ACCENT AND MORPHOPHONEMICS IN CAHUILLA AND IN UTO-AZTECAN[1]

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0. It has been noted that several such Uto-Aztecan languages as Southern Paiute, Tübatulabal, Hopi, Yaqui-Mayo show a feature in common which has been termed alternation of stress:[2] given a point of departure which may be the place of the primary stress, secondary stresses would be predictable as to their placements because of the regular alternation of stressed and unstressed counting forward and/or backward from the point of departure up to certain limits in the speech chain which in the respective languages may be said to correspond to the limits of the word. To these languages as mentioned above we are now going to add Cahuilla as spoken by the 'desert' branch of Indians living around Indio, California.[3]

The phenomenon is striking both as to its comprehension within one and the same language and as to its extension over several genetically related languages, and also as to its extension over a certain geographical area. The phenomenon, however, cannot be correctly understood in isolation; we will have to situate it in its appropriate structural context. This will have to be done within one and the same language first. Cahuilla will serve as the test language.

It is quite possible that besides the Uto-Aztecan languages mentioned above others too show alternation of stress and that further descriptive work will substantiate such a guess, which would make for a remarkable resemblance among these languages. But still more striking than the widespread occurrence of a certain stress pattern is the fact that within each of these languages we have a cooccurrence of the stress pattern with certain definite morphophonemic processes. The processes are: glottalization (insertion and infixation of glottal stops, see the definitions in 2.1), lengthening of vowels, lengthening of consonants, syncope of vowels, unvoicing of vowels, perhaps also nasalization and spirantization. Not all of these processes together cooccur with stress alternation in each of the respective languages.

Southern Paiute as described by Sapir[4]

shows extensive glottalization and equally extensive geminations; in addition, we have unvoicing of vowels.

In Tübatulabal,[5] the situation is quite similar: Extensive glottalization cooccurs with gemination and lengthening of vowels.

We shall review the situation of these languages and of some others in more detail at the end of this paper (comparative statements).

For the moment, more than one interesting question arises. We will have to choose one which will be given special attention.

1) Is there any structural relationship within a given language between one or more of these morphophonemic processes and the particular feature of stress alternation?

2) Is there a structural relationship among the morphophonemic processes themselves? Within one particular language? Within several languages as compared with each other?

It is interesting to note in this context that Sapir[6] describes gemination and glottalization as 'tending to be associated or equivalent processes' and that Sapir also in his comparative work on Southern Paiute and Nahuatl[7] connects the vowel syncope which took place in earlier stages of Nahuatl with the (mora-)principle of alternating stress and with the law of accentual rhythm in Southern Paiute.

3) If (1) and (2) can be answered positively: Is there a definite set of properties common to languages which form a certain geographical area so that the whole phenomenon should be viewed in the light of either 'languages in contact' or of being

characteristic for a subbranch of Proto-Uto-Aztecan? The latter solution is hinted at by Kroeber and Grace in an appendix III (The Place of Luiseño in Uto-Aztecan) to the Sparkman Grammar of Luiseño.[8] They think that the features are limited to what they would call North Shoshonean (Plateau and Kern River branches) and that they presumably have originated there.

4) Or is the supposed set of common properties a matter inherited from the Proto-language?

We shall try to bring closer to a solution the problem mentioned first; but we will certainly keep in mind the other questions too even if the answer must be left to future research. The final solution to the whole complex of problems can only come from a synoptic treatment of all the questions mentioned.

The immediate aim of this paper is thus to first describe in detail for one language, i.e. Cahuilla, the phenomenon of alternating stress and one particular morphophonemic process, viz. glottalization. Their structural interrelation will then be studied. Some attempts at internal reconstruction and at historical comparison between several Uto-Aztecan languages will furnish outlooks for further work.

1.1. We distinguish between the physically measurable phenomena and their distribution. Among the former, we define stress as prominence of loudness, and pitch as relative height of tone.

The distribution of stress and pitch may be described with reference to segmental units such as the phonemes and, eventually, the syllable and the word. We need a further term in such cases where 'syllable' will not do for adequately describing the distribution of stress and pitch; we then utilize the term 'mora' in a purely distributional sense

[5] Charles F. Voegelin, Tübatulabal Grammar, UCPAAE 34(1935).

[6] SP, p. 59 ff.

