Recent advances in predicting Comanche's voiceless vowels

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This paper extends and refines my earlier work on voiceless vowels in Comanche and attempts to show that some promise is shown by a relatively superficial approach to the major unresolved problem in that work (Armagost 1986 and in press). From a historical point of view, the problem is simply one of a series of changes by which part of the Shoshoni dialect chain split off to become Comanche. Viewed synchronically we have an interesting example of opacity in which, as in all such cases, one must consider the objective of maximum predictability against the interplay of possible formal mechanisms with which it may be expressed.

Some of the voiceless vowel data are related to a pattern of consonant gradations that was once (i.e. in Shoshoni) much more extensive than in Comanche. In order to keep this paper within reasonable limits I will have no comment on these gradations except as they bear directly on the subject of primary interest. After some preliminary remarks, I will summarize my earlier research on voiceless vowels and then turn to the focus of the paper.

The phonology of Comanche has not yet been worked out in sufficient detail to allow unequivocal statements about its underlying segments and their relationship to the kind of roughly systematic phonetic transcription found, for example, in Canonge's Comanche Texts. However, as a working hypothesis for the purpose of this paper, we can take the segments of (1) as approximately correct:

1) /p t c k kw ? s sh m n y w i u e a o

Surface [c] and [k] are here assumed to be predictable spirantized versions of /p/ and /t/ respectively. Vowels may cluster, with up to three segments possible. Clusters of two identical underlying vowels appear phonetically as a long vowel; the only three-vowel clusters are /aa/ and /oo/, both quite infrequent. There are no surface consonant clusters of any type except for those having [h] or [ʔ] as the first element. Surface syllables therefore have the structure given in (2), where the rime and nucleus are obligatory and the onset and coda are optional.
The simplest assumption is that (2) represents not only surface but underlying syllable structure applicable to each morpheme. In the overwhelming number of cases this assumption appears to be justified by the data, although there are a few exceptional grammatical morphemes such as the nominalizing suffix */ʔ/ and the prefix */s/ DEFINITE. I will discuss below a small number of important nominal and verbal suffixes whose underlying structure is */CCV/.

The vowel inventory given in (1) implies that all voiceless vowels are predictable; (3) shows the voiced/voiceless alternations to be discussed here. Capitals represent voiceless vowels.

Each underlying vowel regularly has two surface manifestations differing only in voicing. However, */a/ has two voiceless allomorphs differing in timbre: [A] raises to [I] everywhere except following a glottal [(ʔ)nakɨci] 'having heard' but [(ʔ)mɨʔnɨci] 'having gone'

The vast majority of words are predictably stressed on the first syllable if we exclude proclitics from consideration.

A number of words have lexical stress on a noninitial syllable. Many of these irregular forms are borrowings, but others are native. Regardless of the location of primary stress, however, Comanche has apparently completely lost the old alternating stress pattern exhibited by Shoshoni.

There are two types of vowel devoicing, commonly referred to as organic and inorganic. Inorganic devoicing, which will not concern us here, is optional and affects only prepausal vowels. Organic devoicing is obligatory and conditioned by a following voiceless continuant within the same word, giving rise to the voiceless vowels noted in (3). It does not affect vowel clusters of any type, nor does it affect vowels protected by stress. Examples of conditioning by */s/ and */ʔ/ are given in (5) and (6), respectively.

