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Some Semantic Implications of Tzeltal Numeral Classifiers

by

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SOME SEMANTIC IMPLICATIONS OF TZELTAL NUMERAL CLASSIFIERS

By Brent Berlin and A. Kimball Romney
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In Tenejapa Tzeltal[2], as in many other languages, counting 'something' is associated with 'classifying' or 'modifying' indicators about the thing being counted. The 'classification' or 'modification' of the thing being counted may be indicated by the presence of a morpheme referred to as a <u>numeral classifier</u>[3]. Numeral classifiers always occur as the second member of a numeral phrase where the first member is a numeral, i.e., in the form:

numeral + numeral classifier ± noun.

Numeral phrases are typically followed by a noun (the noun is implied when not explicitly stated) and some semantic features of the noun are invariably indicated by the numeral classifiers. This paper explores some semantic implications of these numeral classifiers.

The major concern here is with denotative meaning as defined by Osgood (1961:102), namely, "as a conventional, habitual correlation between a nonlinguistic perceptual pattern, (S), and some particular linguistic response, (R)." Connotative meaning is discussed briefly in the latter part of the paper.

Before turning to the more technical aspects of the subject, it may be useful to attempt to communicate an intuitive understanding of the role of numeral classifiers in Tenejapa Tzeltal (referred to as TTzel in the remainder of the paper). Consider the following phrases in English:

'three square blocks'

'three round blocks'

The words 'square' and 'round' in these phrases occur after a numeral, they are followed by a noun, and they indicate something about the noun,

e.g., its shape. In TTzel, numeral classifiers have these same characteristics as well as numerous additional ones. For example, in English, it is possible to omit the modifying words without altering the grammatical appropriateness of the phrase. In TTzel, classifiers occur only in numeral expressions. Thus, whenever it is important for TTzel speakers, during enumeration, to specify some semantic feature of some event, object, process or whatever, the thing being enumerated is always modifed by the presence of a numeral classifier occurring with the general numeral[4]. As we shall see later, shapes, positions of objects, certain actions performed on objects, etc., are domains of meaning indicated by classifiers. On the other hand, colors of objects are never indicated by numeral classifiers.

In this paper we first present a brief sketch of the linguistic features of numeral classifiers. Next, the procedures for eliciting approximately 600 classifiers are sketched. The main body of the paper consists of a preliminary segmentation of classifiers into gross semantic categories followed by a detailed examination of selected sets of classifiers covering narrow semantic domains. One of the results is a precise operational definition of allosemes. Finally, the general results are discussed and placed in the context of broader studies of semantics and meaning.

Linguistic features of numeral classifiers.

The numeral classifiers of Tenejapa Tzeltal are a series of predominantly monosyllabic, bi-morphemic stems which occur obligatorily with quantifying expressions. They are considered a sub-class of numerals, which are in turn a sub-class of nouns.

Earlier works dealing with numeral classifiers in other Mayan languages are few. Tozzer (1921), drawing heavily on lists collected by Zavala and Beltran cites several classifiers for Yucatec Maya.

Harris (1947) includes thirteen classifiers with minimal glosses for Chontal, but Keller (1955) offers a much more comprehensive list (78 forms) and analysis for the same language. Castillo (1961) published a list of 33 forms with approximate glosses for modern Yucatec. For Tzeltal proper, Kaufman (1961), in discussing numerals in general, lists 48 common classifiers from the Tenejapa and Aguacatenango dialects. Slocum presents a list from the Oxchuc dialect.

Keller's article on Chontal is perhaps the most relevant as far as outlining the general semantic features of classifiers which appear, superficially at least, to function similarly in Tzeltal.

Unlike modern Yucatec and Chontal, classifiers in Tzeltal are theoretically unlimited in occurrence with any general numeral, while in the two former languages, occurrence is limited to numerals 1-4 (for Yucatec) and 1-6 (for Chontal). Tzeltal also differs in that 'general' as well as 'specific' numeral phrases are present. A general numeral phrase in Tzeltal does not incorporate a numeral classifier, having quantifying functions only. A specific numeral phrase, comprised of numeral plus classifier, invariably indicates some semantic features of the noun which optionally follows. The occurrence of a following noun is optional only to the extent that it is 'implied' by the classifier. For example, the highly limited number of nouns occurring with /tul/, a classifier indicating the class 'person-like-beings', allows for little ambiguity when the classifier occurs alone. E.g.,

/čaʔtul/ 'two (of the class person-like-beings)'

Following Kaufman (1961), we analyze numeral classifiers as second members of exocentric compounds (numeral + classifier) the resultant construction being a noun. Upon inflection by nominal possessive prefixes, the construction is first derived by the nominal suffix -al. E.g.,

/yoškohtal/ 'the third animal-like being'

y- third-person possessive prefix + ?oš 'three' + koht numeral classifier occurring with animal-like-beings < positional verb root kot*, e.g., (-kotan 'to place on all fours') + -al nominal derivational suffix.

Classifiers are derived from (a) transitive verb roots, (b) positional verb roots[5], (c) intransitive verb roots, (d) noun roots, and (e) particle roots. The great majority of classifiers are formed from transitive and positional verb roots of the canonical shape CVC, and only a small percentage of forms are derived from the remaining three form classes.

Classifiers may be linguistically described most generally in terms of their potential distribution with specific quantifying expressions. There are two principal groupings at this level of description.

I. Those classifiers which have at least one allomorph restricted in occurrence with the quantifying expression /h-/ one or /čaʔ/ two. (/h-/ is an allomorph of the general numeral hun one. It occurs before all numeral classifiers and the quantifying classifiers in I.1. /čaʔ/ is an allomorph with /č-/ of the expression two. /č-/ occurs before the general numeral derivational suffix /-eb̓/; /čaʔ/ elsewhere.)

II. Those classifiers which are unrestricted in occurrence with any quantifying expression.

Classifiers of group I can be further sub-divided into two groups:

I.1. Quantifying classifiers, of which there are three:

/tab'-winik/	twenty[6]
/b'ahk'/	400
/pik/	8000

E.g.,

/htab' pešu/	20 pesos
/hb'ahk' pešu/	400 pesos
/hpik pešu/	8000 pesos

I.2. Classifiers which function syntactically as time or extent phrases. Three have been isolated.

/ʔahk'/	momentarily
/yalel/	all at once
/teb'/	a little

E.g.,

/...te k'alal ʔay ẖʔahk' ɛ̃in ya yutyut sb'aik.../

... When momentarily [they began] to argue among themselves...

/...helaw naš lah b'el ta ẖyalel.../

... it happened, or occurred, all at once...

/...ʔay ẖteb'.../ There is a little.

Classifiers in group II may conveniently be sub-grouped in terms of the stem class from which they are derived, if known.

