Numic Consonantal Correspondences

Irvine Davis

International Journal of American Linguistics, Vol. 32, No. 2. (Apr., 1966), pp. 124-140.

NUMIC CONSONANTAL CORRESPONDENCES

IRVINE DAVIS
[with editorial addenda (see fn. 1)]
SUMMER INSTITUTE OF LINGUISTICS

0. Introduction and phonemic inventories
1. The problem
2. Proto Numic reflexes
2.1. Stops
2.2. Sibilant and laryngeals
2.3. Sonorants
3. Comparative vocabulary
4. Bibliography

0. An important contribution to comparative Uto-Aztecan has recently appeared in the form of a monograph by C. F. and F. M. Voegelin and Kenneth L. Hale (1962). The authors of this study (abbreviated in the remainder of this paper as VVH) have outlined the principal features of the historic phonology of Uto-Aztecan as a whole and of its major branches. The purpose of the present paper is to examine the consonantal developments of the Plateau Shoshonean or Numic languages in the light of VVH's reconstructions.[1]

Previously unpublished data have been made available to the author from the Shoshone (Sh) of the Wind River Reservation in central Wyoming, the Ute (Ut) of the Southern Ute and Ute Mountain Reservations of southwestern Colorado, and the Northern Paiute (NP) of the vicinity of Owyhee, Nevada.[2] Published Comanche (Co) material by Canonge (1958) has been supplemented by additional data from the same author. Also included for purposes of comparison are Southern Paiute (SP) data drawn from Sapir (1930) and from VVH, Northfork Mono (Mo) data from Lamb's doctoral dissertation (1958) and from Klein (1959), and Kawaiisu (Ka) data from Klein (1959). Other references listed in the bibliography were consulted in the preparation of this study but were not utilized as sources of data.

---

[1] [Numic is a term introduced by Sidney Lamb; it is by no means a bland switch in technical label for Plateau Shoshonean. The revolutionary challenge initiated by Whorf left unquestioned what VVH labelled the Aztec branch of Uto-Aztecan; rather, it attempted to demolish the postulated Sonoran branch, immediately to the north of the Aztec branch, as well as the northernmost branch of Uto-Aztecan, known collectively as the Shoshonean languages. If the Shoshonean languages are merely located in a geographic periphery of the western continental distribution of the Uto-Aztecan family, then the question arises as to what is coordinate with the agreed upon Aztec branch. The answer proposed was that the Numic branch is attestable as such a branch, but Shoshonean as a whole (and the Sonoran as a whole) was not so attestable. In this sense, Numic means that even if Shoshonean as a whole is not attestable as a branch of Uto-Aztecan, the languages and/or dialects here called Numic do constitute an attestable branch, and what remains of the classic Shoshonean branch—Hopi, Tubatulabal, and the Southern Californian group of which Luiseño is the best known representative—constitute branches coordinate with Numic (with Tubatulabal closer to Numic than others in the northern periphery).

[This paper is focussed on the Numic languages and/or dialects in this sense. Some units of the sample are so closely related that mutual intelligibility prevails. For the revised AES wall map of North American Indian Languages (1966) we distinguish, on the basis of mutual intelligibility, four languages among those classified here as Numic. That is to say, Southern Paiute, Ute, and Kawaiisu are dialects of one language, and Shoshone and Comanche are dialects of a second language, with Northern Paiute and Mono representing the third and fourth languages.

[Kenneth Hale has made additional editorial changes, converting charts into linear statements throughout. Both his changes and ours have been made with approval of the author. CFV]

[2] The Sh data were supplied by Wesley Kosin of Forth Washakie, Wyoming, the Ut data by Jack Green of Cortez, Colorado, and the NP data by Edward Andrews of Owyhee, Nevada.

The lexical items have been reduced to a common orthography which, it is hoped, will facilitate the comparison of cognates. Although this procedure may seem to do violence to the phonemic analyses of individual languages, it allows one to bypass many details of phonetic difference and proceed to an examination of the broad patterns of change evident in the Numic languages.

The fortis voiceless stops common to all Numic languages are symbolized by p, t, c, k and k^w. SP has, in addition, a back velar fortis stop, q, and Mo has both q and q^w. SP also makes a distinction between the alveolar voiceless affricate, c, and an alveo-palatal affricate, č.

Lenis consonants corresponding to the fortis series have developed to varying degrees in the languages under consideration. This development has been restricted to b and d in Co. SP and Ut have b, d, g and g^w, while Sh and Ka have b, d, ʒ, g and g^w. NP has the latter series, and, in addition, an alveo-palatal affricate, ǰ. Mo has a full series of lenis consonants matching its fortis series: b, d, ʒ, g, g^w, g and g^w. The lenis consonants are actualized variously as voiced stops or as spirants, either voiced or voiceless. In addition, the d phoneme in some languages may be a voiced alveolar flap.

All Numic languages have at least one sibilant, s. In Sh and NP the fortis-lenis contrast is carried over into the sibilants, yielding an additional phoneme, z.

The laryngeals, h and ʔ, are represented in each of the languages with the exception of Ut, which lacks h. In Sp h occurs only as preaspiration preceding certain consonants.

SP has four nasal phonemes: m, n, ŋ and $ŋ^w$. Some Ute dialects have the same four nasals, although Ut ŋ and $ŋ^w$ are apparently on the way out. When present, the latter phonemes are actualized merely as nasalization on the preceding vowel, followed, in the case of $ŋ^w$, by a bilabial semivowel. Some Ut speakers (particularly those of the younger generation, and more generally in the Southern Ute than in the Ute Mountain Reservation) omit even this nasalization. NP has three nasal phonemes: m, n and ŋ, while Sh has m, n and $ŋ^w$. In Sh, as in Ut, the $ŋ^w$ phoneme lacks velar closure. The remaining languages of our sample have only m and n.

The semivowels, w and y, are represented in each of the seven languages or dialects in this sample of Numic.

The phoneme x is reported to occur in Mo as a fortis voiceless back velar fricative contrasting with other velar phonemes. It is rare, however, and is not represented in the cognate list.

Prenasalized stops occur in Sh, SP, Ut and, less extensively, in Ka. These are actualized as stops preceded by a nasalized vowel and/or a homorganic nasal continuant. Prenasalized stops are symbolized by a raised n before the fortis stop symbol: ^{n}p, ^{n}t, etc. Sporadic occurrences of ^{n}t are reported for Mo but are not represented in the present data.

Preaspirated consonants which contrast with plain fortis consonants are indicated as hp, ht, etc. These occur to varying degrees in each of the Numic languages with the apparent exception of Ut and Ka.

Preglottalized consonants contrast with plain consonants in Co and, to a lesser extent, in some of the other languages. They are indicated by the glottal symbol preceding the consonant: ʔm, ʔp, etc.

Double consonants are reported for some of the languages. Klein's Ka data contain examples of nn, bb and mm. Mo and NP each have occurrences of a long n (interpreted here as nn), although only Mo nn appears in the cognate sets.