5) *ʔomo-ma 'by foot'  *ʔomo-miʔ-s+ 'still by foot'
   *kasa 'wing'  *ka-kiša 'wing (REDUP)'
   *tosa 'white'  *to-ʔoša 'white (REDUP)'
   *piš-a 'themselves'  *piš-miʔ-a 'themselves also'
   *tɨkɨ-noo 'to carry food'  *tɨkɨ-sona 'to lay a foodcloth'
6) 'ti-hoca 'to dig'  
   'ku-të-hoca 'to dig a firepit'  
   'q+hi 'blanket'  
   'wana-q+hi 'cloth blanket'  
   'caka 'to lead'  
   'cak+hu-y+ka 'to round up'  
   'kohno 'cradle'  
   'haBi-k0no 'night cradle'  
   'naki 'ear' (OBJ/POSS)  
   'nakI 'ear' (see below)  

The data suggest a rule along the lines of (7).  

\[
\begin{array}{c|c|c}
& -\text{voice} & +\text{voice} \\
\text{stress} & - & + \\
\end{array}
\]

The consonant(s) on the left in the environment will prevent application to clustered vowels; as noted above, these do not devoice. The preceding vowel in the environment guarantees nonapplication to irregularly stressed forms such as the following:

8) \( ?u \)'suni 'always'  
   wa'saasi? 'Osage'  
   pih'naa? 'sugar'  
   pi-sik"a'nuu?i 'to slide sitting'  

With this brief overview of organic devoicing, we now turn to the principal defect in the analysis as so far presented. In contrast to (6), note that devoicing is not conditioned by \( /h/ \) in data of the following sort:

9) 'na-ë+kka-? 'groceries'  
   'tëna-hp+? 'man (ABSOLUTIVE)'  
   '?+tuhka 'under you'  
   'woBi-hta 'wood (OBJ/POSS)'  
   'ti-chi-ka?a 'to cut off'  
   's-i-ë+hi? 'this one (DIMINUTIVE)'  

It can be noted that the \( /h/ \) of ['kohno] 'cradle', which conditions devoicing in (6), is from a different historical source than those in (9), which have no effect on a preceding vowel. Specifically, the Shoshoni form for 'cradle' is identical to the Comanche while the forms for 'under', for example, are [tukka] and [tuhka] respectively. Similarly, the Shoshoni suffix corresponding to that seen on the form for 'wood' in (9) is [tta].

We can imagine a number of phonological solutions to such a problem of opacity. Among others, we might seek to distinguish two sources for surface [\( \text{CH} \)] in some analysis involving ordered rules and absolute neutralization. For example, we might hypothesize a loosening of underlying syllable structure to allow codas beyond \( /h/ \) (recall (2) above), perhaps also allowing syllable-final stops of all types. In particular, we might propose that Comanche allows underlying geminates parallel to the historical sources, giving derivations such as the following (Miller 1973):

10) 'night  

\[
\begin{array}{c|c|c}
\text{stress} & 0 & 0 \\
\text{devoicing (7)} & - & - \\
\text{degemination} & - & h \\
\text{h-deletion}\text{6} & 0 & 0 \\
\end{array}
\]

On the other hand, we might wish to maintain the original constraint that a glottal is the only possible coda. We could do this while increasing the inventory of underlying segments to

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include the voiced counterpart of /h/, namely /ʁ/. Then the
forms in ⟨10⟩ would have the following derivation:

\[
\begin{array}{ll}
\text{stress} & /\text{haβi}-\text{kohno}/ \\
\text{devoicing} & 0 \\
/ʁ/ \text{ devoicing} & - - - \\
\text{h-deletion} & 0 \\
\end{array}
\]

[ˈhaβik0no] [ˈnaʁ+hkaʔ]

Ignoring large questions concerning absolute neutralization
and relative lack of motivation, let us assume that derivations
such as ⟨10⟩ and ⟨11⟩ are countenanced by general linguistic
theory. That is, let us say that ⟨10⟩ and ⟨11⟩ are available to
us on condition that we cannot find another analysis that does
not raise these or similar questions. I wish to turn now to a
third type of phonological solution to the problem posed by the
data considered here. It may turn out in the long run that
this analysis cannot be maintained. It deserves serious
attention, however, and cannot be dismissed out of hand.