[7] Southern Paiute and Nahuatl, a Study in Uto-Aztecan, I. Journal de la Société des Américanistes de Paris 10(1913) pp. 379–425. II. ibid. 11(1919) pp. 443–488; referred to as SPN I, II. Both parts are also published in: American Anthropologist 17(1915) pp. 98–120 and 306–328.

[8] A. L. Kroeber and George W. Grace, The Sparkman Grammar of Luiseño. University of California Publications in Linguistics vol. 16(1960) referred to as Kroeber-Grace.

as being a placement of stress and pitch which is determined by definite rules and which is located on a stretch of speech not necessarily coterminous with and mostly smaller than a syllable. Thus, for us the notion of mora is constituted by the rules that govern the placements of stress in relation to certain stretches; it is not a 'unit of length' as it is with writers on related subjects.[9]

The term accent refers both to pitch and stress and to their distribution.

1.2. Three degrees of stress-pitch have been perceived:[10] primary [´], secondary [`], and unstressed. Evidence for the phonemic status of the primary stress is given by such pairs (not very frequent) as néñukum *female cousins* vs. neñúkum *male cousins*. Usually the primary stress is on the first syllabic of the stem. There are exceptions, however, and the treatment differs from one morphological category (noun) to another (verb).

1.3. Secondary and zero stress prove to be a function of primary stress, they follow primary stress in regular intervals counting forwards and backwards within the word. We must admit of a certain degree of circularity here, as one of the foremost criteria for delimiting the word is precisely the alternation as extending over a certain stretch of speech. It is not possible here to go into the intricacies of defining the word.[11]

In Cahuilla the following segments and sequences of segments count as one mora: short vowel followed or not by consonant or consonant cluster, or by semivowel; semivowel in postconsonantal position; glottal stop preceding or following a consonant. For details see next section.

[9] Sapir, SP. Voegelin-Hale I, p. 100.

[10] For this and the following sections compare the fuller treatment in H. Seiler, Die phonetischen Grundlagen der Vokalphoneme des Cahuilla, Zeitschrift für Phonetik und allgemeine Sprachwissenschaft 10(1957) pp. 204–223.

[11] Some theoretical aspects in H. Seiler, On Defining the Word. Proceedings of the IXth International Congress of Linguists, Cambridge, Mass., 1962.

1.4.1. A sequence $C V_1 C V_2 C V_3 \ldots$ shows the distribution of stresses as outlined above: Suppose the primary stress is on the first V. The third, fifth etc. then receive secondary stress. If, on the other hand, V_3 has primary stress, there will be secondary stresses both before: V_1, and after: V_5, V_7 etc. Example: pàpentúleqàlevèh *where I was grinding it*. As a concomitant feature, pitch drops about a fifth from main stress to unstressed and then raises and falls about a third with the alternation of secondary stress and unstressed. Word-final moras always have low pitch.

1.4.2. Voiceless vowels and glottal stop. Phonetically, the voiceless vowels are a breath release with tongue position corresponding to a definite vowel quality. Distributionally they follow a consonant and the tongue position is that of the vowel preceding that consonant. They are analyzed as being an integral part of the respective consonant phoneme. Voiceless vowel after any consonant but /ʔ/ occurs only word-finally. Voiceless vowel (phonetically symbolized as V̲) after /ʔ/ occurs in the sequence -[ʔ + V̲ + C]-, i.e. within the word, or finally as -[ʔ + V̲]. Examples: [méniʔiḷih] *moon, objective case*, [ñáʔačèh] *sit down*, [hémuʔu̲] *his nose*, [háʔati̲sqal] *he is sneezing*. Secondary stresses are indicated. As is seen in the last example, in the sequence [C V̂ ʔ V̲ C V̂ ...] the voiceless vowel fills the slot of an unstressed in the regular alternation between stressed and unstressed: the voiceless vowel, or, phonemically speaking, the glottal stop has the value of an unstressed mora. It can never have the value of a stressed mora, which is shown by the example [méniʔiḷih]: in the sequence [C V̂ C V C V̲ C V] the V̲ should receive a secondary stress; whenever this would happen, the stress is shifted unto the preceding vowel and from there the alternation continues regularly, thus not *[méniʔiḷih] but [méniʔiḷih], with the first and third [i] stressed.