Co, Sh, Ka and Mo each have a six-vowel system: i, e, a, ɨ, u and o. NP and Ut are lacking e, while SP has four vowels: i, a, ɨ and u. Long vowels, phonemically significant in all but NP, are interpreted as geminate clusters. Voiceless vowels in Co and Ut are not entirely predictable in terms of other phonemic features outlined here and are written with upper case letters.

The phonemic status of certain voiceless vowels in word-final position is open to question. Final "neutral" vowels omitted by VVH are written here as ɨ (or as Ɨ in Co and Ut). Final voiceless echo vowels preceded by a glottal stop are also written in most cases, although in some of the languages these may be fully predictable. In Co, where there is a contrast between mere echo vowels and full vowel phonemes in final position preceded by a glottal stop, only the latter are written.

Stress in Co, SP, Ut and NP is not predictable in every case. Primary stressed syllables are indicated in these languages by an accute accent.

The phonemic structures included in the present comparison are summarized below. Phonemicization of the Sh and Ut data is my own, while for the other languages I have followed, in general, the analyses of the respective authors. Certain modifications have been made, however, for the sake of uniformity.

COMANCHE.
/p t c k kʷ/ /b d/ /s h ʔ/ /m n/ /w y/ /i e a ɨ u o/ /I E A Ɨ U O/ Double vowels. Stress.
Nearly all consonants may occur preaspirated or preglottalized.

WIND RIVER SHOSHONE.
/p t c k kʷ/ /b d ʒ g gʷ/ /s z h ʔ/ /m n ŋʷ/ /w y/ /i e a ɨ u o/ Double vowels.
Prenasalized stops, /ⁿp ⁿt ⁿc ⁿk ⁿkʷ/.
Preaspirated consonants, /hm hn hw hd/.

SOUTHERN PAIUTE.
/p t c č k kʷ q/ /b d g gʷ/ /s ʔ/ /m n ŋ ŋʷ/ /w y/ /i ɨ u a/ Double vowels. Stress.
Prenasalized stops, /ⁿp ⁿt ⁿc ⁿč ⁿkʷ ⁿq/.
Preaspirated consonants, /hp ht hc hč hk hkʷ hq hs/.
Preglottalized consonants occur in Sapir's data, but are apparently not a regular feature of modern Southern Paiute (VVH, p. 12).

UTE.
/p t c k kʷ/ /b d g gʷ/ /s ʔ/ /m n ŋ ŋʷ/ /w y/ /i a ɨ u o/ /I A Ɨ U O/ Double vowels. Stress.
Prenasalized stops: /ⁿp ⁿt ⁿc ⁿk ⁿkʷ/.
Preglottalized consonants: /ʔm ʔn ʔŋ ʔŋʷ ʔw ʔy/.

KAWAIISU.
/p t c k kʷ/ /b d ʒ g gʷ/ /s h ʔ/ /m n/ /w y/ /i e a ɨ u o/ Double vowels.
Double consonants, /bb mm nn/.
Prenasalized consonant, /ⁿp/.

NORTHERN PAIUTE.
/p t c k kʷ/ /b d ʒ ǰ g gʷ/ /s z h ʔ/ /m n ŋ/ /w y/ /i a ɨ u o/ Stress. Double consonant, /nn/.
Preaspirated consonants, /hm hn hw/.
Preglottalized consonants, /ʔm ʔn ʔw ʔy/.

NORTHFORK MONO.
/p t c k kʷ q qʷ/ /b d ʒ g gʷ ɡ ɡʷ/ /s x h ʔ/ /m n/ /w y/ /i e a ɨ u o/ Double vowels. Double consonant, /nn/.
Prenasalized consonant, /ⁿt/.
Preaspirated consonants, /hw hy/.
Preglottalized consonants, /ʔm ʔn ʔw ʔy/.

1. Proto Numic consonants show a marked persistency word initially. The changes in this position have been few, and generally well defined. The present data supply confirming evidence for most of VVH's conclusions, but add little new information regarding initial consonantal developments in the Numic languages.

In contrast to initial consonants, those in medial position show a variety of reflexes. Moreover, the conditioning factors for these changes are, in many cases, extremely elusive. In addition to the same changes which characterize initial consonants, medial consonants have undergone a number of changes which can be described in general terms as 'weakening' processes. Although it is not known how closely interrelated these changes may be, a number of different kinds of developments seem to be controlled, to some degree at least, by factors of a similar nature. Thus the development of lenis consonants from the stop series, the development of h

from *s, the appearance of ŋ^{w} and w as reflexes of *m, and the complete loss of certain continuant phonemes have all been linked by VVH, in one context or another, to the presence of a preceding *V$_{s}$. Although the expedient of postulating such a 'suspending' vowel as a Proto Uto Aztecan feature governing many otherwise puzzling changes helps to systemize the data, it does not shed much light on the particular phonetic or distributional factors involved, nor can it represent a single undifferentiated feature of the proto language. This paper suggests certain specific factors which may be relevant, but a complete analysis of the nature of medial consonantal 'weakening' or 'suspension' is not at the present possible.

Another feature handled by VVH in terms of progressively determining vowels is prenasalization. There can be little doubt that prenasalized consonants (or some feature from which prenasalized consonants can be directly derived) must be reconstructed for a horizon that antedates Proto Numic. The validity of a *V$_{n}$ that produces effects other than prenasalization, however, rests on thin evidence.

It can be concluded that the whole problem of medial consonantal reflexes in the Numic languages is exceedingly complex, and that the reconstructed morphophonemic formulae, *V$_{s}$, *V$_{n}$ and *V$_{u}$, while providing a useful framework for tracing historic developments, have proven inadequate to handle all details of the medial consonantal developments for which they were intended.

2. VVH list the Proto Shoshonean constants as:

p	t	c	k	k^{w}	ʔ
		s			
m	n		ŋ		
	l-				
w		y			

In addition, morphophonemic formulae *V$_{u}$, *V$_{s}$ and *V$_{n}$ which affect the following consonants are introduced.

This reconstructed consonantal system, with the exception of l- (which is not a Proto Numic feature), is utilized as a point of departure from which reflexes in the present-day Numic languages are outlined. Unless specifically noted otherwise, starred forms in the sections to follow refer to reconstructions based on comparisons involving the Numic data only. This represents a horizon somewhat more recent than VVH's Proto Shoshonean.

For convenience the consonants are divided into three groups: the stops /p t c k k^{w}/, the sibilant and laryngeals /s h ʔ/, and the sonorants /m n ŋ w y/.

2.1. Proto Numic initial stops which remain in initial position in the daughter languages are, in general, unchanged. Exceptions documented by VVH include the double reflection of *c and *k in SP and of *k and *k^{w} in Mo. In addition to these, the present data contain examples of initial k:k^{w} and k^{w}:w correspondences. None of these developments, however, are peculiar to initial position and they will be discussed in more detail below. One other change involving an initial stop is suggested by item 149 of the comparative vocabulary. Apparently the entire initial syllable in Ut has been lost under conditions in which a voiceless syllable would normally be expected. In an initial unstressed syllable, Ut vowels occurring between s and a fortis stop are regularly voiceless (16, 40, 56, 103).