Returning to an examination of data exhibiting organic
devoicing in contrast to other data in which vowels are voiced,
it may be noted that in ⟨6⟩ the /h/ that triggers devoicing is
followed by either a sonorant or a morpheme boundary. In ⟨9⟩,
however, which exhibits no devoicing in the relevant locations,
surface [h] is followed by an intramorphemic stop. The
conditions are therefore complementary, and we might
hypothesize that devoicing is sensitive to conditions on the right
of the triggering voiceless continuant. Thus devoicing rule (?)
may be reformulated as ⟨12⟩.

\[
\begin{array}{ll}
V & \rightarrow -\text{voice} \\
\text{[-stress]} & \begin{array}{ll}
V & \text{[+voice]} \\
\text{[+cont]} & \{ \text{+son} \}
\end{array}
\end{array}
\]

Illustrating with the forms considered immediately above, the
derivation will now proceed as follows:

\[
\begin{array}{ll}
\text{stress} & /\text{haβi}-\text{kohno}/ \\
\text{devoicing} & (12) \\
\text{h-deletion} & 0 \\
\end{array}
\]

[ˈhaβik0no] [ˈnaʁ+hkaʔ]

This analysis has obvious advantages over the alternatives
sketched above and would without doubt be selected on general
principle if it were the case that all possible data conformed
to what has been considered to this point. Disregarding certain
apparent or real exceptions that I have discussed elsewhere
(Armagost 1986 and in press), however, there are three
additional problems that must be resolved. I will turn to these
after briefly filling out the present analysis by characterizing
the conditions under which /h/ fails to surface.

Consider the following in which [h] alternates with zero:

14) 't+ìhka 'to eat' 't+ìkì-ci 'having eaten'
'tunehc+ 'to run' 'tunecì-ci 'having run'
-kupì 'inside' -kupì-s+ 'still inside'
'cah-toŋi 'to pull up (S6)' 'ca-pìhe 'to take off (S6)'

The first three lines show loss of a morpheme-medial coda /h/
conditioned by a following voiceless vowel.\textsuperscript{7} The last line illustrates similar loss of /h/ from an instrumental prefix ('by hand'). This again appears to be loss of an underlying coda; we return to this point below. In all these cases it can easily be shown that we have loss and not insertion of /h/, i.e. ['nakk\textbackslash{ci}] 'having heard' but ['nak], not \#['nakh], 'to hear'. I therefore formulate the following rule of h-deletion ordered after devoicing.

15) \( h \rightarrow \theta / \quad C \begin{bmatrix} -\text{voice} \end{bmatrix} \)

But /h/ is also deleted in the following forms:

16) 'kohno 'cradle' \quad 'ha\textsubscript{b}i-k\textsuperscript{n}o 'night cradle'
    'kahni 'house' \quad 'soo-k\textsuperscript{\textsc{i}}ni 'village' (/soo/ 'many')
    'ku\textsuperscript{\textsc{i}}ma 'husband' \quad 'ku-k\textsuperscript{\textsc{u}}ma 'husband' (REDUP)
    'yahne 'to laugh (SG)' \quad 'na\textsuperscript{?}-y\textsuperscript{\textsc{ne}} 'to laugh (PL)'

I will account for this loss of /h/ by rule (17), which again must obviously follow devoicing.

17) \( h \rightarrow \theta / \quad C \begin{bmatrix} -\text{voice} \end{bmatrix} +\text{son} \)

Finally, the following forms show an additional environment in which /h/ fails to surface:

18) 'nak\textsuperscript{i} 'ear' \quad 'nak\textsuperscript{i}-n\textsuperscript{\textsc{k}}\textsuperscript{\textsc{w}} 'ears (DL)
    'nak\textsuperscript{i}-ma 'with the ear' \quad 'nak\textsuperscript{i}-ku\textsuperscript{\textsc{h}}\textsuperscript{\textsc{p}}a 'inside the ear'
    'nak\textsuperscript{i}-ka 'at the ear' \quad 'kahni-k\textsuperscript{\textsc{i}} 'at the house'
    'nak\textsuperscript{h}i-a 'ear (OBJ/POSS)'
    'kahni-k\textsuperscript{\textsc{h}}-u 'into the house'

Morpheme-final /h/ deletes under all circumstances, whether having triggered devoicing or not, except before a following vowel (compare morpheme-initial and -medial /h/ in (6), which also surfaces). Rule (19) expresses this loss of /h/.