II.1. Classifiers derived from transitive verb and positional verb roots by infixed /-h-~-ø/. (The allomorph /-h-/ occurs before all voiceless consonants with the exception of /ʔ/. /ø/ occurs before final voiced consonants and /ʔ/.) Close to 90% of all classifiers are of this class.

II.1.1. Classifiers derived from transitive verb roots with no change in phonemic composition.

II.2. Classifiers derived from intransitive verb roots.

II.3. Classifiers derived from noun roots.

II.4. Classifiers derived from particle roots.

II.5. Classifiers of unknown derivation.

Intransitive, noun, and particle roots exhibit no change in phonemic composition upon derivation as classifiers.

Any particular numeral classifier most usually occurs with a series of nouns. It is of interest to note that the nouns with which most classifiers occur also occur as objects of the transitive (or positional verb roots derived as transitive bases) roots from which they are derived. For example, a particular classifier /lahɬ/ occurs with the following nouns (etc. indicates that the list does not presume to be complete).

any numeral	+	/lahɬ/	+	/si?/	'firewood'
"		"		/?ak/	'grass'
"		"		/?oy/	'corner posts of house'
"		"		/šul/	'cane'
"		"		/?išim/	'corn'
"		"		/wale?/	'sugar cane'
"		"		/latre/	'brick'
				etc.,	etc., etc.

/lahɬ/ is derived from the transitive verb root /-laɬ/ 'to stack items in a specified way (usually evenly)' and the objects of this transitive verb are identical to the above list of nouns. Thus, any object that can be acted upon in a particular fashion can also be enumerated as a result of that particular action.

Elicitation of the list of numeral classifiers.

Since numeral classifiers are for the most part monosyllabic, it has been feasible to elicit most, if not all, of the classifiers in the dialect. Prior to working with informants, we generated a list of all the phonemically possible CV(h)C forms in the dialect (of which there are 4410)[7]. We then devised an eliciting frame that would enable a native speaker to report which of the generated forms actually occurred as numeral classifiers in Tzeltal.

The generated list was presented independently to two TTzel informants who had been trained to read and write phonemically. These informants were instructed to work through the generated list asking themselves the question indicated in the following frame:

/ya b'al stak' kahtahtik te b'itik s-_____-e/

'Is it possible for us to count things, one by one, with the form _____.'

All generated CV(h)C forms were tested in this frame in reduplicated form to indicate continuous enumeration.

For example, beginning at the head of a list of possible CV(h)C roots suggested by position and articulation of the phonemes of TTzel, we note:

/ya	b'al	stak'	kahtahtik	te	b'itik	s-pipip-e/
/ "	"	"	"	"	"	s-pihpipihp-e/
/ "	"	"	"	"	"	s-pepepep-e/
/ "	"	"	"	"	"	s-pehpepehp-e/
/ "	"	"	"	"	"	s-papapap-e/
/ "	"	"	"	"	"	s-pahpapahp-e/
/ "	"	"	"	"	"	s-popopop-e/
/ "	"	"	"	"	"	s-pohpopohp-e/
/ "	"	"	"	"	"	s-pupupup-e/
/ "	"	"	"	"	"	s-puhpupuhp-e/
						etc.

Any CV(h)C roots thus isolated as 'forms' with which 'things' could be counted were then further checked by determining a partial list of what 'things' could be enumerated (i.e., a list of the nouns occurring with such classifiers). This check was accomplished by employing the frame:

/b'itik hehčuk ya stak' ʔahtael te _____-e/

'What things can one count with the form _____-e?'

and substituting the previously isolated CV(h)C form. If the root is a classifier, the informant should be able to list a series of nominals which in turn can be placed in the sequence mentioned earlier:

specific numeral + numeral classifier ± noun

Thus far, nearly 600 numeral classifiers have been isolated and checked by such procedures. This number is considerably greater than any other inventory thus far published. Without the systematic eliciting procedures described above, less than a tenth of the classifiers in TTzel would have been discovered. Actual occurrences of classifiers are infrequent in textual material. Tzeltal may be unusual in the extent to which classifiers as a class are productive. Kaufman states, "It appears that any transitive or positional verb root whose meaning involves specifying the position or shape or state of an object, or a change therein can be made into a numeral classifier." (1961:10) We do not propose that the list is complete; we do feel that it approaches the full inventory.

Segmentation of the total list into semantic domains.

Preliminary analysis (which included some degree of familiarization with TTzel) suggested that the classifiers were not all equally 'related' semantically, but that the inventory might well be characterized by sets of classifiers distributed as "...clustering[s] of linguistically related events around a norm or 'focus'." (Chafe 1962:340) For example, description of the 'state' of certain items enumerated by specific numeral classifiers were facilitated for the informant by the manipulation of material objects; i.e., one could demonstrate the difference in /hlihk laso/ 'one piece of lazo in its natural state' and
h /b'ehč' laso/ 'one piece of lazo wrapped in single wraps around long, stick-like objects' by pointing and manipulating the lazo into its various

states. A whole series of items could be arranged in the appropriate manner to their respective numeral classifiers and talked about afterwards.

Other classifiers, however, could be demonstrated only as the action was in progress, e.g., if enumeration were to occur, it must be done during the process of the action.

Still other numeral classifiers seemed to refer to the 'sounds' of a particular action, while others referred to items which had not received <u>any</u> human action, i.e., were natural to the world, as such.

These observations led to the formulation of TTzel frames to distinguish some gross semantic distinctions. The frames were as follows:

/te k'alal ya kiltik te b'itike, ya stak' ?ahtael
ta b'aɕ'il sb'il ta ?alel/
'When we see the things, one can count it by name,
saying it certainly.'

This frame allowed for the grouping of those classifiers which referred to items that 'existed in the world.' The set was further broken down into items which were: 1) the result of human action (but for which the action was not relevant for enumeration), and 2) items which were not the result of human action. The relevant frames were:

/b'itik hehčuk te ya stak' spasel yu?un te kirsanoe/
'What things can be made by people'
/b'itik hehčuk te ma ya stak' spasel yu?un te kirsanoe/
'What things cannot be made by people'

A second set turned out to be classifiers which occur during the action in process, or after the action has occurred, i.e., some 'residue' of the action remains. The frame relevant here was:

/ya stak' ?ahtael ta b'a b'i te b'itik, ya stak' pasele, sok šan ta patil, ya stak' šan ?ahtael, ta me ya š hil yehtal te b'itike/

'One can count the things while one is making them also afterwards one can count them because a mark (of the action) remains on the things'.

A third set referred to 'actions', so to speak, which could be enumerated only during process. No enumeration was possible after the action had been completed. The frame is:

/ya stak' ?ahtael te b'itik ya stak' pasel ta b'a b'ie, ha?te ta patil ma š čikna ta ?ahtael/

'One can count the things being made in the first place (i.e., at the time of making), but afterwards, they cannot be counted'.