Each of the Proto Numic stops is multiply reflected in medial position. Probable medial reflexes are listed below:

*-p- > Co p (44, 78, 87, 107, 122, 132, 166, 167, 169), b (30, 34, 47, 71, 90, 93, 127, 143–5, 153, 168, 185), hp (20, 46, 119), hb (77, 170), p- (94); Sh p (20, 44, 87, 119, 122), b (30, 32, 47, 71, 77, 90, 93, 127, 143–5, 153, 165, 168, 170, 185), ^{n}p (78, 107, 132, 166, 167), p- (94); SP p (20, 44, 46, 119, 122), b (30, 32, 39, 47, 71, 77, 88, 93, 94, 127, 143, 145, 165, 168, 169, 170, 185), hp (103), ^{n}p (78, 166, 167), p- (107); Ut p (44, 46, 78, 103, 119, 122, 166, 167), b (30, 32, 39, 47,

71, 77, 87, 93, 94, 127, 143, 145, 169), p- (20, 107), w (88, 168?), g^w (185); Ka p (46, 119, 169), b (47, 77, 88, 93, 103, 143, 185), ^{n}p (166, 167); NP p (77, 107, 119, 122, 127, 165–7, 169), b (30, 32, 39, 47, 71, 87, 88, 90, 93, 132, 143–5, 153, 168, 170), p- (94), ?w (20?); Mo p (103, 107, 119, 165–7), b (32, 44, 47, 71, 77, 88, 90, 93, 143, 169, 185), w (20?, 145?).

Not included in the present cognate sets, but probably reflexes of medial *p are Co ?b (Co ?p has not been encountered in the data), Ut ^{n}p and Ka bb.

*-t- > Co t (7, 60, 95, 99, 105, 128), d (21, 33, 41, 79, 120, 123, 163), ht (62, 169, 175), hd (4); Sh t (7, 62, 128, 175), d (21, 33, 41, 60, 79, 99, 105, 120, 123, 163), hd (4), t- (147); SP t (4, 95), d (21, 33, 41, 51, 120, 123, 147), c (99, 105), č (7, 60, 128), t- (163, 169); Ut t (95), d (21, 41, 51, 120, 123), c (99, 105, 128), t- (147, 163, 169); Ka t (4, 128), d (41, 51, 99, 120), t- (147, 169); NP t (41, 51, 62, 105, 120), d (4, 7, 21, 60, 79, 99, 123, 128), t/d (175), t- (147, 163, 169); Mo t (41, 51, 105, 120), d (4, 7, 21, 60, 99, 128), t- (147, 169).

Other probable reflexes of *t not represented in the cognate sets include Co ?t and ?d; Sh, SP, Ut and Mo ^{n}t; and SP ht.

*-c- > Co c (16, 24, 26, 27, 68, 101a, 101b, 137, 168, 183), hc (48, 153), s (56? 124?, 128?, 149?); Sh c (26, 48, 68, 137, 153, 168, 171), ʒ (16, 24, 101b, 183), ^{n}c (27), s (56? 124?, 128?, 149?); SP c (24, 26, 101a, 114, 168, 171), č (48, 124?, 137), ^{n}c (68), s (56?, 128?, 149?, 183?), s- (16?); Ut c (24, 26, 48, 114, 124?, 137, 171, 183), s (56?, 128?, 168?), s- (16?, 149?); Ka c (24, 114, 171), ʒ (137, 183), s (56?, 128?, 149?); NP c (48, 128?, 153, 168, 171, 183), ʒ (16, 26, 27, 101a, 101b, 114, 137), s (56?, 124?), z (68), h (149?); Mo c (149, 183), ʒ (24, 56?, 114, 137, 171), s (124?, 128?), c- (26).

More complete data would likely add Co ?c; SP hc, hč and ^{n}č; Ut ^{n}c; and NP ǰ as reflexes of *c.

*-k- > Co k (5, 6, 17, 22, 28, 35, 53, 64, 75a, 75b, 113, 125, 126, 151, 161, 176, 179), hk (84, 97, 152, 160), k- (44); Sh k (6, 84, 97, 152, 160), g (17, 28, 35, 64, 65, 126, 147, 151, 161, 179), ^{n}k (5, 22, 53, 75a, 75b, 113, 176), k- (44); SP k (103), g (6, 28, 35, 64, 65, 126, 147, 161, 176, 179), hk (152), ^{n}k (113), q (97, 160), hq (84), ^{n}q (5, 75a, 75b), g^w (151), k- (44); Ut k (5, 22, 75a, 75b, 84, 97, 103, 152, 160), g (17, 28, 35, 64, 65, 126, 161, 179), ^{n}k (113), k^w (125), g^w (6, 147, 151), k- (44); Ka k (84, 97, 103), g (5, 6, 65, 75b, 113, 125, 147), g^w (151), d (179?); NP k (22, 64, 75a, 75b, 84, 152, 160), g (6, 28, 53, 65, 113, 147, 151, 161, 176), c (44?, 97?), k/g (179); Mo k (44, 113, 160), g (65, 84, 103, 161), q (5, 28, 64, 75a, 75b, 176), ɢ (6, 125, 147, 151, 179), c (97?).

A probable reflex of *k not represented above is Co ?k.

*-k^w- > Co k^w (18, 98, 164), w (133?, 182?); Sh k^w (164), g^w (18), $^n k^w$ (98), w (133?, 182?), # (147?); SP g^w (18), g (98), ? (182?), # (147?, 164?); Ut g^w (18), g (98), ? (182?), # (147?); Ka g^w (18), g (98), w (147?); NP k^w (98, 164), g^w (18, 133?, 147?, 182?); Mo k^w (98, 182?); g^w (18), q^w (147?).

Other probable reflexes of *k^w include Co hk^w and ?k^w; SP k^w and $^n k^w$; Ka k^w; and Mo g^w.

In addition to the developments noted for initial position (the velar-back velar contrast, the alveo-palatal affricate, and the labialization or loss of labialization of velars), the data attest the following major patterns of change for medial stops: changes reflected by sibilant-affricate correspondences, the development of the fortis-lenis contrast, preaspiration, prenasalization, and the development of an affricate from the alveolar stop in SP and Ut.

Conditions governing these changes are only partly understood. The development of back velar stops in SP and Mo is shown by VVH to depend on the quality of the following vowel (p. 68, 72). SP back velar q and Mo back velars q, q^w, ɢ and g^w appear, in general, preceding low vowels, *o and *a. The bulk of the present data confirms this observation (5, 6, 28, 34, 36–42, 45–47, 64,

75, 97, 125, 147, 151, 176, 179 versus 43, 44, 48–52, 54, 65, 103, 113, 152, 161). Two items (84 and 160) show the velar point of articulation retained in Mo before *a. VVH's suggestion that medial Mo q (hq in the source orthography) has developed only when flanked by low vowels may explain item 160, but cannot account for the retention of g in item 84 in the face of the development of g in item 6. An alternative hypothesis might be that the conditions which produced Co hk (whatever these may have been) also favored the retention of the velar point of articulation in Mo.