19) \( h \rightarrow \theta / \quad C \begin{bmatrix} -\text{CC} \end{bmatrix} \)

In what follows I will refer to (15), (17) and (19) collectively as "h-deletion".

Returning now to the general discussion of conditions under which voiceless vowels are predictable, I will briefly discuss three types of problematical data and argue that two minor readjustment rules are capable of resolving most if not all the difficulties raised.

Consider first the behavior of ten pairs of so-called "alternating suffixes" (appendix I). Illustrating with the dependent clause suffix seen in (14), we have:

20) 'naka 'to hear' \quad 'nak\textbackslash{c}i 'having heard'
    'maka 'to feed' \quad 'makah\textbackslash{c}i 'having fed'

Lexically, verb stems have no final codas; the citation forms all end in voiced vowels. As suggested by (20), these stems must be lexically marked to take one member or the other of the pairs of alternating suffixes.\textsuperscript{8}

Note that one alternate of the suffix in (20) has a surface [ch\textbackslash{J}] that fails to induce devoicing of the stem-final vowel. Given the above analysis of devoicing and h-deletion, this alternate must be ['hc\textbackslash{ci}], a nonproblematical form except in that
it is one of a very small number of morphemes that lexically violate the severe restriction on underlying syllables discussed at (2).

The other alternate gives rise to forms that are phonetically comparable to those in (18). The correct surface form in this case would follow directly from the present analysis if the /h/ of the suffix were on the other side of the morpheme boundary, e.g. /nakah-ci/ "having heard". I therefore hypothesize the following readjustment rule sensitive to some lexical feature [A] that represents the subcategorization of verb stems mentioned above. (Let us arbitrarily say that /naka/ is a [+A] stem and /maka/ is a [-A] stem.)

\[
21) \quad \text{[h \rightarrow \ldots h]} \text{[+A]} \text{[-A]}
\]

Given readjustment rule (21), derivations will proceed as follows:

\[
22) \quad \text{/naka-hci/} \quad \text{/maka-hci/}
\]

\[
\begin{align*}
\text{rule (21)} & \quad \text{h-} & \text{--} & \\
\text{stress} & \quad \text{--} & \text{--} & \\
\text{devoicing (12)} & \quad \text{h} & \text{--} & \\
\text{h-deletion (19)} & \quad \text{0} & \text{--} & \\
\end{align*}
\]

\[
\text{'[nakhti] [makahi]}
\]

Similar to the righthand column of (22), derivations involving the three nominal suffixes given in (23) will proceed in a straightforward manner. These suffixes, like the alternating verbal suffixes, have a partially unpredictable underlying syllable structure.

\[
23) \quad \text{/hp+?/ ABSOLUTIVE, e.g. ['tenahp+] 'man'}
\]

\[
\text{/hta/ OBJ/POSS, e.g. ['wohhta] 'wood (OBJ/POSS)}
\]

\[
\text{/hci?/ DIMINUTIVE, e.g. ['sit+hci?] 'this one <DIMINUTIVE>}
\]