This set was further sub-divided into classifiers which referred primarily to the acoustic results of certain actions. The frame is:

/ya stak' ?ahtael te b'itik ya š k'opoh te k'alal la yič' tihele/

'One can count the things because it talks when it received the strike (i.e., 'times' that it talks in a specific manner)'.

Figure 1 illustrates the gross semantic distinctions isolated by the above frames.

Figure 1

Gross semantic distinctions among Tzeltal numeral classifiers.

STATE			ACTION
No action during enumeration		Enumeration during process and/or after completion of action	Enumeration imperative during action
referring to items made by man	referring to items not man-made		actions of living beings /t'en/, /č'ih/, /p'eʔ/, etc.
e.g., /t'ol/ /mahk'/ /kah/ /lihk/ . . . n	e.g., / /tul/ /č'ie/ /koht/ /tehk/ . . . n	e.g., /b'ehč'/ /k'ahs/ /sil/ /ɬ'un/ . . . n	acoustic result of action of living beings /ɬan/, /kan/, /ɬin/, etc. . . . n

An examination of these gross groupings of classifiers suggested the feasibility of discovering additional, smaller groupings of classifiers. The work of Frake (1962) and Hymes (1962) is especially relevant to these goals.

As Hymes has observed, "All utterances occur contrastively in contexts." (1962:19; emphasis ours). When a TTzel speaker is selecting a numeral classifier to characterize the particular shape or state of an object in his physical environment, he first must select a context which allows for some limited "range of meanings"

(Hymes 1962:19). The semantic load "supported" by this context includes presumably the range of meanings of the specific numeral classifier and the ranges of meanings of all other semantically appropriate classifiers which could conceivably be alternatives. For example, a classifier occurring in a context dealing with the enumeration of objects in terms of some components of height would presumably not be an appropriate alternative for the context of 'kinds of actions of eating'. One may view classifiers as linguistic units which indicate certain semantic components of objects and/or actions performed upon certain objects in some specified contexts. The goal of explicating the semantic features of classifiers is thus seen as two fold. The first step is to discover the context(s) indicated by each classifier. Secondly, one must determine the semantic criterial attributes of each classifier within each context. The context and the classifiers occurring in it are defined here as a semantic domain.

An example of a semantic domain in English is "shape." Thus, words such as 'round', 'square', 'rectangular', etc., may each be thought of as sharing the feature of "saying" something about shape. They signal the hearer that the aspect being talked about is shape. In addition, each word in the domain "says" something different, e.g., round is different than square.

The task now is to develop ways of segmenting our gross categories of TTzel numeral classifiers into smaller semantic domains. We report below our preliminary attempts to achieve and test such a segmentation.

The method utilized in achieving a first tentative segmentation of the classifier inventory into groups of forms which function as semantic domains was to instruct informants in TTzel to group the randomly arranged inventory into 'sets' that were semantically related. This sort, to be sure, was a crude one, and it is expected that further

revisions and tests for reliability will need to be carried out. However, independent groupings by two trained informants tend to indicate a high reliability of domains, as did an examination of the distribution of nouns within each set. Additional tests for reliability have been performed with promising results.

The large inventory of classifiers has thus been segmented into some one hundred such domains, ranging from two to twenty or so classifiers per set. Some of the classifiers were not placed by our informants into any specific semantic domains and to this point have not been examined in detail.

The original informants' groupings of semantically related classifiers gained considerable support by an examination of the distribution of nouns with classifiers in each set. One convenient manner by which distributional features of classifiers and nouns can be observed is in matrix form. A typology of the sets thus arranged indicates three distinct distributions.

The first distribution is one where any numeral classifier in a set may occur with any nominal of the set. One such grouping of classifiers and nominals is given below:

Nouns	Numeral classifiers		(x=occurrence)
	/b'uhs/	/t'ol	
/ʔišm/ 'corn'			
/kahpe/ 'coffee"			
/kašlan čenek'/ 'peanut'			
/ʔič/ 'chili pepper'	x	x	
/ton/ 'stone'			
/maɬ'/ 'corn dough'			
/tomut/ 'egg'			
/ʔahč'al/ 'mud'			
etc.			

The classifiers /b'uhs/ and /t'ol/ in the set given above are said to be in contrastive distribution, i.e., they occur in identical linguistic environments with a change in meaning ('meaning' is here used identically to Gleason's use of content. To demonstrate contrast between any two classifiers, we are primarily concerned with establishing, by informant response, same or different. Just what the differences may consist of is a related, but quite distinct, question of the delineation of criterial attributes).

The denotata of the nouns /ʔišim/ 'corn', /kahpe/ 'coffee', /kašlan čenek'/ 'peanut' are such that (1) they occur in at least two distinct natural states that permit their classification with the two classifiers /t'ol/ and /b'uhs/ in this context and/or (2) said denotata can undergo certain actions or manipulations such that they acquire the requisite criterial attributes indicated by the two classifiers.

One might restate the semantic relationship as follows: /t'ol/ and /b'uhs/ are labels which indicate separate or distinct bundles of criterial attributes. The denotata of the nouns of the set are such that when they occur with /t'ol/ they manifest the criterial attributes indicated by that classifier, as they contrast with the criterial attributes indicated by the classifier /b'uhs/. Conversely, when the denotata of the nouns of the set occur with /b'uhs/, they manifest the attributes indicated by that classifier as they contrast with those indicated by /t'ol/.

To paraphrase Frake again, one observes in this instance a situation (i.e., context) indicated by the two classifiers /t'ol/ and /b'uhs/ where a Tenejapa Tzeltal speaker must make a decision about the category membership of some objects by selecting from a set of alternatives a verbal label (i.e., one of the two classifiers) with classificatory import. When the speaker asserts: This is an X (e.g., /t'ol ʔišim/ "... he is also stating that it is not specific other things, these other things not

being everything else conceivable, but the alternatives among which a decision was made" (Frake 1962:78), in this case, /b'uhs/.

Frake says further, "... the cognitive relation of contrast is not equivalent to the relations of class exclusion in formal logic and set theory. The three categories 'hamburger', 'hot dog', and 'rainbow' are mutually exclusive in membership. But in writing the rules for classifying hamburgers, I must say something about hot dogs, whereas I can ignore rainbow. Two categories contrast only when the difference between them is significant for defining their use" (Frake 1962:79).

Assuming that contrast has been established between /t'ol/ and /b'uhs/, it yet remains to describe the dimensions of contrast between the two forms, that is, to delineate their distinctive criterial attributes.

The procedures utilized here in such a task was to instruct informants to produce and/or manipulate objects into 'states' appropriate to the contrasting classifiers. Such observation was made feasible in TTzel due to the linguistic features (mentioned in 1.) that most classifiers are derived from transitive verb or positional verb roots, the direct objects of which are identical to the nouns occurring with the respective numeral classifiers. As such, the informant could be instructed to 'perform' the action of the particular verb (from which the classifier was derived) on a particular object.