In Sapir's data k and q are in complementary distribution, the former appearing only before a high front vowel. In adapting this data to VVH's phonemic analysis and to my own orthography I have, in the absence of confirming data from VVH, written q before *a and *o, and k elsewhere. This assumes that the development of q in SP before *a and *o has been entirely regular, an assumption that may not be completely valid. VVH's SP data have one exception (their item 170; my item 35) in which k is apparently retained before *a.

The development of SP č seems to likewise depend on the quality of the following vowel, although the examples are few and some items pose problems in the reconstruction of vowels. The present data confirm, in general, VVH's observation (p. 67–68), that SP č has developed preceding *a and *o (25, 60, 124, 128, 137 as contrasted with 23, 24, 26, 68 ?, 99, 101, 105, 168, 171). Possible exceptions are items 7 and 48, in which SP č appears before vowels which are probably reflexes of *i and *u respectively, and item 114, in which SP c is retained before what may be *a.

Items showing correspondences involving plain velar and labialized velar consonants suggest that historic changes have operated in both directions. Conditions for these changes are not entirely clear, although there is some evidence that the quality of contiguous vowels is, in some cases, a contributing factor. Medial labialized velars in Ut have apparently developed contiguous to *o (6, 125, 147), while the single example of a similar development involving SP, Ut and Ka suggests that the conditions might be occurrence following *u and preceding a vowel other than *u (item 151). Item 48 shows an unexplained k^w in Sh with k appearing in the other languages. Apparent cases of the loss of labialization (55, 56, 59, 98) are sporadic and, except for item 59, are confined to the group of languages composed of SP, Ut and Ka.

A number of items (16, 56, 68, 124, 128, 149, 168, 183) show possible correspondences of alveolar affricates with sibilants. Although these items have been listed as probable examples of *c, it is not at all certain that the change has been from an affricate to a sibilant in every case. The preponderance of sibilants in Uto Aztecan languages outside of the Numic group suggests that some of these items might be reconstructed to *s rather the *c. It is probable that the changes that have produced the affricate-sibilant correspondences have operated over a long period of time under diverse conditions and that the delineation of these conditions is now a nearly hopeless task.

Of the changes confined to medial stops, the development of lenis consonants is the most pervading. VVH handle this phenomenon by the expedient of setting up the morphophonemic formula *V_s (a spirantizing or suspending vowel) with the specification that after *V_s certain changes take place, e.g., *p becomes b in Co and SP, and *k becomes g in SP but not in Co. An examination of the evidence, however, leads one to the conclusion that the development of lenis consonants in the Numic languages cannot be explained on the basis of a single factor. Reference to the lists of medial stop correspondences shows that the occurrence of lenis as opposed to fortis consonants seems to be almost random. While some cognate sets show the same type of consonant in each of the languages (e.g., b in

items 47, 93 and 143), the distribution of the lenis and fortis consonants in other sets follows no apparent pattern. This distribution has no doubt resulted from the interaction of a complex set of factors, some of which are still in operation in the present-day languages. Although a detailed analysis of these factors must await more complete data, the following observations can be made on the basis of the present evidence:

1) Some languages have developed a more complete set of lenis consonants than others. While Mo matches each of its fortis stops with a lenis stop and NP carries the process even farther, Co has only b and d in the lenis series.

2) In most, if not all, of the Numic languages there are productive morphophonemic processes involving the alternation between fortis and lenis consonants. These alternations operate under certain conditions of affixation as well as at some word boundaries in rapid speech.

3) Initially in an utterance there is no fortis-lenis contrast in any of the Numic languages. Words beginning with a fortis consonant in isolation, however, may show a change to the corresponding lenis consonant when spoken in context. The critical factor often seems to be whether or not the consonant is immediately preceded by voicing. It is reported that in Comanche, for instance, the mere clearing of the throat may trigger the production of a lenis rather than a fortis consonant.

4) Probably related to the above factor is the role of preaspiration in some of the languages and perhaps in Proto Numic. In Mo there is no contrast between fortis stops and preaspirated stops. In medial position, therefore, Lamb writes the fortis stop series (which may be slightly preaspirated) as hp, ht, hc, hk, hq, hk^{w} and hq^{w} and the corresponding lenis series (which are never preaspirated) as p, t, c, k, q, k^{w} and q^{w}. This analysis, while fitting the Mo data and perhaps reflecting the Proto Numic structure, cannot be applied to certain other Numic languages such as Co, in which both fortis and lenis stops may occur following h (i.e., they may be preaspirated).

5) The quality of the preceding vowel is a factor in at least some of the languages. Co d is never found following a front vowel, either within a word, or, in connected speech, following a word boundary. This restriction does not apply to Co b, nor does it apply to d in certain other closely related languages (see Sh item 60).

6) Some morphemes have the characteristic, independent of their phonetic composition, of producing a change to the lenis form in a following consonant. In Co the first person morpheme, ni, is never followed in rapid speech by p or t—the corresponding lenis consonant, b or d, appears instead. Other morphemes of similar phonetic content, however, are never followed by the lenis consonants.

7) There is apparently a relationship in some of the languages between stress patterns and the occurrence of lenis consonants. Data from Ut and from SP indicate that the stress patterns control, to some degree at least, the occurrence of voiceless syllables. Since voicelessness apparently precludes the occurrence of a following lenis consonant in these and other languages, there is undoubtedly a partial correlation between stress placement and the positions within the word in which lenis consonants may be found.

The problem of preaspiration noted above requires further comment. The only language in our sample in which reaspirated stops occur extensively is Co, although three occurrences are registered for SP (84, 103, 152) and one for Sh (4). According to VVH (p. 70) Co hk is a reflex of *k after *V$_{u}$ (a vowel after which consonants are retained unaltered in most of the languages). The data presented in this paper partly support this hypothesis; Co hk corresponds most often to a plain fortis stop in each of the other languages (84, 97, 152, 160), while Co k is usually matched by ^{n}k or g. A preceding

*V_u, however, cannot account for all occurrences of preaspirated stops in Co nor for their scattered occurrence in the other languages. The present data, for instance, contain some cognate sets (20, 46, 119) in which Co hp corresponds quite regularly to unaltered p, while other sets (44, 122) support VVH's hypothesis that *p is retained in Co after *V_u. As in the case of the development of the fortis-lenis contrast, conditioning may depend on a complex set of interacting factors not readily deduced from the data.

