the second morpheme is almost always non-phonemically lowered: ^{n}daʔ^{1}žu^{1} su^{4}či^{1} -ų$^{4\text{-}1}$ *that child is crying* (< ^{n}daʔ^{1}žu^{1} (c) *is crying* + su^{4}či^{1} *child* + -ų$^{4\text{-}1}$ *that*); here the toneme 1 on the final syllable of su^{4}či^{1} is usually lowered to [1–]. ^{n}daʔ^{1}žu^{1} (c) ma^{3}a^{1} -i^{2} *that little one is crying* (<^{n}daʔ^{1}žu^{1} (c) *is crying* + ma^{1}a^{1} (b) demonstrative + -i^{2} 3rd person familiar); here the toneme 1 on the final syllable of developed ma^{3}a^{1} may be optionally lowered to [1–].

In sequences of three or more morphemes, when the second morpheme has had a toneme 1 lowered to [1–], the third and all following morphemes to the end of the utterance may have their tonemes 1 optionally and non-phonemically lowered to [1–]: a^{1} hi^{1}ni^{1} -ni$^{3\text{-}1}$ ^{n}du^{2}či^{2} la^{1}ba^{1} lu^{3}li^{1} *do you know little horse beans?* (<a^{1} (b) *question* + hi^{1}ni^{1} (c) *know* + -ni^{1} (b) *you* + ^{n}du^{2}či^{2} (a) *beans* + la^{1}ba^{1} (c) *horse beans* (Sp. haba) + lu^{1}li^{1} *little*); here the toneme 1 on developed -ni$^{3\text{-}1}$ is practically always lowered to [1–] and the tonemes 1 on la^{1}ba^{1} and developed lu^{3}li^{1} are often but not always lowered to [1–].

The pitch interval between phonemic tonemes 1 and 2 is considerably wider than between 2, 3 and 4. This fact, together with the marked nonphonemic lowering of toneme 1 as described above, and the speed of the 2–1 developed glides which makes them extremely difficult to hear, has caused considerable analytical difficulty. See now Pike's comments on this particular difficulty.

In sequences of two morphemes, in which the first has a toneme 3 on its final syllable, and the second has a toneme 3 (developed) on its first syllable, the toneme 3 of the first syllable of the second morpheme is always lowered to [3–], but this lowered tone still contrasts with a toneme 4 in the same position: ʔi^{1}o^{1} bi^{1}či^{3} na^{3}na^{1} -ų$^{4\text{-}1}$ *that lady has a fan* (<ʔi^{1}o^{1} (b) + bi^{1}či^{3} (c) *fan* + na^{1}na^{1} (c) *lady* + ų$^{4\text{-}1}$ *that*); developed na^{3}na^{1} has its toneme 3 lowered to [3–] following bi^{1}či^{3}. Contrast: ʔi^{1}o^{1} bi^{1}či^{3} te^{4}e$^{2/3}$ -ų$^{4\text{-}1}$ *that man has a fan* (<te^{4}e$^{2/3}$ *man*); bi^{1}či^{3} does not affect the first toneme of te^{4}e$^{2/3}$, which is lower than developed na^{3}na^{1} above, with a [3–] tone on its first syllable.

In a sequence of two morphemes, in which the first has a developed 3–4 couplet, and the second likewise has a developed 3–4 couplet, both of the tones of the second morpheme are usually slightly lowered, i.e. to [3–4–]; k^{w}ą^{2}ą^{2} -ri^{2} ʔu^{3}ni^{4} ^{n}do^{3}o^{4} *I will buy three sugar canes* (<k^{w}ą^{2}ą^{2} (a) *will buy* + -ri^{2} (c) *I* + ʔu^{2}ni^{4} (c) *three* + ^{n}do^{2}o^{4} *sugar cane*); the morpheme ^{n}do^{2}o^{4} has a developed tone couplet 3–4 which is almost always subphonemically lowered to [3–4–] after another developed 3–4 couplet as here.

7. Summary.

To make clear the differences between the SE and SM tonal systems we summarize as follows (for illustration of these differences, see **1.6**):

7.1. Characteristics of SE:

There are four phonemic levels of tone.[19]

[19] Some of the basic tone couplets referred to in this paper are represented by a very small list of

There are some phonemic tone sequences (phonetically glides) on single syllables.