In the set given above, knowledge of the derivational structure of the two classifiers indicated that they are derived from the positional verb roots /t'ol*/ and /b'us*/. By inflecting the derived positional verb root in the imperative mode and providing a nominal occurring in the list of nouns in the set, the following frame is constructed:

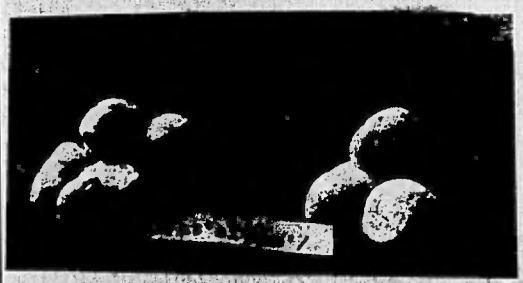
> /t'olana ma¢'/ 'perform the action indicated by the derived positional verb root /t'ol*/ on the object designated by the noun /ma¢'/'

The informant then performs the action on the object /maȼ'/ 'corn dough' placing it in a state appropriate for enumeration by the classifier /t'ol/.

One then proceeds with such a frame until the denotata of all the nouns occurring with both /t'ol/ and /b'uhs/ manifest the attributes, or are in the appropriate 'state', of those classifiers. E.g.,

/t'olana ?išim/	/b'uhsana ?išim/
/t'olana kahpe/	/b'uhsana kahpe/
/t'olana čenek'/	/b'uhsana čenek'/
etc.	etc.

Such a procedure was followed independently with two TTzel informants, providing each of them with a quantity of 'beans', 'peanuts', 'corn dough', etc., to be 'manipulated'. The results of the actions performed on /maȼ'/ 'corn dough' are seen in the photographs below. (The h- preclitic occurring with each classifier is an allomorph of the general numeral hun <u>one</u>. /ht'ol maȼ'/ may be glossed as 'one pile of corn dough in the state appropriate to the classifier /t'ol/'. Unfortunately, photographs of the denotata of the other nouns in the set are not available.



/ht'ol maȼ'/

/hbuhs maȼ'/

While it would be hazardous to suggest the full range of criterial attributes of the two classifiers, certain operational statements can be made. Some criterial attributes of /t'ol/ appear as: piles of 'granular' objects, specifically corn, coffee beans, beans, peanuts, chili peppers, stones, pieces of corn dough, eggs, pieces of mud, etc., in a manner such that maximal vertical piling is achieved.

Some criterial attributes of /b'uhs/ appear to be: piles of 'granular' objects, specifically corn, coffee beans, beans, peanuts, chili peppers, stones, pieces of corn dough, eggs, pieces of mud, etc., in a manner such that maximal horizontal extension of items is achieved with minimal spacing between items.

To be sure, such a gloss of criterial attributes is far from elegant, (especially in comparison with some 'componential' kinship analyses.) However, given the photographs and some verbal gloss as to attributes, a non-native TTzel speaker can manipulate groups of objects in such a way so as to elicit predictable responses of numeral classifiers from native speakers. As such, he can fulfill, partially at least, Goodenough's rather stringent requirement of behaving "... in ways which lead to the kind of responses from the community's members which our theory would lead us to expect" (1957:168).

\+ + +

A variation of the distribution of contrasting classifiers in the set including /b'uhs/ and /t'ol/ is one where the distribution of nouns with classifiers is defective. That is, where some but not all classifiers occur with lists of noun-overlapping nouns and where some but not all classifiers occur with lists of identical nouns. This is the most common distribution observed in our data. An example would be:

Nouns	Numeral classifiers.			
	/huy/	/puhɉ'/	/p'ih/	/k'ans/
/č'ahan tak'in/ 'wire'	x	x	x	x
/te?/ 'tree'	x	x	x	x
/te?el ?iš̌im/ 'stem of corn'		x	x	x
/wale?/ 'sugar cane'		x	x	x
/lapis/ 'pencil'			x	x
/b'ak/ 'bone'			x	x
/si?/ 'fire wood'			x	x
/mačit/ 'machete'	x			x
/kučiyo/ 'knife'	x			x
.				
.				
.				
etc.				

Set III.

Following identical procedures as were given for the preceding domain, these tentative criterial attributes have been isolated for each of the four classifiers:

/huy/ '"bends" in certain cylindrical objects such as flexible tree stems, wire, such that no "breakage" is observed'

/puhɉ'/ '"bends" in certain cylindrical objects such as wire, stems of corn, sugar cane, such that "breakage" is observed, but not through surface of object'. (An object familiar to English speakers would be the observable "bends" in a wax match).

/p'ih/ 'partial breakage in cylindrical objects such as pencils, bones, firewood, etc., such that surface of breakage is observed'

/k'ahs/ 'complete breakage of cylindrical items such as tree stems, sugar cane, etc.'

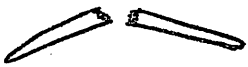
/huy/

/puhɛ'/

/p'ih/

(if returned to original position, likelihood of breakage)

/k'ahs/



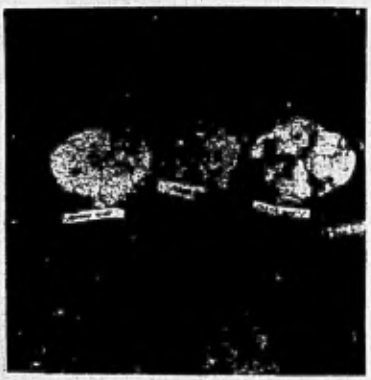
(complete breakage)

Summary observation of the distribution of nouns and classifiers in the set indicates that /huy/, /puhɛ'/, /p'ih/ and /k'ahs/ appear to contrast by virtue of their occurrence in the same environment with the nouns /č'ahan tak'in/ 'wire' and /te?/ 'tree'. The denotata of all nouns in the group, however, do not have this freedom of distribution. /wale?/ 'sugar cane', for example, may occur with each classifier in the set other than /huy/. The denotata of the nouns /lapis/ 'pencil', /b'ak/ 'bone', and /si?/ 'firewood' may fulfill the criterial attributes indicated by the classifiers /p'ih/ 'partial breakage' and /k'ahs/ 'complete breakage', but not of the classifiers /huy/ 'bend and return' and /puhɛ'/ 'bend and return with indication of bend'.

Another such domain exhibiting defective distribution of nominals in reference to classifiers is as follows:

Nouns	Numeral classifiers											
	tuhɢ'	k'aht	tel	sehp	len	lehs	kuh	kul	t'el	8 wol-nol	hen	k'ol
/teʔ/ 'tree'		x										
/ton/ 'stone'	x	x	x	x	x	x	x	x	x	x	x	x
/maɢ'/ 'corn dough'	x	x	x	x	x	x	x	x	x	x	x	x
/ʔaɢ'am/ 'salt (block)'		x										
/ʔaskal/ 'sugar (block)'		x										
/kaša/ 'box'		x										
/ʔič/ 'chili pepper'										x		
/ʔalčaš/ 'orange'										x		
/ʔon/ 'avocado'										x		
/holol/ 'head'										x		
/ʔahč'al/ 'mud'	x	x	x	x	x	x	x	x	x	x	x	x
/wiɢ/ 'mountain'							x					
/ɢaʔ/ "defecation'			x				x					
/čumanteʔ/ 'tree trunk'								x				
etc.												
etc.												
etc.												