VVH handle prenasalized stops by setting up *V_n as a nasalizing vowel after which SP but not Co or Mo stops become prenasalized. With some exceptions (68, 98, 176) the present data indicate that Sh stops are prenasalized under the same conditions as those of SP (5, 75, 78, 113, 166, 167), that Ka p (166, 167) but not other stops undergo this modification, and that the phenomenon is absent from NP. Sporadic occurrences of prenasalization occur in Ut (113), but there is much dialectical and idiolectical variation and the feature is probably in the process of disappearing from the language.

The evidence indicates that prenasalization of stops is a Proto Numic feature. From the standpoint of Numic comparisons there appears to be no advantage in postulating the morphophonemic formula *V_n rather than reconstructing prenasalized stops as such. From the standpoint of broader comparisons, however, the former procedure has certain advantages.

VVH cite the development of SP c from *t under conditions that are not clear (p. 67). Our data add a number of examples of SP c and č and Ut c as reflexes of medial *t (7, 60, 99, 105, 128). An acceptable hypothesis is that the affricate has developed contiguous to *i and *ɨ under conditions in which the fortis articulation has been retained.

The data are insufficient for even tentative conclusions regarding other possible developments involving Proto Numic stops. Preglottalization is confined to the sonorants in most Numic languages but occurs with stops in Co. Although no examples occur in the cognate sets, it is reasonable to suppose that preglottalized stops in Co are reflexes of the corresponding plain stops. The phoneme ǰ in NP may be a reflex of *c, although it is not represented in the cognate sets. Several items in the cognate sets (20, 88, 145, 168) suggest that w may at times be a reflex of *p. Also item 185 indicates g^w as a possible reflex of *p. If this is a valid reflex, it may have developed with w as an intermediate step. The alternation between k^w and w is a productive morphophonemic process in NP and the data indicate some possible k^w:w and g^w:w correspondences (61, 133, 147, 182). Two cognate sets (44, 97) suggest c as a possible reflex of *k in NP and Mo, and item 179 indicates d as a possible reflex of the same proto phoneme in Ka.

2.2. The sibilant *s is reflected consistently as s in initial position in each of the Numic languages. In medial position the following reflexes are indicated:

*-s- > Co s (40, 56?, 57, 58, 94, 116, 124?, 125, 128?, 129, 149?, 154, 155), # (110?), s- (127); Sh s (40, 56?, 57, 58, 94, 116, 124?, 128?, 129, 149?, 154, 155), # (110?), s- (127); SP s (56?, 58, 94, 128?, 149?), hs (154), č (124?), ʔ (110?), # (116?), s- (127, 129); Ut s (40, 56?, 94, 127, 128?), c (124?), ʔ (110?), # (116?), s- (129, 149?); Ka s (56?, 128?, 149?), ʔ (110?), s- (125); NP s (40, 56?, 57, 58, 94, 124?, 127, 154), z (116), c (128?), h (149?, 155), # (110?), s/z (129); Mo s (40, 58, 110?, 124?, 128?, 129), c (149?), ʒ (56?), h (155), s- (125).

The problem of sibilant-affricate correspondences was touched upon in the preceding section. Cognate sets showing the sibilant in most languages, but with one or two entries containing an affricate (56, 124, 128, 149), are indicated above followed by a question mark. VVH (p. 72) suggest the possibility of an *s > c development in listing Mo c as a reflex of *s under conditions that are not known. The present data shed little light on the problem, except to

indicate that the phenomenon is not confined to Mo.

The development of z from *s is documented for NP (116, 129). Sh also has a z phoneme which undoubtedly reconstructs to *s, but is not represented in the comparative vocabularly. Although the conditions for the development of z in these languages cannot be deduced from the data, they are probably of the same nature as those governing the development of lenis consonants from the stop series.

VVH (p. 71) list Co h as a reflex of Uto Aztecan *s after *V_s. The single item that supports this hypothesis (their item 52; my item 61) suggests that the change took place in pre-Numic times, as no s appears in the present sample. Other items, however, show h as a probable reflex of *s in NP and/or Mo (149, 155, and possibly the elements in parentheses in items 8 and 14). The data are insufficient for final conclusions regarding the conditions for this change.

The complete loss of *s or its replacement by ʔ are cited by VVH (p. 68, 71) as changes having taken place in SP and Co. Items 110 and 116 possibly contain examples of this change, but the evidence is weak. It should be observed that the change from *s to h noted above opens the way for a further change to ʔ or # (see the discussion of the reflexes of *h below).

There is one example of SP hs as a reflex of *s (154), and fuller data would probably add Co hs and ʔs, as well. It is not known how closely these developments might parallel those of preaspirated and preglottalized stops.

Initial *h is reflected as h in Co, Sh, Ka, NP and Mo, while SP and Ut have either lost all prevocalic h's or have replaced them with a glottal stop. The cognate sets indicate ʔ as the single reflex of initial *h in SP and Ut. The phonemic representation of the data, however, may be faulty at this point. It is possible that a contrast between an initial vowel, V-, and a ʔV- sequence has been overlooked. Thus VVH (p. 67–68) give ʔ as the reflex of initial *ʔ and zero as the reflex of initial *h in SP.

Medial *h is reflected in a large majority of cases as either h or zero in the Numic languages. In SP and Ut the single reflex is zero, with the possible exception of SP y in item 102 and SP ʔ in one form of item 61. Certain items (10, 90, 91, 96, 111, 118, 159, 172, 174, 181) show medial *h retained in all the languages (except SP and Ut) for which there is data. Reflexes attested by the remainder of the cognate sets in which medial *h appears are tabulated below.

*-h- > Co h (9, 61, 102?, 134, 150?); # (44?, 59, 70, 72, 77); Sh h (9, 61, 102?, 112, 134, 150?), # (44?, 59, 70, 77); Ka h (59, 70, 77, 112, 150?), # (72, 134); NP h (44? 70, 72, 77, 150), # (9, 59, 61, 112, 134), w (102?); Mo h (9, 59, 70, 77, 112, 134), # (44?, 61), ʔ (72), w (102?), h/m (150?).

The data show a close parallel between Co and Sh as to the loss of *h, but otherwise little correlation among the languages. It is impossible on the basis of the present evidence to state the conditions for the loss of *h or to explain the sporadic occurrences of other possible reflexes (72, 102, 150).

Glottal stop is retained in initial position in each of the languages. In medial position it nearly always appears as either ʔ or zero, but with a seemingly random distribution of the two reflexes. Probable reflexes of medial *ʔ are tabulated as follows:

*-ʔ- > Co ʔ (66, 95, 106, 109, 116?), # (45, 52, 74, 80, 133, 178); Sh ʔ (66, 116?), # (45, 52, 74, 80, 106, 109, 133, 178); SP ʔ (45, 73, 74, 95, 116?, 178), # (66, 80, 109); Ut ʔ (73, 106, 116?, 178), # (80, 95, 109), ʔ/# (52); Ka ʔ (52, 73); NP ʔ (45, 80, 106, 116?, 133, 178), # (52, 66, 73, 109); Mo # (45, 73, 109, 178), y (66), hy (52).