Type (a) action (nonperturbing) is limited to certain morphemes with final toneme 2 or 3; see **2.1.**

Type (b) action (causing perturbation of certain following morphemes to higher tone patterns) is limited to certain morphemes with final toneme 1; see **2.2.**

Type (c) action (causing perturbation of certain following morphemes to lower tone patterns) is the most extensive perturbation phenomenon; see **2.3.**

---

morphemes. We list those comprising such smaller groups:

Morphemes thus far observed with basic lexical 1–2(a) couplets are: bi^{1}lu^{2} *cat*; lu^{1}su^{2} *pet dog*; sa^{1}ʔa^{2} *do, make*; skʷa^{1}ʔa^{2} *study*; kaʔ^{1}nu^{2} *large (one object)*; naʔ^{1}nu^{2} *large (more than one object)*; Nąʔ^{1}ą^{2} *companion, one of several*; ma^{1}ni^{2} *habitually, only*; ni^{1}nu^{2} *above*; hi^{1}nu^{2} *one time*; sə^{1}ę^{2} *different*.

Morphemes with basic 1–2(c) couplets comprise a larger list, consisting of verbs which are 2–2(c) in their potential aspect.

Morphemes thus far observed with basic lexical 1–3(a) couplets are: če^{1}ⁿgo^{3} *opossum*; ba^{1}ha^{3} *macaw*; sya^{1}ʔa^{3} *let go*.

Morphemes thus far observed with basic lexical 1–3(c) couplets are: ʔi^{1}ši^{3} *a blue bird*; ri^{1}ki^{3} *woodpecker*; bi^{1}či^{3} *fan*; bi^{1}li^{3} *plaything* (in some dialects bi^{1}li^{4}); liʔ^{1}li^{3} *rooster*; te^{1}hi^{3} *vulture*.

Morphemes thus far observed with basic lexical 1–4 couplets which are not loans are: bi^{1}li^{4} *plaything* (in some dialects bi^{1}li^{3}); ⁿda^{2}žoʔ^{1}o^{4} *corn stalks*; stąʔ^{1}ą^{4} *threaten*; he^{1}e^{4} –ni^{2} *proud* [lit. *proud inside*]; in addition there are such loans as: ho^{1}si^{4} (Sp. hoz) *sickle*; ko^{2}ra^{1}li^{4} (Sp. corral) *corral*; ma^{1}a^{4}r (Sp. mar) *sea*; lu^{2}ga^{1}a^{4}r (Sp. lugar) *place*; lu^{2}ne^{1}si^{4} (Sp. lunes) *Monday*; ⁿdyo^{1}o^{4}s (Sp. Dios) *God*.

Morphemes thus far observed with basic lexical 2–1(b) couplets are: ⁿdu^{2}hi^{1} *chicken*; li^{2}ⁿji^{1} *lizard*; či^{2}tu^{1} *to be full*; ko^{2}ko^{1} *will swallow*; ⁿdu^{2}ku^{1} *will search for*; na^{2}ni^{1} *will bear the name*; ka^{2}ta^{1} *will itch*; žə^{2}ə^{1} *difficult*.

Type (a) and (c) morphemes have a specialized perturbing action in special sequence types, causing certain following morphemes to be perturbed to higher developed patterns distinct from those resulting from (b) action; see **3.**

Regressive perturbing action causes certain tonemes 1 to become 2, and certain tonemes 2 to become 1, before a following toneme 1; see **5.**

Pronoun enclitics comprise four tone-perturbation groups, some of which have unique tonal rules; see **4.**

There is a marked but non-phonemic shifting of tonemes 1, 3 and 4 to lower levels in certain contexts; see **6.**

7.2. Characteristics of SM:

There are three phonemic levels of tone.

There are no phonemic tone sequences on single syllables (and no perceptible subphonemic ones).

Type (a) action (nonperturbing) is represented in all tone classes.

Type (b) action (causing perturbation of certain following morphemes to higher tone patterns) is represented in all tone classes except low-mid, mid-high and low-high.

Type (c) action (causing perturbation of certain following morphemes to lower) is extremely limited.

There is no distinction between regular and special sequence types as in SE.

There is no regressive lowering influence, but the same regressive raising influence as in SE; see **5.**

Pronoun enclitics comprise four major groups with unique tonal rules, which differ from those for SE.

There is no marked tendency for tonemes later in the phrase to readjust to non-phonemic lowered levels, as in SE.