Focusing on a noun which exhibits contrast with each classifier in the set (e.g., maɢ' 'corn dough'), one observes:



/hsehp /hlen /hles
ma¢'/ ma¢'/ ma¢'/

/hwol /hk'ol /hhen
ma¢'/ ma¢'/ ma¢'/

/hkuh /hkul /ht'el
ma¢'/ ma¢'/ ma¢'/

/htuh¢' /hk'aht /htel
ma¢'/ ma¢'/ ma¢'/

Some criterial attributes operative in the domain given above appear to be something like:

1) round-disk-like forms, /sehp/, /len/, and /lehs/
2) round-sphere-like forms, /wol-nol/, /k'ol/, and /hen/
3) oblong-standing-mound-like forms, /tel/, /kul/, and /kuh/
4) oblong-not-standing-wedge-cylinder-like forms, /tuhɛ'/, /k'aht/, and /tel/

These five major sets of attributes appear to split the domain as is indicated by informants' groupings of "items" most similar. Each complex major grouping is further segmented so that each object is characterized by individual contrastive feature(s).

1) round-disk-like forms
    a) well-formed, perfect disk-like, /sehp/
    b) not well-formed, pressed disk-like, /len/
    c) watery, lacking body, /lehs/
2) round-sphere-like forms
    a) small sphere, /wol-nol/
    b) large sphere, /k'ol/
    c) large sphere, flattened bottom, /hen/
3) oblong-standing-mound-like forms
    a) thick-bodied, non-pointed head, /kuh/
    b) thick-bodied, pointed head, /kul/
    c) thin-bodied, non-pointed head, /tel/
4) oblong-not-standing-wedge-
    a) wedge-like, symmetrical ends, /tœl/
    b) wedge-like, non-symmetrical ends, /tuhɛ'/
    c) cylindrical ends, /k'aht/

'Corn dough' is an object that may be manipulated in such a manner as to acquire the attributes of the twelve classifiers in the domain. /ton/, 'stone', however, is not "malleable." For a stone to take any or all of the classifiers, it must occur in a "natural state" with the criterial attributes of each classifier inherently present.

In this regard, two informants were instructed to search independently for stones which inherently were of the shapes indicated by the classifiers in the domain. They were not able to produce examples for each classifier, but those discovered are given in the photographs below.

ʔossehp ton
[third stone in back
porpoise chain]

čaʔtuhć ton

čaʔkʼaht ton

čaʔtel ton

čaʔwol ton

čaʔkʼol ton

čaʔkul ton

It is of interest to (1) compare the stone shapes with the idealized shapes produced in the corn-dough examples and (2) to note the high degree of similarity of the forms arrived at independently by each informant. On an intuitive level, there appears to be a high degree of reliability between the two on all choices.

In reference to the "breakage" domain and the "shape" domain, an important question arises as to whether this defective distribution affects our earlier statement that each of the ~~four~~ classifiers contrast. We would say it does not on the following grounds.

In linguistic analysis, for phonemic contrast to be established, two distinct phones must occur in identical phonetic environments with a response from the informant that the two utterances are 'different'. In English, for example, the phonetic segments [n] and [ŋ] are classed as separate phonemes by virtue of their occurrence in two identical phonetic environments with a response of 'different' from English informants, e.g.,

[. 'biyn.]	'bean'
[. 'biyŋ.]	'bing'

This contrast is sufficient to establish the phonemes /n/ and /ŋ/. It is not required that the contrast be manifest in <u>all</u> possible environments. For English, it would be impossible to demonstrate such a contrast as that given above in the environment #___V...# in some such sequence as:

[#. nat. #]	/nat/	'knot'
[#. ŋat. #]*	/ŋat/*	?

due to the defective (Pike would say <u>differential</u>) distribution of the phoneme /ŋ/. It does not occur initially after # before vowels.

Thus, to return to our classifier examples, contrast in at least <u>one</u> identical environment is sufficient, and we may state

confidently that /huy/, /puhɕ'/, /p'ih/, and /k'ahs/ contrast, as well as /sehp/, /len/, /lehs/, /tuh'ɕ/, /k'aht/, /tel/, /wol/, /k'ol/, /hen/, /kuh/, /kul/, and /t'el/.

What explanation, if any, is available for the defective distribution? In linguistics, such a feature is assumed to be an arbitrary characteristic of the system. An examination of our tentative criterial attributes, however, in reference to the denotata of each noun, allows for certain speculations to be made for numeral classifiers.

We suggest that the denotata of some nouns in the set are such (by some inherent characteristics) that they would not normally manifest the semantic features of the classifiers with which they do not occur. Thus, while /b'ak/ 'bone' can be broken partially (placing it in a state appropriate to the criterial attributes of /p'ih/) or broken completely (placing it in a state appropriate to the criterial attributes of /k'ahs/) in no uncontrived context would /b'ak/ normally be manipulated in a manner appropriate to the so-called 'bending' classifiers /puhɕ'/ and /huy/. Similarly, the blade of /mačit/ 'machete' may be manipulated in a manner appropriate to the 'bending' classifier /huy/ or it may be snapped in two, placing it in an appropriate condition for the attributes indicated by /k'ahs/. The inherent physical features of machete blades, however, would not normally allow them to manifest the 'bending' attributes of /puhɕ'/ or the 'broken' attributes of /p'ih/.

A similar argument can be made for the classifiers in the "shape" domain.

Thus, while /kaša/ 'box' may exhibit on some occasions the criterial attributes indicated by the classifier /k'aht/, it would not normally occur with the classifiers /wol-nol/, /k'ol/, etc., which indicate features inappropriate to 'boxes'.

A second basic distribution of classifiers and nouns and one that has quite distinct semantic implications is one where each classifier

in a set may occur with lists of unique, non-overlapping nouns. That is, no noun occurs with more than one classifier. An example of such a set is:

Nouns	Numeral classifiers (x=occurrence)	
	/t'uhč/	/tuhč/
/p'in/ 'earthen jar'		x
/p'is/ 'small glass'		x
/limete/ 'liter bottle'		x
/k'ib'/ 'large pitcher		x
/čumante?/ 'tree trunk'	x	
/te?/ 'tree'	x	
/wale?/ 'sugar cane'	x	
/te?el lo?b'al/ 'stem of banana tree'	x	
/te?el ?alčaš/ 'stem of orange tree'	x	
/mačit/ 'machete'	x	
etc.		
etc.		