Conditions for the loss or retention of medial glottal stop are not know. The appearance of y and hy in Mo may be conditioned by a preceding *i or *i̯.

What appears in our data as a final glottal stop in Co and as a final -ʔV sequence in the other languages may be a Proto Numic

feature, although its distribution is such that its reconstruction for specific items would be difficult. It occurs most often in Co and Sh (1, 11, 26, 35, etc.), less often in NP and Mo (11, 93, etc.), and only rarely in SP and Ut (83a).

2.3. In general, the sonorants, m, n, w and y, are retained unaltered in initial position in each of the Numic languages. There is one example, however, of the development of SP ʔ (or zero?) from *w (176)

There are no examples of initial ŋ in the data. Uto Aztecan *ŋ apparently merged with *n in pre-Numic times in all but certain intervocalic environments.

In medial position the sonorants, like other consonants, show multiple reflexes. Medial reflexes of *m are tabulated below.

*-m- > Co m (19, 36, 43, 49, 54, 69, 70, 85, 86, 135, 138, 141, 148), hm (92, 139), n (140), w (2?); Sh m (37, 43, 135, 140, 141, 148), hm (92, 139), ŋʷ (19, 85, 138), w (2?, 54, 86), b (69), m- (70); SP m (36, 37, 49, 139, 141, 148), ŋʷ (2, 19, 54, 85, 86, 138, 140), ʔ (114?), # (135), m- (69, 70); Ut m (36, 139, 140, 141, 148), ŋʷ (2, 19, 86), # (114?), w ŋʷ (138), m- (69, 70); Ka m (114, 148), mm (139), w (2, 86, 138), m- (69, 70); NP m (2, 19, 36, 37, 43, 49, 54, 85, 86, 135, 138, 139, 140, 141, 148), hm (92), ŋ (114?), m- (69, 70); Mo m (36, 37, 43, 86, 135, 140), w (2, 49, 54, 85, 114?, 138, 139), # (148), m- (69, 70).

The data suggest two principal developments from medial *m. Under certain conditions m is retained in each of the languages (36, 37, 43, 141), and under other conditions it is retained only in Co and NP, while w appears in Ka and Mo, and ŋʷ (or sometimes w) in Sh, SP and Ut (2 ?, 19, 54, 85, 138). The occurrence of Ut ŋ rather than ŋʷ in item 85 can probably be accounted for on the basis of the following vowel. Sets other than those listed above show only partial conformity to the two major patterns. If it were not for the Mo forms, 148 could be added as an example of the first pattern and 86 as an example of the second. Unexpected occurrences of w and ŋʷ appear in items 49, 114, 135, 139 and 140. VVH (p. 68) give the condition for the development of SP ŋʷ from *m as its occurrence following *V_s. This suggests that the conditions which produce w or ŋʷ in some of the Numic languages are of the same nature as those which govern the development of the lenis consonants from the stop series.

In addition to the two major patterns of change from medial *m the data indicate other sporadic developments which remain unexplained. Preaspirated hm appears in Co, Sh and NP (92, 139). Sh h and b occur as probable reflexes of *m in items 49 and 69 respectively. Item 114 shows an odd variety of correspondences, which makes it suspect as an example of *m. Ka double mm appears in 139 and Mo zero in 148.

In a majority of cases medial *n remains in each of the languages (29, 50, 55, 65, 76, 79, 121, 139, 162, 163, 164, 177). Sets showing multiple reflexes of *-n- are given in the following paragraph.

*-n- > Co n (107, 108?, 115, 173), hn (13, 38, 80, 104); Sh n (80, 107, 173), hn (13, 38, 108), h (104), # (115); SP n (38, 108, 115, 173), # (107), n- (80); Ut n (38, 108, 115), # (104, 107), n- (80); Ka nn (108); NP n (80, 107, 115, 173), ŋ (108), h (13, 104); Mo n (107), nn (115), ʔn (173), h (13, 108).

Few conclusions are possible regarding conditions for these developments. There does not appear to be any widespread pattern of change comparable to the development of lenis consonants in the stop series, or of w and ŋʷ from *m. The reflexes nn, n, hn, h and zero, however, might represent progressive degrees of 'weakening' brought about by some of the conditions which have produced lenis consonants.

Item 173 contains one of the few examples of a preglottalized sonorant in the data. There is reason to believe that fuller data would add examples from Co, Ut, NP, Mo and possibly SP. Contemporary Sh data may shed some light on the development of preglottalized sonorants. Preglottalization

in Sh is a predictable feature of all sonorants in final syllables preceded immediately by a stressed syllable: ['no?yO] noyo *egg*.

Non-labialized velar nasals appear only in SP, NP and, to a lesser extent, in Ut. The data suggest that Uto Aztecan *ŋ is retained in these languages only between vowels of the class /a ɨ o/. Probable reflexes of *ŋ are given below.

*-ŋ- > Co n (12, 87, 142, 146?), hn (3, 11, 184), m (130), # (131); Sh n (12, 87, 146?), hn (3, 11, 184), ⁿk (142), w (131), # (130); SP ŋ (3, 11, 142, 184), ?ŋʷ (146?), # 12, 130, 131); Ut ŋ (142), ?ŋʷ (146?), # (12, 87, 130, 131); Ka n (142), # (130, 131); NP ŋ (11, 12, 87, 130, 131, 142); Mo n (130), nn (142), m (12), w (11, 131).

In general, the data indicate that *ŋ has been retained in NP, that it has been either retained or replaced by zero in SP and Ut, and that in the other languages it has been replaced by a variety of reflexes, including n, nn, hn, m, w, ⁿk and zero. The conditions governing these changes are not known, except that there is evidence that the zero reflex may be analogous in its development to the lenis consonants. VVH (p. 69), for instance, cite the loss of *ŋ in SP after *V$_s$. Their example of the loss of *n in SP under similar conditions probably involves *ŋ rather than *n (their item 166; my item 130).

Data for medial *w and medial *y are so meager that these may be considered suspect as proto Numic features. Most examples of medial w in the present data are reflexes of *m, *ŋ, *kʷ or *p. Items 1 and 34 may show medial *w retained in Mo, but lost in the other languages. Set 96 contains w in most of the forms but SP ŋʷ suggests that these may be reflexes of *m or *ŋ. Examples of medial w in set 156 may have developed from the preceding u. Item 129 may contain a genuine example of *w, although the Sh form has gʷ as an alternate.

Most occurrences of a medial y in the data have been eliminated from the comparison for one reason or another and have been placed in parentheses in the comparative vocabulary (81, 89, 91, etc.). Of the remaining occurrences, Mo hy (52) and y (66) have apparently developed from *? and SP y (102) from *h. Set 82 has so few cognates that no conclusions are possible concerning Co ?y and SP y in this item.