As variants of *a.* [C V ʔ V̲ C V ...] we often find either *b.* [C V ʔᶜ(V̲) C V ...] with unreleased glottal stop and therefore

barely hearable voiceless vowel, or we find *c.* [C V : C V] with a long vowel instead of the sequence [V ? V]. Examples: *a.* [táxmuʔàʔaṭ̣ìh] *song, objective case. b.* [táxmuʔàʔ⌐tìh]. *c.* [táxmuʔà:tìh]. On the occurrence of these forms see section 2. As is seen, the stress pattern is unaltered in the variants, the voiceless vowel of the unreleased glottal stop or part of the long vowel having mora value.

/ʔ/ has also mora value in the sequence /C ʔ/ which is phonetically [C ə ʔ]: There is no voiceless vowel there but a voiced mid central vowel which occurs as part of the /ʔ/-Phoneme irrespective of the qualities of preceding or following vowels. Examples: [múkəʔìh] *he died,* [nesékəʔàh] *my shoulder.*

1.4.3. Long vowels. The following minimal pairs bear evidence to the phonemic status: pá:l *wooden mortar* vs. pal *water,* penté:wqal *I see it* vs. pentéwqal *I find it.*

Phonetically we find the following concomitant features: Pitch drops about a fifth from the beginning to the end of the long vowel. The next following vowel receives secondary stress and pitch raises about a third. Within the long vowel, quality changes from high to low. Examples: ʔeléꞁ˻dkʷìcem *bad ones,* penkíꞁ˻ɪnqàlevèh *I going with him, etc.,* qáꞁ˻ankìcem *palo verde, pl.* The same or analogous concomitant features as in these sequences C V̌ : C V appear in sequences of the type C V̌ C V C V (see **1.4.1**), in other words: a long vowel structurally behaves like a sequence of two short vowels separated by consonant. Correspondingly we interpret and write vowel length as /aa/, /ee/, /ii/, /uu/. In matters of mora value the two semivowels /w/ and /y/ closely parallel the behavior of /ʔ/. They cannot receive stress and thus only count as unstressed moras. Example: [súval(u)wàl] = /súvalwal/ *sparrow,* with secondary stress expected on the [(u)]—parentheses symbolize a hardly perceivable vowel—and shifted to the next following vowel. They have mora value when they follow a consonant, compare the last example and [nás(u)wètem] = /náswetem/ *smoke trees.*

No mora value in intervocalic position. Whether or not the semivowels (symbolized S), like the glottal stop, show mora value also when they precede a consonant in a sequence, say, [...C V S C V...], is not entirely conclusive as far as our present materials go. A form like [púkawtèmih] *gopher snakes, object plural,* where the stresses are clearly perceived as indicated, is inconclusive because the secondary stress according to our earlier statements comes on the [e] anyway. A form like [qáwlamih] *rats, object plural* could be conclusive, but it is difficult to tell whether it is [qáwlàmih] with mora value of the [w] or [qáwlamìh] without, as a word-final secondary stress in words not longer than three syllables is hard to distinguish from unstressed. We must leave the question open to further research.

2. Morphophonemics are complex in Cahuilla, and among the most puzzling phenomena are the appearances of glottal stops in certain forms as compared with otherwise identical or structurally analogous forms which do not show that particular glottal stop.

2.1. For all the varieties of this phenomenon we use 'glottalization' as a cover term. Sapir[12] has utilized this term in a context quite comparable to ours, and it therefore seems appropriate to introduce it here. We will speak of 'movable glottal stops' to refer to the phenomenon of glottalization.

We shall distinguish between two varieties of glottalization.

We speak of 'insertion of glottal stop' or 'insertion' for short under the following circumstances: given are two sequences of morphs one with a glottal stop (or more than one glottal stops), the other without that particular glottal stop (or those particular glottal stops), all other things being equal; the presence versus the absence of glottal stop(s) is seen in places where, on the grounds of the usual criteria and all the facts with the exception of these movable glottal

[12] SP, p. 59 ff.

stops a boundary between morphemes may be posited.

We speak of 'infixation' under the following circumstances: given are two other sequences of morphs, one with glottal stop(s), the other without, all other things being equal; the presence versus the absence of the glottal stop(s) is seen in places where, on the grounds as mentioned above, a boundary between morphemes may not be posited; positively: these places are within morphemes.

We speak of 'inherent glottal stops' to distinguish them from the 'movable' ones. The inherent glottal stops show the same structural behavior as any other consonant within a sequence of phonemes representing a morph.