Following the procedures for the delineation of criterial attributes, the following glosses can be given: /tuhč/ : vertical maintenance of certain cylindrical objects such as jugs, glasses, bottles, pitchers, etc., by means of their own support. Base of the object must sit directly on surface of table, ground, etc. /t'uhč/ : vertical maintenance of certain objects such as tree trunks, tree stems, sugar cane stems, etc., by being inserted in ground or being held in hand. Vertical maintenance is impossible without some outside support. Base of object must be submerged.

Another example of a semantic domain exhibiting this characteristic non-overlapping distribution of nouns with classifiers is:

Nouns		Numeral Classifiers					
		tul	č'uy	k'ah	ka?	k'ohk	hohk'
/ b'aɢ'il ?ič/	'chili pepper'	x					
/ wamal/	'leafy plant'	x					
/ ničim/	'flower'	x					
/ čenek'/	'bean'	x					
/ b'ok /	'leafy vegetable'	x					
/ kahpe/	'coffee (bean)'	x					
/ lo?b'al/	'banana (stalk)'		x				
/ wale?/	'sugar cane'			x			
/ ?išim/	'corn'			x			
/ ?ahan/	'young corn'				x		
/ ?alčaš/	'orange'					x	
/ lima/	'lemon'					x	
/ ha?as/	'zapote'					x	
/ čawčaw?ič/	'sweet green pepper'					x	
/ či?in/	'potato'						x
/ kašlan čenek'/	'peanut'						x
/ ɢahal či?in/	'sweet potato'						x
etc.							
etc.							

This domain is comprised of classifiers utilized in the enumeration of certain actions performed on specific objects. In this instance, the actions enumerated all refer to 'plucking', 'picking', or 'digging'; the objects are parts of plants, generally fruit, but including as well leaves and tubers. The set as a whole may be glossed as the semantic domain of <u>harvest</u>.

These tentative attributes are offered as criterial.

/tul/	'harvesting' of small "bean-like," "leafy-like" portions of plants by plucking
/č'uy/	'harvesting' of bananas (by cut of stalk)
/k'ah/	'harvesting' of sugar cane and mature corn
/ka?/	'harvesting' of immature corn
/k'ohk/	'harvesting' of predominantly tree fruit, probably round in general shape[39].
/hohk'/	'harvesting' of underground tubers

The classifiers in the two domains presented above cannot be said to contrast in reference to the nouns with which they occur. We suggest that they be considered as allosemes of some higher order seme. This conclusion is based on the evidence that (1) the classifiers' occurrences can be predicted by reference to the nouns in these particular domains (i.e., they are in complementary distribution) and (2) their occurrences in an identical semantic domain allows for the inference of their semantic similarity.

The features of complementarity and semantic similarity can be made clearer by reference again to linguistics. One goal of phonemics is to classify distinguishable phones into larger-order units, or phonemes. Two principal criteria are employed: complementary distribution and phonetic similarity. (The following discussion has been aided greatly by reference to an analogous outline used by Roger Brown [1956:252-54].) Complementary distribution can be established for two distinct phones when "...each occurs in certain environments in which the other never occurs--that is, if there are no environments in which they both occur" (Gleason 1955:80). In such cases, the "...class [or phone] can be predicted from the phonetic context" (Brown 1956:252-53).

But complementary distribution in itself will not allow the grouping of two phones into a single phoneme. The second criterion of phonetic similarity (usually judged in terms of place and manner of articulation) of the phones must be satisfied as well. To use a well-worn linguistic example from English, one notes that the segments [h] and [ŋ] are in complementary distribution, but that their lack of phonetic similarity prohibits their inclusion in a single phoneme.

The two domains given above are quite analogous. Each classifier is seen to be in complementary distribution in that each occurs in environments in which the others do not occur. This feature of distribution allows for the prediction of the classifier when given the noun in the domain's 'maintenance of verticality,' or 'harvest.' Thus, the classifier /t'uhč/ is semantically redundant in the domain of verticality in that it carries no additional semantic load other than that already indicated by the nouns with which it occurs. The same is to be said, of course, for /tuhč/, and for the classifiers /tul/, /č'uy/, /k'ah/, /kaʔ/, /k'ohk/, and /hohk'/ in the 'harvest' set.

The classifier-like lexemes <u>herd</u>, <u>covey</u>, <u>school</u>, in English, are similar. Given the domain 'groups of animals' each classifier can be predicted from the noun with which it normally occurs. The classifiers which occur in the frames 'A _____ of cattle, a _____ of quail, and a _____ of bass' can be predicted with essentially the same degree of accuracy as can some phones of English vowels, "...(e.g., shorter vowels before voiceless consonants, longer vowels before voiced consonants)" (Brown 1956:253).

Note that such predictability due to environmental features is impossible in cases of contrast. Given a noun /mač'/ 'corn dough' in the domain of 'piles of granular items,' it is impossible to predict the classifier /t'ol/ or /b'uhs/. On the contrary, /t'ol/ and /b'uhs/ focus

on non-redundant semantic features of /ma¢'/ in two distinct physical states, as do the "shape" classifiers in the "shape" domain. Likewise, in English, given the domain 'shaped object' and the noun 'modeling clay,' it would be impossible to predict the occurrence of a host of 'shape attributes' such as 'square,' 'round,' 'oblong,' etc., In this context, the attributives specify some features of the object not indicated by the noun itself.

We have yet to focus on the second criteria of determining the allosemic states of the classifiers in the above domains; that is, their semantic similarity. From our phonemic example from English, [ŋ] and [h], although in complementary distribution, must be phonemically distinct due to their lack of phonetic similarity--a similarity that can be determined by reference to linguistics' arbitrary phonetic grid arrived at by decades of "...cross cultural sophistication" (Lounsbury 1956:198) and familiarity with numerous languages. No such 'etic' grid comprised of some arbitrary grouping of semantic 'components' or 'criterial attributes' is available for our work with classifiers. Semantic similarity must be determined by more indirect methods, i.e., informants responses.

One principal means of determining what classifiers participate in the same semantic domains have been given above (1.), i.e., the judgements of informants when set to segmenting the randomized list of classifiers into semantically related groups.

Prior psychological studies have indicated that such groupings can indicate relevant semantic dimensions among lexical items. We would not reject evidence of the relatedness of 'hamburger' and 'ham-sandwich' if informants were to select them from a group of forms, setting 'rainbow' apart (to paraphrase Frakes's classic 'hamburger' example, 1962). To a great extent, the grouping evidence that is available is similar to the 'folk linguistic' evidence utilized by Swadesh (1960)

in his work with Nitinat, an indigenous language of Vancouver Island. To reject such evidence as at least serving as semantic "clues" is to place too high a value on distributional analysis. As Hymes has noted:

> An unfortunate distrust of the native speaker as anything but a source of sounds has sometimes led to the ignoring of information of a[n ethnolinguistic] sort as 'unscientific.' As it happens, reliable data of this sort could be of immense importance to students of psycholinguistics as well as ethnolinguistics. Rather than regard native speaker comments and attitudes as intrusive, irrelevant, incorrect or merely amusing, we should regard them as an outcropping of data from a largely unworked vein. (1960:82-83).