Turning now to the second class of forms that are problematical for the general analysis of devoicing presented here, attention must be focused on the old so-called "geminating morphemes" inherited from Shoshoni. A fairly small number of morphemes are of this type, including most of the instrumental prefixes (appendix II). The problem is illustrated by the following forms having an instrumental prefix 'by hand':

\[
24) \quad \text{'cah-paki 'to cling'} \quad \text{ca-yaa 'to carry (SG)}
\]

\[
\text{'cah-ka?a 'to cut' 'ca-hima 'to carry (PL)}
\]

\[
\text{'cah-tiki 'to set down 'ca-su?me 'to scrape'}
\]

\[
\text{(SG) 'ca-?ka 'to enter carrying (SG)}
\]

\[
\text{'cah-cu?ma 'to finish up' 'ca-wek'w 'to enter carrying (PL)}
\]

\[
\text{'cah-nia 'to lift' 'ca-nua 'to move'}
\]

In general, the historically geminating forms show a surface [h] before the noncontinuant obstruents and no [h] before sonorants and /s/. (No attempt will be made to discuss the situation before nasals.) The possibility of accounting for lack of [h] in the righthand column here by resort to h-deletion is illusory: none of the h-deletion rules considered above would correctly sort out the data of (24) without some modification.
Equally importantly, we must consider the ramifications of such forms for vowel devoicing. Since devoicing is blocked by stress in (24), we must examine other forms such as [\text{\textasciitilde{wacih-pun}i}] 'to watch from hiding' in order to fully understand the problem posed by the geminating morphemes. Why is this form not pronounced [\text{\textasciitilde{wac}\-pun}i], with expected devoicing and h-deletion?¹¹

Here the surface [\text{\textasciitilde{h}}] acts like the [\text{\textasciitilde{h}}] of (9) or (23). Thus in a sense the problem is the opposite of that posed by the alternating suffixes. I hypothesize a second readjustment rule (25) sensitive to a lexical specification [\text{\textasciitilde{h}}] of the geminating morphemes, which in effect constitute an arbitrary class of all morphemes ending in a vowel. This rule inserts [\text{\textasciitilde{h}}] on the far side of a morpheme boundary followed by a noncontinuant obstruent.¹² (In this analysis relevant surface forms cited above therefore have the morpheme boundary marked in the wrong place, a matter which is surely moot in most conceptions of phonetic representation.)

\[ \begin{align*}
25) \ & \emptyset \rightarrow \text{\textasciitilde{h}} / \ldots \text{[\text{-son}} \ \\
& \text{\textasciitilde{h}} \text{[\text{cont}]}
\end{align*} \]

Thus the form for 'to watch from hiding' is derived as follows:

\[ \begin{align*}
26) \ & \text{\textasciitilde{wac\-pun}i} \\
& \text{\textasciitilde{h}} \\
\end{align*} \]

\[ \begin{align*}
\text{rule (25) } & \rightarrow
\text{stress } \rightarrow \\
& \text{devoicing } \\
& \text{h-deletion }
\end{align*} \]

\( \text{\textasciitilde{wacihpun}i} \)

The [\text{\textasciitilde{h}}] inserted by (25) acts like any other morpheme-initial [\text{\textasciitilde{h}}] in important ways. Thus [\text{\textasciitilde{wacihpun}i}] is phonetically comparable to [\text{\textasciitilde{ci\-hka\-a} \text{\textasciitilde{h}}} 'man'. In addition the [\text{\textasciitilde{h}}] inserted in [\text{\textasciitilde{nana\-hk\"i\-h+}} 'married couple' undergoes regular h-deletion (15) triggered by the following voiceless vowel (i.e. [\text{\textasciitilde{nana\-hk\"i\-h+} \rightarrow}

\[ \begin{align*}
\text{intermediate } & \text{\textasciitilde{nana\-hk\"i\-h+} \rightarrow \text{\textasciitilde{nana\-hk\"i\-h+}}} \]
\]

A third type of problem for my general analysis is illustrated by the following data:

\[ \begin{align*}
27) \ & \text{\textasciitilde{c\-ci\-hka\-a \text{\textasciitilde{h}}} 'to cut' } \\
& \text{\textasciitilde{k\-i\-hkupa \text{\textasciitilde{h}}} 'to kill by bite' } \\
\end{align*} \]

\[ \begin{align*}
28) \ & \text{\textasciitilde{c\-ci\-hpa\-ki \text{\textasciitilde{h}}} 'to cling' } \\
& \text{\textasciitilde{m\-ci\-Bak\-i \text{\textasciitilde{h}}} 'to stick, glue (S6)' } \\
\end{align*} \]