2.2. Examples of insertion: pemíisiʔneqal *he is praying* vs. pemíisineqal *id.* A morphemic analysis would show as respective morphemes {pe} + {míisi} + {ne} + {qal}. It may surprise that in the course of our segmentation and assignment to morphemes the glottal stop seemingly is not accounted for. But this is precisely the point we want to make: in most instances the glottal stop cannot be allotted to any particular morpheme in any normal way.

The following examples may show some of the difficulties. As a special case of morpheme boundaries, we find movable glottal stop also at word boundaries: héqa ʔ ñíšluvel *his grandmother, the old woman* vs. héqa ñíšluvel *id.* in other contexts. Where is the movable glottal stop to be allotted to? It could be heqaʔ: the word shows /-ʔ/ primarily, but not exclusively, when it occurs in isolation or phrase-finally. It could also be ʔñíšluvel: the word shows this glottalized variant primarily, but not exclusively, in phrase-initial position. It could also be both héqaʔ and ʔñíšluvel. A decision is not possible here. It is possible in cases as this: peʔ héqaʔ *that grandmother* vs. pé héqaʔ *id.* in other contexts; the first /ʔ/ must belong to the first morpheme (-word), as there is no initial cluster /ʔh-/ in Cahuilla.

Examples of infixation: a sequence kúlvaʔ-čem *cooks, pl.* is to be compared with a sequence without /ʔ/ but of identical meaning kúlvačem which occurs elsewhere in the corpus. The corresponding singular is invariably kúlvaš *cook* without /ʔ/. The segments are /kul-/, /-vač-/, /-em/ corresponding to the morphemes {kul-} *cook*, {-vaš-} *agent*, {-em} *pluralizer*. Thus, the glottal stop in the variant kúlvaʔčem appears before the last consonant of the prefinal morph of that form or word.

Infixation occurs in no other place except the prefinal morph of a word. It is thus in a relation of dependence with the final morph. Only certain final morphs, mostly inflective affixes, admit of infixation; others don't. It is rare with some inflective affixes like the plural marker (see the example just given); it is frequent with others, like the marker of the object /-ih/: násweʔtih *smoke tree, o.c.* as compared with naswetih *id.* elsewhere; the corresponding subjective form is naswet and may be analyzed as /nas + wet/; the prefinal morph of násweʔtih shows an infixed glottal stop. Certain forms occurring in different places of the corpus once show infixation and in other instances insertion: páal *wooden mortar* shows in the objective case both páaʔlih (infixation) and páalʔih (insertion); qíčil *money* shows qíčiʔlih and qíčilʔih.

2.3. We are interested in the limitations as well as in the statistical frequence: Are there forms invariably showing a glottal stop which is then inherent? Are there forms which do not allow of glottalization? And are there forms occurring particularly often with glottalization? We shall proceed from morphological to phonological and rhythmical conditions.

2.3.1. The first morph in a word, no matter in what position in the sentence, always opens in a consonant; if the consonant is /ʔ/ it is invariably there.

There are forms with initial reduplication and with syncope of the root vowel; /ʔ/ proves to be inherent in the root: ʔéyet

thief shows a reduplicated plural ʔéʔyetem which is to be analyzed as ʔé-ʔy-et-em. Incidentally, the comparison of the two forms shows that /ʔ/ and its absence are in contrast in analogous environments. The suffix of the punctual preterit /-ʔih/ invariably shows the glottal stop.

So far, we have seen in this section inherent glottal stops. The only way of accounting for them would be to list the morphemes and morpheme sequences, which we shall not do here.

There are other kinds of glottal stops invariably present and these do not seem to be connected with particular morphemes; there seems to be a conditioning factor of accentual or rhythmical nature. One particular case deserves special attention: when a suffix opening in a vowel is appended to a bound or free form whose last syllabic counts one mora and bears primary stress, the glottal stop always appears at the junction. We find the /ʔ/ either between morphs (insertion) or within a morph (infixation). Insertion: qál *is placed* shows a preterit qálʔih *was placed*, the root kup- *sleep* a preterit pekúpʔih. Infixation: kút *fire* shows the objective case kúʔtih, kíš *house* - kíʔčih, sél *mesquite blossom* - séʔlih. These objective cases never occur without /ʔ/. The behavior differs markedly from that of other forms: ʔélaʔtih *dress, o.c.* has a variant ʔélatih. The conditioning factor is, as indicated, in the rhythmic structure of the base form: in kúʔtih the suffix is appended to a base form ending in a mora bearing primary stress: kút; in ʔélaʔtih / ʔélatih the suffix is appended to a base form showing a syllabic after the primary stress (see the interpretation in **3.2.4**).