3. Cognate items are listed in the following order: Comanche (Co), Wind River Shoshone (Sh), Southern Paiute (SP), Ute of the Southern Ute and Ute Mountain Reservations (Ut), Kawaiisu (Ka), Duck Valley Northern Paiute (NP), and Northfork Mono (Mo). Items of doubtful status as members of a cognate set are marked (?). Elements in parentheses are excluded from the comparison. Some of these are clearly isolable as morphemes in the present-day languages; others are not. English glosses often indicate only approximately the semantic range of the native terms. Reconstructed consonants are indicated following each cognate set.

1. Co ?áa?, Sh ?aa?a, SP ?áa(pɨ), Ut ?áa(pɬ), Ka ?aa(pɨ), NP ?a, Mo ?a(wa) *horn*. *?

2. Co wá(hcɨ) (?), Sh wa(cɨ) (?), SP ?aŋʷá(taⁿpɨ), Ut ?aŋʷá(tapɬ), Ka ?awa-(tubiina), NP ?amá(tabɨ), Mo ?awa(wono) *ribs*. *? *m

3. Co ?áhna, Sh ?ahna, SP ?aŋá(bu) *armpit*. *? *ŋ

4. Co ?áhda(bɨ), Sh ?ahda(bɨ), SP ?atá-(gɨbi), Ka ?ata(bɨmi), NP ?adá(bɨ), Mo ?ada(bɨ) *jaw*. *? *t

5. Co ?éka-, Sh ?eⁿka(biti), SP ?aⁿqá-, Ut ?aká(gadɬ), Ka ?aga(kidɨ), Mo ?aqa(bono) *red*. *? *k

6. Co ?éekO, ?éko, Sh ?eku, SP ?agú-, Ut ?agʷó(bɬ), Ka ?egu(ⁿpi), NP ?igó, Mo ?ego *tongue*. *? *k

7. Co ?éetɨ, Sh (huu)?eti, SP ?áčɨ, NP (wá)?adɨ, Mo ?edɨh *bow*. *? *t

8. Co ?ɨ(sɨ), Sh ?i(sɨ), SP ?i-, Ut ?ɨ(cɬ), NP ?i (sú), Mo ?i(hi) *this*. *?

9. Co ?óha-, Sh ?oha(piti), SP ?uá(qadɨ), Ut ?ɨá(kadɬ), NP ?oá-, Mo ?oha *yellow*. *? *h

10. SP ʔuú(bɨ), Ut ʔɨ́(bɬ), Ka ʔohoo(bɨ), NP ʔohó, Mo ʔoho *bone.* *ʔ *h

11. Co ʔohnáa ʔ, Sh ʔohna ʔa, SP ʔɨŋáa-, NP ʔoŋá ʔa, Mo ʔowaa ʔa *baby.* *ʔ *ŋ

12. Co ʔónaa(bi), Sh ʔonaa(bi), SP ʔuá(bi), Ut ʔɨá(bI), NP ʔoŋá(bi), Mo ʔoma *salt.* *ʔ *ŋ

13. Co ʔóhni-, Sh ʔohni-, NP ʔohí, Mo ʔohi *to cough.* *ʔ *n

14. Co ʔó(sɨ), ʔú(sɨ), Sh ʔu(sɨ), SP ʔu-, NP ʔu(sú), Mo ʔu(hu) *that.* *ʔ

15. Co ʔɨ́(ni), Sh ʔɨ(nɨ), SP ʔí(mi-), Ut ʔɨ́(mɬ), NP ʔɨ́, Mo ʔɨ *you (sg.).* *ʔ

16. Co ʔɨ́ci(ʔitɨ), Sh ʔɨʒi(ⁿti), SP si- (?), Ut sɬ(pídai) (?), NP ʔɨʒí(ci) *cold.* *ʔ *c

17. Co ʔɨ́ki(bicI), Sh ʔɨgɨ(bici), Ut ága(dɬ) *new.* *ʔ *k

18. Co ʔɨ́kʷi-, Sh ʔɨgʷiʔi, SP ʔugʷí-, Ut ʔugʷí, Ka ʔugʷi(dɨ), NP ʔigʷí, Mo ʔegʷi *to smell.* *ʔ *kʷ

19. Co ʔíma-, Sh ʔiŋʷa(tɨ), SP ʔuŋʷá-, Ut ʔuŋʷá(dɬ), NP (pá)ma *rain.* *ʔ *m

20. Co ʔíhpii-, Sh ʔipii-, SP ʔapíi-, Ut pií, NP ʔíʔwí (?), Mo ʔiwi (?) *to sleep.* *ʔ *p

21. Co ʔídɨ(ʔitɨ), Sh ʔɨdɨ(ⁿti), SP (ta)dú-(ʔi), Ut (tɨ́)di(ci), NP ʔɨdí(tɨ), Mo ʔɨdiʔɨ *hot.* *ʔ *t

22. Co cáka-, Sh caⁿka-, Ut caká-, NP caká *to lead by the hand.* *c *k

23. Co cih-, ciʔ-, Sh ci-, SP ci-, NP ci- *prefix indicating pointed object.* *c

24. Co (tá)ci(nupi), Sh (ta)ʒi(uⁿpi), SP (púu)ci(bi), Ut (púu)ci(bɬ), Ka (pu)cii(bɨ), Mo (ta)ʒi(nuh) *star.* *c

25. Co coʔ-, SP ču-, Ut cu-, Mo coh- *prefix referring to the head.* *c

26. Co (huh)cúuʔ, Sh (hu)cuʔu, SP (wi)cíʔ-, Ut (wi)cí(cɬ), NP (hu)ʒí(baʔa), Mo cii(paʔa) *bird.* *c

27. Co háicI, Sh haiⁿci, NP háiʒi *friend.* *h *c

28. Co háka(dɨ), Sh haga(dɨ), SP ʔagá-, Ut ʔagá(dɬ), NP hagá, Mo haqe *who, which one.* *h *k

29. Co háni-, Sh hani-, Ut ʔoní-, NP haní *to do.* *h *n

30. Co hábi-, Sh habi-, SP ʔabí, Ut ʔabí, NP habí *to lie down.* *h *p

31. Co hí(na), Sh hi(nɨ), SP ʔi(ní-), Ut ʔí(pɬ) (?), NP hi, Mo hii(pɨ) *what.* *h

32. Co híbi-, Sh hibi-, SP ʔibí-, Ut ʔibí, NP hibí, Mo hibi *to drink.* *h *p

33. Co hóda-, Sh hoda-, SP ʔudá- *to dig.* *h *t

34. Co ka(húuʔ), Sh kaa(kɨ), SP qáa-, Ut ká(tacɬ), Ka kaa(ʒe), NP ka, Mo qa(wa) *rat.* *k

35. Co káku ʔ, Sh kagu ʔu, SP kagú-, Ut kagú(cɬ) *grandmother.* *k *k

36. Co káma-, SP qamá-, Ut kamá-, NP kamá, Mo qama *to have a taste.* *k *m

37. Sh (tosa)kamɨ, SP qámɨ, NP kamí, Mo qamɨ *jackrabbit.* *k *m

38. Co káhni, Sh kahni, SP qáni, Ut kánI *house.* *k *n