Here (27) exhibits the expected effects of rule (25); surface [\text{\textasciitilde{h}}] and no vowel devoicing. In (28), however, we have a discrepancy. The forms on the left are comparable to those in (27), but those on the right have undergone vowel devoicing and subsequent h-deletion.

These irregular effects could be accounted for by a minor rule triggered by [\text{\textasciitilde{ma\- UNSPECIFIED OBJECT but not by \textasciitilde{t\-i\- UNSPECIFIED OBJECT.}}]

The effect of this rule, which would follow (25), would be to attract the inserted [\text{\textasciitilde{h\-}}] to the left side of the morpheme boundary, where it would then act like a normal
"devoicing" /h/. Comparably, it may be necessary to have lexical
doublets in such cases, e.g. /ca - paki/ 'to cling' but
[C+B]
"ma - cah - paki/ 'to stick, glue (SG).
[C+B]
Finally, a few additional alternations again suggest the need
for complications in the lexicon. Consider the following forms:
29) 't+ihe 'full'
'wuite 'to peep'
'p+ihe 'to burst'
'?4hp+i 'to sleep (SG)
'T+i-t+iBe 'full (REDUP)'
'to-wite 'to peep' /to/ 'by hand'
'ca-p+ica 'to rip open'
'n+mi-'ca-?4+ki-7e-t+i 'ether'
(lit. 'puts people to sleep')
The stems in the righthand column have no motivated internal
morpheme boundary or sonorant, which I have hypothesized to be
necessary for the prediction of voiceless vowels and subsequent
loss of /h/. These forms, again, may simply have to be given
their own lexical entries.
In conclusion, I have tried to show the degree of insight
possible in a relatively superficial account of voiced/voiceless
vowel alternations and [h]/zero alternations. I claimed that
the notion "/h/ (and /s/) before a sonorant or morpheme
boundary" is relevant to predicting surface forms. Two simple
readjustment rules are needed in order to preserve the
genreality of this notion, which claims that an underlying or
inserted voiceless continuant will have no effect if it is
followed by an intramorphemic obstruent. A relatively small
number of recalcitrant forms, whose surface shape contradicts
the general analysis, are to be expected when considering
phenomena exhibiting such a long history as vowel devoeicing.
APPENDIX I: Alternating suffixes

a. Motion
   - hki 'come'
   - kwa 'go'
   - kwa'i 'move about, come and go'

b. Other
   - hci DEP CL (same subj.)
   - hka DEP CL (diff. subj.)
   - hka STATIC
   - hkat+h TEMPORARY STATE
   - hpi+i INTENSIVE
   - ht+k INCEPTIVE
   - htai 'finally, for good'

APPENDIX II: "Geminating" morphemes

a. Instrumental prefixes
   - k+ 'with mouth, teeth'
   - s+ 'with feet'
   - ci+ 'with sharp point'
   - mu+ 'with nose'
   - to+ 'with violent hand'
   - ta+ 'with foot, leg'
   - ni+ 'with speech'
   - pi+ 'with buttocks'
   - ku+ 'with fire, heat'
   - co+ 'with head'
   - wi+ 'with body, sideways'
   - ca- 'with inward, upward hand'
   (but not /ma/ 'with hand')

b. Other
   - pasa 'to dry' (only in compounds)
   - nana- 'collective kinship, in-group'
   - waa 'cedar'
   - waci 'to be out of sight' (only in compounds)
   - caa 'good'
   - tiki- 'for food, eating'
   - tosa 'white'
   - eka 'red'
   - etc. (an unknown number)
NOTES

1 Work in progress (Armagost and Miller) lays out in some detail the consonant gradations and voiceless vowel data of Shoshoni together with the major changes giving rise to Comanche.