2.3.2. Certain morphemes and combinations of morphemes do not allow of glottalization. Again, a list would be appropriate, but some examples must do.

The allomorphs of the inflective morpheme *3rd person durative present*, when they are word-final, never entail glottalization: híčiqal (analyzed as híči-qal) *he is going* has no

variant *híčiʔqal, nor does the plural hem-híči-wen (hem-híči-wen) occur as *hem-híčiʔwen. The morpheme of the objective case {-ih} which very frequently entails infixation, never does so when it is appended to certain roots such as puš *eye* in hépučih (hé-puč-ih) *his eye*, where no *hépuʔčih exists. Nor does infixation occur when the marker of the object case is appended to the plural marker: húnal *badger*, plural subjective case húnlam, plural objective húnl-amih (húnl-am-ih); *húnlaʔmih or *húnl-amʔih do not exist.

Again, in addition to the morphological conditioning for the lack of glottalization we may look for a conditioning of phonological or accentual nature.

We know that in Cahuilla there are no clusters of more than two consonants. Thus, glottalization is excluded where there would result a three consonant cluster: the derivative augmentative suffix /-wet/ shows glottalization in wávuʔwet *big* (= wavu + wet) but not in kútašwet *big talker* (= kútaš + wet).

A restriction for glottalization deserves to be mentioned under this section: as far as our materials go, we have not found any reliable instance of two movable glottal stops within one and the same word. In other words: glottalization seems to be a process which is not applied repeatedly as affixes are appended to forms. Infixation is bound up with the suffix appended last. Insertion may appear in a place before the prefinal suffix: hemʔéwluʔneweneh *they initiated (girls)*, the segments are /hem-/ *plural*, /-ʔew-/ *blood*, /-lu-/ *being in a condition*, /-ne-/ *causative*, /-wen-/ *durative*, /-eh/ *preterit*. The suffix last mentioned frequently entails infixation.

2.3.3. Glottalization occurs with certain morphemes. As has been mentioned before, the glottalized forms are particularly frequent with the inflective suffixes 'objective cause' and 'preterit'. Some prefixes also appear in glottalized form but less frequently so. The number of derivative suffixes admitting of glottalization is considerable.

Besides the morphological conditions favoring glottalization, we have the phonological and rhythmical ones.

When a morpheme ending in a vowel is followed by a morpheme opening in a vowel they are usually separated by /ʔ/. The non-glottalized variant is then quite rare: múʔan- *shoot* (= mu-an-) vs. múan-. Incidentally, vowel clusters of the type /ua/ do occur in Cahuilla.

Glottalization occurs with a striking frequence before any kind of pause: comma or period. Compare pačemkínaʔveh *it got burned* at the end of a sentence, and pačemkínaveh with identical meaning at the beginning of the next following sentence. Other example: méniʔlih *the moon, o.c.* vs. ménili.

Non-glottalized forms before pause are rare. Glottalized forms sometimes also appear where no pause is discernible.

3. Until now, facts have been presented. It will now be necessary to correlate them with other facts of structure, attempting thereby an explanation.

The following domains are involved: morphology inasmuch as the possibility for forms to show variants either with or without glottal stop is bound up with certain morphemes and sequences of morphemes as they occur in words. There is thus a morphological conditioning in the first place.

Now, given the variation with the limits as determined by morphology, there must be reasons for it: why does a glottalized form show up in some places in the corpus and why is a form, otherwise identical but non-glottalized, given preference in other instances?

Some phonological or rather phonotactical reasons may be adduced: clusters of more than two consonants are avoided. But this accounts for only a small portion of the instances found in the corpus.

In order to discover the more decisive reasons we must ask what this glottalization does with regard to other facts of structure.

This kind of reasoning is teleological indeed and it is deliberately brought into our discussion.

3.1. Glottalization in many instances is a marker of morpheme boundary. Apart from the /ʔ/-Phoneme, we know that in a majority of consonant clusters in Cahuilla we are presented with a boundary of morphemes between the two consonants. A major exception is given by syncope of vowels: húnal *badger* -plural húnl-am (see **2.3.2**). Still it may be said that the morpheme boundary is where the two consonants are, viz. after the second, whereas normally the boundary is between them.