Secondly, preliminary experiments with randomly arranged lists of classifiers from two distinct contrast sets presented to informants for 'recall' support that the original groupings are relevant. Informants do not 'recall' classifiers in a random fashion, but tend to cluster presumably related classifiers in groupings not significantly different from the original sets.

Thirdly, when presented with objects hearing purposely 'erroneous' numeral classifier labels, informants tend to 'correct' such errors by selecting the appropriate forms from predictable sets of alternatives, i.e., the semantic domain. (This follows Frake's suggestion [1961; 1962:81-82] of setting up frames with expected negative responses, cf. 'Is that an X?' 'No, that's a Y.')

We are suggesting, then, that certain classifiers, while distributional in complementary distribution, are nevertheless, semantically related, and might heuristically be designated as allosemes of some more inclusive semic unit. The fact that such a unit may lack a single linguistic designator, such as a unit lexeme, need not hinder such an analysis.

The allosemes herd, flock, school, etc., might operationally be members of the higher level seme 'groups of animate beings', although there would indeed be exceptions to such a gloss. The important feature to note is that such classifiers as herd, flock, etc., are semantically redundant (in reference to the nouns with which they occur, given the context of 'groups of animals') whereas such contrasting attributes as 'square', 'round', etc., in our 'clay' example are not. That such a semantic principle holds identically in other languages as well is of no mean significance.

A third distribution of classifiers plus nouns is what, for lack of a better term, we label 'complex semantic domains'. Such domains include sets of classifiers exhibiting contrastive as well as complementary distributional features. One such domain is given below:

Nouns		Numeral Classifiers				
		šaʔ	suhk'	pohk	sahk'	sahp
/ɕoɕil hol/	'hair'	x				
/ʔeil/	'mouth'		x			
/limete/	'bottle'		x	x		
/p'is/	'small glass'		x	x		
/k'ib'/	'pitcher'		x	x		
/bohč/	'gourd bowl'		x	x		
/p'in/	'earthen jar'		x	x		
/seɕ'/	'plate'		x	x		
/pulata/	'plate'		x	x		
/k'ab'al/	'hand'			x		
/č'uhteʔ/	'plank'			x		
/sit/	'face'			x		
/ʔbak'etal/	'body'			x		
/mešа/	'table'			x		
/manɕana/	'apple'			x		
/k'uʔil/	'clothes'				x	
/ɕoɕ/	'blanket'				x	
/pak'/	'material'				x	
/wešil/	'pants'				x	
/ɕek/	'skirt'				x	
/b'ok/	'leaf vegetable'					x
/kahpe/	'coffee beans'					x
/ʔišim/	'corn'					x
etc.						

This domain, as the 'harvest' domain, is comprised of classifiers utilized in the enumeration of actions performed on certain objects. The actions all involve "cleansing with water," the objects are perhaps any item that can be washed. Some criterial attributes appear as follows:

/ǎa?/	enumeration of times washing of head hair.
/suhk'/	enumeration of times washing "interior" of certain objects, e.g., mouth, bowls, plates, etc.
/pohk/	enumeration of times washing surface of certain objects (not including hair, clothing, or plants), but not interior.
/sahk'/	enumeration of times washing clothing.
/sahp/	enumeration of times washing bean-like items, leafy vegetables, etc., by immersion in water, accompanied by vigorous movement of item in water.

In this distribution, one might well argue that /ǎa?/, /sahk'/, and /sahp/, due to their complementary distribution are allosemes in this semantic domain. What of their relationship to the contrasting classifiers /suhk'/ and /pohk/? One is tempted to suggest that the latter two classifiers function as a unit in reference to the former three, and may be called an alloseme indicating "cleansing of all items other than hair, clothing, or small bean-like items and leafy vegetables." Only at more specific levels would the contrast of /suhk'/ and /pohk/ be considered.

Diagrammatically:

SEMANTIC DOMAIN	ALLOSEME UNITS		CONTRAST UNITS	
"Cleansing domain"	"other"	/suhk', pohk/	"inside"	/suhk'/
			"surface"	/pohk/
	"hair"	/ǎa?/		
	"clothing"	/sahk'/		
	"vegetables, etc."	/sahp/		

Summary and discussion.

We have outlined the linguistic characteristics of TTzel numeral classifiers and indicated the procedures employed in eliciting over 600 distinct examples of them. Preliminary segmentation of the whole list into gross semantic divisions on the basis of systematic use of substitution frames resulted in the following classification:

I. Numeral classifiers of states (no action during enumeration).
   A. Items made by man.
   B. Items not made by man.

II. Numeral classifiers of states and/or actions (enumeration during process and/or after completion of action).

III. Numeral classifiers of actions (enumeration imperative during action).
   A. Actions of living beings.
   B. Acoustic results of action of living beings.

Within each of these larger semantic divisions, a series of smaller semantic domains were defined on the basis of judged similarities by native informants. Examples of semantic domains discussed include "shapes," "maintaining vertical position," "acts of washing," "harvesting," etc. A series of sets of numeral classifiers corresponding to a series of semantic domains were then subjected to analysis. Two basically distinct types of distributional and semantic characteristics of these sets have been isolated. In the first type, the numeral classifiers are in contrast, both in distribution and in denotative meaning. In the second type, the numeral classifiers are in complementary distribution (or free variation) and are denotatively synonymous. In the paper we indicated that a third complex type sometimes occurred in which some numeral classifiers in the domain were in contrast while others were in complementary distribution. For ease of exposition, we will limit the discussion here to the first two ideal types.

We believe that the methods and findings of the paper are applicable to a wide variety of situations in most languages. In order to illustrate how this might be so, let us state the relevant method in its most general form and then illustrate it using examples from English.

Assume a set of "related" modifiers (M)(i.e., modifiers in a single semantic domain), together with a list of nouns (N) typically occurring as objects of each of the modifiers. The problem is how to find whether any two modifiers have the same or different denotative meaning.

Our assumptions are as follows: (1) If two modifiers, M_1 and M_2, occur with the same noun, N_1, and if the two resulting phrases, M_1N_1 and M_2N_1, can be shown to differ in denotative meaning, then the modifiers, M_1 and M_2, differ in denotative meaning. (2) If two modifiers, M_1 and M_2, never occur with the same noun (except in free variation), N_1, and if in two phrases, M_1N_1 and M_2N_2, they have equivalent denotative meaning, then they are allosemes, i.e., they are equivalent in denotative meaning.