2 The data on which this paper is based come from Canonge 1958, copies of some of his unpublished texts (Canonge n.d.), and an early draft of Wistrand Robinson’s dictionary (forthcoming). The latter incorporates all of Canonge’s fileslips from extensive SIL fieldwork conducted some thirty years ago.

3 This raising of [CA] to [X] is not seen after /h/ since devoicing has no effect on a vowel in this environment. See the following note.

4 Two further details concerning organic devoicing deserve mention (see Armagost 1986 and in press for additional comments). First, there is a condition on the stridency of the flanking consonants that prevents application to the underlined vowels in [‘naha-hu-tu?] ‘will happen’, [‘ti-a-si-se?] ‘also (CONTRASTIVE)’, and similar forms. Second, the rule shows rightward iterative effects in forms such as [‘pi-ec-i-ku-si-se?] ‘early morning (CONTRASTIVE)’ from [‘pi-ec-i-ku-si-se?], where devoicing of /u/ is blocked by specification of a preceding voiced vowel in (?)

5 Ignored here is the question of [B] from /p/ and [C] from /t/ (see 11 and discussion).

6 This h-deletion will be discussed below.

7 The observant reader will note what appears to be exceptional devoicing before the dependent clause suffix [cci]. This and similar suffixes will be discussed below.

8 This is equally true of Shoshoni, where selection is between /hci/ and /ccess/, etc. (Miller 1972). In both languages the choice is partially predictable. For Comanche, all stems having a penultimate coda /h/ are like /maka/, e.g. [‘tunehci] ‘to run’, [‘tunehcici] ‘having run’ (note h-deletion), all stems ending in vowel clusters are like /maka/, e.g. [‘cayaa] ‘to carry (S6)’, [‘cayaaahci] ‘having carried (S6)’ and [‘caai] ‘to hold’, [‘caaihci] ‘having held’.

9 I have not attempted a rigorous count of these morphemes, but examination of Canonge’s materials shows them to be quite small in number. This is especially so since several geminating forms in Shoshoni have been reshaped as spirantizing in Comanche, e.g. /tua/ ‘son’, /meeka/ ‘now’, /puhi/ ‘leaf’. There are no known examples of other types of morphemes being reshaped as geminating from Shoshoni to Comanche.

10 In addition to the types of forms given here are a few others in which a geminating morpheme appears with [‘?], e.g. [‘ca?ni] ‘to put on a loincloth’. The glottal stop is unpredictable, as far as I know.
Actually, the form would probably show spirantized /p/, i.e. [ɓ].

This analysis of geminates differs slightly from that given in oral presentation of this paper.

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PREFACE

For the first time, The Hokan-Penutian Languages Workshop and the Friends of Uto-Aztecan Working Conference met together as a single conference, at the University of Utah, Salt Lake City, June 18-21, 1987. In the past, the conferences usually met back to back; the Uto-Aztecan meeting usually ended one or two days before the Hokan-Penutian meeting began, which gave people just enough time to travel from one location to the other. Since a number of people attend both meetings, it is hoped that these joint meetings can occur more often.

All the papers except the last one were given in a slightly different form at the meeting in Salt Lake City. The last paper was given at the 1986 Hokan-Penutian meeting, which met as a section the Haas Festival at Santa Cruz. The papers are given in the order they appeared at the meeting at the University of Utah.

The participants of the conference gratefully acknowledge all the work done by Professor Wick R. Miller, other faculty members, and the students at the University of Utah, which made the conference run so smoothly and enjoyably.

The 1988 Hokan-Penutian Languages Workshop will meet at the University of Oregon, Eugene, June 16-18, 1988.

James E. Pedden, Editor
Carbondale, March 1986
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