3.2. Glottalization is connected with word structure, i.e. with the particular way in which morphemes are put together and are integrated in a string, called a word. Glottalization is also connected with accentual rhythm as it is manifested within that particular string which is called a word.

Three major factors may be discerned: 1) The word as a stretch of morphemes is very clearly marked off by the law of alternating stress. 2) When affixes are appended to a base form which may be either bound or free, either a root or a stem or a word, the resulting form must yield to alternating stress pattern as set by the base form. 3) Affixes tend to preserve a structural independence from the base form; in particular they tend to bear stress.

2) seems to conflict with 3): when an affix is integrated in a certain stress pattern, it is a priori equally possible that it be stressed or unstressed. The solution to this dilemma seems to be the glottalization. Let us see the evidence for these assertions.

3.2.1. Glottal stop preceding or following a consonant has mora value (**1.3**). Now, if a glottal stop is inserted or infixed in connection with an appended element, the latter will, as a consequence, always bear a (secondary) stress. Let the base form be of two moras, e.g. súkat *deer* and the appended element be the objective case suffix /-ih/, we

then get the form súkà?tìh with stress pattern according to the rule formulated in **1.4.2**. Let the base form be of three moras, e.g. táxmu?àt *song*, we get the objective case form táxmu?à?tìh, again in agreement with the above mentioned rules. The same holds for prefixation: a stem máyĭu- *to get a baby* and a prefix pa *where(by)* are integrated into a form pa?-máyĭu-qàlevè *where she was giving birth to*.

3.2.2. It has been said (**3.1**) that consonant clusters are signals for morpheme boundaries. Statistically, the boundaries of morphemes are very frequently signalled in this way. The high frequence is seen when we compare the number of morphemes per word with the number of overt signalizations of morpheme boundaries.

This state of affairs may be taken as an indication for a tendency of morphemes to have clearcut boundaries as they are integrated within a word.

3.2.3. Glottalization is predominantly connected with the affix appended first among prefixes and last among suffixes. Glottalization thus can be seen as a process which is intimately connected with the process of affixation—a process which involves a hierarchy of several layers.

3.2.4. The special case mentioned in **2.3.1** is significative in this context: /?/ is obligatory at morpheme boundaries when a suffix opening in a vowel is appended to a form whose last syllabic counts as one mora and bears primary stress. The chances in this particular case would be a 100 % that, within the accent pattern of the respective word, the syllabic of the appended element would come to stand in unstressed position. These chances are less than 100 % in all other cases, viz. if the syllabic counts more than one mora and/or if the primary stress is not on the last syllabic of the base form. The obligatory presence of the glottal stop under the conditions as described is seen as a device to assure the affix to receive a stress where otherwise it would inevitably be unstressed.

3.2.5. Insertion and infixation is particularly favored before pauses (see **2.3.3**). Now, we know as a fact of general validity in many languages that rhythmic structures are most patent and most clearly discernible at the final stretch of sequences, i.e. before pause. The fact is amply illustrated in metrics and in prosody of various languages. Insertion of glottal stop, in Cahuilla, proves to be of the order of the domains just mentioned. In fact, insertion and infixation of /?/, although they pertain to the integration of segmental elements, i.e. morphemes, into words and although the glottal stop is in itself a segment, find their closest analogs in such non-segmental phenomena as comprised by the term accent.

4. The frequence of long vowels in Cahuilla is low: not more than two or three dozen in the lexicon; plus some instances in morphological processes where length is a concomitant feature (allomorphic), such as the plurals of some forms denoting a quality: wávuwet *big* → wáavučem, ?elélkʷiš *bad* → ?eléelkʷičem. The majority of quality expressions shows reduplication in the plural. The first consonant plus vowel of the root is prefixed to the root and accompanied by syncope of the root vowel: ?ínišiĭ *small* → ?í?nišmaĭem. It may be suspected that the length originated in such cases as the last cited where we have a sequence C V ? C.

We know (**1.4.2**) that for sequences C V ? C there is the variant C V : C. We now add that the latter variant is predominant in the speech of the younger generation whereas with the older people C V ? C is the rule. Obviously, the length is a result of the contraction between V and the voiceless vowel of the glottal stop.

In other cases, the length results from contraction of two short vowels after loss of intervocalic /h/. The reconstruction of the original forms goes along the following lines: take the noun múut *owl*, plural múhtam, which is structured like a syncopated plural

of the type túkut *wild-cat* - túkt-am. This enables us to reconstruct an earlier singular *múhut. The reconstruction is supported by external, i.e. comparative, evidence: mono has muhu.