These assumptions may be illustrated by considering the following paradigms in English:

(1) cup of sugar
cube of sugar
and
(2) school of fish
herd of cattle

In the first case, we have 'cup' (M_1) and 'cube' (M_2) occurring with 'sugar' (N_1). They differ in denoting different 'amounts' and 'states' of the modified object, 'sugar'. Thus, 'cup' and 'cube' contrast in denotative meaning in this context. In the second case, we have

'school' (M_1) and 'herd' (M_2) occurring with different nouns. Both indicate something like 'a natural group of' some animal. Knowledge of the noun is sufficient to predict which modifier is appropriate. The two modifiers never occur with the same noun (in this context) with contrastive denotative meaning. We would call them allosemes.

We think that allosemes may well vary in connotative meaning although we have no data on this as yet. The semantic differential would provide an appropriate measure to test this suggestion.

Most of the research reported in this paper has dealt with the mechanics of eliciting and with the preliminary semantic description of numeral classifiers in TTzel. Since the research is to continue, we hope that discussion would include suggestions as to possible psychological implications of the general relations between nouns and their modifiers (including numeral classifiers).

Among the many problems left untouched in this paper are those of metaphorical extension and a phenomena of regular variation in meaning related to presence or absence of infixed -h-. Examples of these two problems are presented below and conclude the paper.

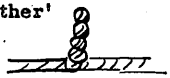
In regard to metaphorical extension, one would like to inquire into the semantic extension of the attributes indicated by certain classifiers to objects which normally would not be expected to exhibit such attributes. An example would be /koht/, the classifier occurring primarily with animal (i.e., non-human) beings, but which also may occur, for some speakers, with /meš̌a/ 'table', /ž̌ila/ 'chair', and /b'aɛ'il ʔič̌/ 'small red chili pepper'. The folk etymology for the use of /koht/ in this metaphorical extension may serve as clues to understanding the normative semantic range of the classifier, (cf. Hymes: 1960). Two informants indicate that 'tables' and 'chairs' occur with /koht/ due to the fact that each has 'four legs', one feature common to numerous animals. The occurrence of 'chili pepper' with the classifier is said

to be due to the 'bird-like' resemblances of the chili when dried. How common is metaphorical extension for the set of classifiers as a whole?

Another phenomen~~a~~on is the semantic relationship between two classifiers derived from the same verb. One form occurs with the infixed {-h-~∅} (Class II.1.), and the other with no change in phonemic shape (Class II.1.1.), e.g., /sut', suht'/ < tv /-sut'/ 'to tie knots in rope-like materials'

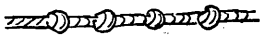
/sut'/: 'knots in rope-like-materials, normally each knot tied one on top of the other'

/čan sut' laso/



/suht'/: 'knots tied around some item in rope-like materials, but each knot separated linearly along the material'

/čan suht' laso/ ~~(sodrow)~~



/šut', šuht'/ < tv /-šut'/ 'to pinch with fingernails'

/šut'/: 'pinches with fingernails of person, hands, etc.'

/šuht'/: 'pinches with fingernails, taking off small pieces of tortillas, meat, etc.'

/laɢ, lahɢ/ < tv /-laɢ/ 'to stack it in neat fashion'

/laɢ/: each individual item in a neatly stacked pile, e.g., baskets, earthen jars, pots, bricks, etc.

čanlaɢ p'in 'fourth earthen pan (in a stack)'

ʔošlaɢ p'in 'third earthen pan (in a stack)'

čaʔlaɢ p'in 'second earthen pan (in a stack)'

hlaɢ p'in 'first earthen pan (in a stack)'

/lahɛ́/: each stack(s) of neatly stacked items, baskets, bricks, etc.

hlahɛ́ p'in	čaʔlahɛ́ p'in	ʔošlahɛ́ p'in	čanlahɛ́ p'in
'one stack of earthen pans'	'two stacks of earthen pans'	'three stacks of earthen pans'	'four stacks of earthen pans'

Footnotes.

1. This paper represents the results of research conducted in the field during the months of June-December 1962. Supporting funds have been made available by a National Science Foundation Grant #G22152 (A. K. Romney, Principal Investigator). We are especially indebted to Roy D'Andrade, Charles Frake, Terrence Kaufman, Duane Metzger and Gerald Williams for their critical comments and readings of earlier drafts of the paper.

2. Tzeltal is a Mayan language spoken by approximately 45,000 - 70,000 persons in the central highland region of the state of Chiapas, Mexico. The dialect of Tzeltal from which the data for this paper are drawn is that spoken in the municipio ('county' or 'township') of Tenejapa. We are indebted to two principal informants for their services, /h?aluš mentes ton/ of the paraje (homestead-like unit within the municipio) of /kul?ak'tik/ and /hpetul peres konte/ of the paraje of /pokolum/.

3. The use of the term numeral classifier was introduced into modern linguistic usage by Mary Haas (1942) for Thai. Bloomfield (1933:237) notes the Hindu designation of numeratives (dvigu) for forms with similar grammatical features.

4. The series of general numerals present in TTzel (cf. section 1) are coming into greater use by bilingual speakers with a knowledge of Spanish. The conditions that predispose speakers to use ~~a general~~ numeral phrases (which include a specific classifier) have not been determined systematically as yet. There is indication, however, that monolingual speakers prefer the numeral classifiers in quantifying expressions.

5. "Positional verb roots...as opposed to transitive verb roots...are recognized formally by two principal distributional features, (1) they rarely occur as simple CVC inflected stems and (2) upon derivation with the transitive stem-formativo...-an or the intransitive stem-formative...-ah, these exhibit an infixed... [/-h-~ø/]. Transitive verb roots, on the other hand, occur most frequently as simple inflected stems and upon derivation with the above mentioned suffixes do not exhibit infixed [/-h-~ø/]. The term 'positional verb root' has been used by Slocum [1948], Kaufman [1962], and later Berlin [1962] in agreement with certain obvious semantic similarities of glosses referring broadly to position or shape." (Berlin:1963)

6. "The quantifying-classifier 'twenty' has two suppletive allomorphs: /-tab/ occurring after 'one' /h-/, and /-winik/ occurring after all other quantifying expressions." (Kaufman:1961)

7. Sarles (1961) for the Oxchuc dialect and Metzger and Kaufman (1960) for the Aguacatenango dialect have produced similar lists of possible Tzeltal roots.

8. In this example, it is of interest to note that the 'shape' of the fruit determines the classifier used in enumeration even when the objects are apparently in the same general 'class,' folk-botanically speaking. Thus, /ča? k'ohk ?ič/ is definitely 'two large green chili peppers plucked' (i.e., /čawčaw ?ič/) and /ča? tul ?ič/ is definitely 'two small red chili peppers plucked' (i.e., /b'aɬ'il ?ič/), even when the specific sub-class of /?ič/ 'chili pepper' is not stated during enumeration of plucking.

8. apparently in free variation.

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