At an earlier stage, which we can reconstruct, there were probably still fewer long vowels, or none at all. It may then be suspected that the stress alternation was predominantly in a sequence of short vowels and was at that time coterminous with an alternation of stressed and unstressed syllables.

As to the insertion and infixation of glottal stop, it may also be presumed that it had a broader distribution in earlier stages of the language. It has been said that in the coexistent speeches of the older and of the younger generations today we can watch the replacement of inserted glottal stops by length or by zero. Some morphemes, especially suffixes, which do not admit of glottalization today may have done so earlier. A case in point is the pluralizer /-em ∞ -am/. Insertion today cooccurs only with a few exceptional plural forms. They look like remnants of an earlier stage, since they are not, as is today the rule, derived from the singular. palvúkiva?č-em *waterdoves* is given as the plural corresponding to a singular palvúkiš. The attended singular would be *palvúkivaš.

5. Among the languages closest in relationship, Luiseño has received the most extensive treatments up to now.[13] A glance at the materials presented in Kroeber-Grace shows that phenomena comparable to what we have termed insertion and infixation must exist in Luiseño. Among the few statements on the subject we cite this:[14] "Many of our forms were recorded at times with, and at times without, a glottal stop. Most of the cases involves an intervocalic position. It seems probable that the glottal stop is inserted for added distinctiveness in careful speech but is omitted in rapid speech." This interpretation, intuitive as it may be, seems to be in agreement with our findings in Cahuilla, especially with the glottal stop's rôle of setting off morphemes from each-other.

Little clarity is to be gained from what is stated about Luiseño accentuation. Kroeber and Grace[15] admit of not having been able "to fit the phenomena of Luiseño accent to any such principle of morae or alternation". Interestingly, however, they note[16] that "Luiseño stress is related to quantity, but is more than a direct function of it." Malécot[17] distinguishes phonemic zero, half and full stress. In spite of his phonemic statement for which no account is given, he does not write stresses, neither full nor half, except in a few instances. The 'rules for word stress' he gives are, to say the least, in disagreement with the, rather phonetic, notations of Kroeber and Grace.

In Southern Paiute, Sapir[18] sees what he terms the glottalization and the gemination (of consonants) as 'associated or equivalent processes'. He distinguishes between 'inherent', 'accessory' and 'inorganic' glottal stop. A syllable containing an inherent glottal stop counts for two moras, while a short-voweled syllable with accessory glottal stop counts for only one mora. A necessary consequence in a phonemic notation would be to write both primary and secondary stresses. There are glottalized vowels which appear as either ?V or V?. According to Sapir, these variations tend to adjust themselves to the law of alternating stresses.

Tübatulabal, as it is known to us from

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[13] See Kroeber-Grace as cited above and André Malécot, Luiseño, a Structural Analysis, I: Phonology, II: Morpho-Syntax, IJAL 29(1963) pp. 89–95 and 196–210 with complete bibliography.
[14] P. 20.

[15] P. 240.
[16] P. 8.
[17] P. 93 ff.
[18] SP, p. 71 ff.

C. F. Voegelin's description[19] and from some field work of our own shows a highly complex morphophonemics with three or four dominant features: vowel length, consonant length, glottal stop present or absent in comparable forms, and, unvoicing of consonants.

Little is known from Classical Nahuatl, both in matters of accent and of glottal stops, although we can be sure that the latter had a predominant rôle there. Sapir was certainly right[20] in connecting vowel syn-

cope of Clssaical Nahuatl with the law of alternating stress in Southern Paiute. Other morphophonemic phenomena of Classical Nahuatl such as elision and apocope of vowels in prefixation will be described and situated into this context in a separate publication to appear in this journal.

It is certainly too early to exactly define the general denominator of all these phenomena in all the languages mentioned and in some which we have not mentioned.

We suspect that the processes of glottalization, lengthening, gemination, and even spirantization in the languages mentioned are in relation to accent in some similar way. To demonstrate this is a task for further research.

[19] Tübatulabal Grammar; Tübatulabal Texts; Working Dictionary of Tübatulabal ,IJAL 24(1958) pp. 221–228. See especially Morris Swadesh and C. F. Voegelin, A Problem in Phonological Alternation, Language 15(1939) pp. 1–10.

[20] SPN, p. 412 ff.