39. SP qáiba, Ut káabɬ, NP káiba *mountain.* *k *p

40. Co kása, Sh kasa, Ut kɬsí(abI), NP kasá, Mo qasa *feather, wing.* *k *s

41. Co kádɨ-, Sh kadɨ-, SP qadí-, Ut kadí-, Ka kada, NP katí, Mo qatɨ *to sit.* *k *t.

42. Co kée, ke, Sh keʔe, SP qa, qáa(čɨ), Ut ká(cɬ), NP kai, Mo qa(tuʔu) *no.* *k

43. Co kíma-, Sh kima, NP kimá, Mo kima *to come.* *k *m

44. Co kíipɬ, Sh kiipɨ, SP kípɨ, Ut kiípɬ, NP (ma)cíhi (?), Mo (ma)kiibɨ *elbow.* *k *h (?) *p

45. Co kóoi-, Sh koi(pɨ), SP quʔú-, NP kóʔi, Mo qoi *to kill (pl).* *k *ʔ

46. Co kóhpa-, SP qupú-, Ut kApí-, Ka kopa(katikʷedɨ), Mo qo(di) (?) *to break.* *k *p

47. Co kóbe, Sh kobe, SP qubá(bi), Ut kobá(bɬ), Ka kobi(bi), NP kobá, Mo qobe *face.* *k *p

48. Co kúhcuʔ, Sh kʷícu(ⁿpuⁿku), SP kúču, Ut kɬcú(pukɬ), NP kucú *buffalo, cow.* *k *c

49. Co kúma(hpɨʔ), Sh kuha(pɨʔɨ), SP kumá-, NP kumá, Mo kuwa *husband.* *k *m

50. Co kúna, Sh kuna, SP kúna, Ka kuna, NP kuná, Mo kuna *fire, firewood.* *k *n

51. SP kudá(bi), Ut kudá(bɬ), Ka kudo(be), NP kutá, Mo kuta *neck.* *k *t

52. Co kí(hcia-), Sh ki(cia-), SP ki?í-, Ut ki?í-, kií-, Ka ki?i(di), NP kií, Mo kihyi *to bite.* *k *?

53. Co kíka, Sh kiⁿka, NP kigá *onion.* *k *k

54. Co kíma-, Sh kiwi?i, SP kiŋʷá, NP kimá, Mo kiwa *edge.* *k *m

55. Co kʷána-, Sh kʷana(ti), SP kʷaná-, Ut koná(dɬ), NP kʷaná *smelly.* *kʷ *n

56. Co kʷási, Sh kʷesi, SP kʷasí, Ut kʷAsí(bI), Ka kosi(bi), NP kʷasí, Mo qʷaʒi *tail.* *kʷ *s or *c

57. Co kʷásu?U, Sh kʷasu(pi), NP kʷasí *dress, shirt.* *kʷ *s

58. Co kʷási-, Sh kʷasi(pi), SP kʷasí(pi), NP kʷasí(pi), Mo qʷasi *cooked, ripe.* *kʷ *s

59. Co kʷíi(pɬ), Sh kʷii(pi), SP kʷií-, Ut kʷií(kadɬ), Ka kʷihi(pi), NP kʷí(dati), Mo kuhih *smoke.* *kʷ *h

60. Co kʷíta(pɬ), Sh kʷida(pi), SP kʷičá(pi), NP kʷidá(pi), Mo kʷida(pi) *excrement.* *kʷ *t

61. Co kʷíhi-, Sh kʷihi-, SP kʷií-, kʷi?í-, NP kʷi, Mo wii *to take.* *kʷ *h

62. Co kʷíhti-, Sh kʷiti-, NP kʷatí *to shoot.* *kʷ *t

63. SP mái-, NP mai(yí) *to find.* *m

64. Co máka-, Sh maga-, SP magá-, Ut magá-, NP maká, Mo maqa *to give, feed.* *m *k

65. Sh manaigi(ti), SP manigi-, Ut manígi(ni), Ka minaga(yu), NP manígi, Mo manigi *five.* *m *n *k

66. Co mí?a-, Sh mi?a-, SP miá-, NP miá, Mo miya *to walk.* *m *?

67. Co mó?o, ma-, Sh mo?o, ma-, SP mú?u, ma-, Ut mí?ɬ, ma-, Ka mo?o-, NP mai, Mo ma(ya), mah *hand.* *m

68. Co mócO, Sh moco, SP múⁿcu, NP mozúi *beard.* *m *c

69. Co (?áni)mui, Sh (?ani)bui, SP múu(pica), Ut mó(piwiacɬ), Ka muu(piʒe), NP muí(bi), Mo mui(bi) *fly.* *m

70. Co (síhi)mu(picI), Sh mu(ⁿpici), SP muú(pici), Ut moó(picɬ), Ka muhu(ce), NP muhú?u, Mo muhu *owl.* *m *h

71. Co múbi, Sh mubi, SP mubí-, Ut mibí-, NP mubí, Mo mubi *nose.* *m *p

72. Co mía, Sh mia?a, SP miá-, Ut maá-(towacɬ), Ka mia(ʒe), NP muhá, Mo (ta)-mi?a *moon.* *m *h

73. SP na?ái-, Ut na?á-, Ka ne?e(di), NP naí, Mo nai *fire, to burn.* *n *?

74. Co nái(?bi), Sh nai(bi), SP na?ái-*girl.* *n *?

75a. Co náka-, Sh naⁿka-, SP naⁿqá-, Ut niká-, NP naká, Mo naqa *to hear.* *n *k

75b. Co nákI, Sh neⁿki, SP naⁿqá(ba), Ut niká(bɬ), Ka naga(bibi), NP naká, Mo naqa *ear.* *n *k

76. SP naná(pici), NP naná, Mo nana *man, grown.* *n *n

77. Co náahbai(hti), Sh naabai(ti), SP nabái-, Ut nabái(ni), Ka nabaha(yu), NP nápahi(?yu), Mo naabahi *six.* *n *p *h

78. Co nápe, Sh naⁿpe, SP náⁿpa, Ut napá(bɬ) *foot.* *n *p

79. Co nádinoo?, Sh nadino?o, NP nadíno?o *saddle.* *n *t *n

80. Co (ná)hnia, Sh (na)nia, SP niá-, Ut niá(bɬ), NP (na)ní?a *name.* *n *?

81. Co nó(yo), Sh no(yo), SP nu(aga), NP no, Mo no(yo) *egg.* *n

82. Co nó?yaa-, SP nuyú(ga-) *to boil.* *n *y (?)

83a. Co ni?, Sh ni?i, SP ní?i, Ut ní?ɬ, NP ni, Mo nii *I.* *n

83b. Co ní(ni), Sh ni(mi?i), SP ni(mi-), Ut ní(mɬ), NP ni(mí), Mo nii(kʷa) *we (excl).* *n

84. Co níhka-, Sh nika(di), SP (tuú)-nihqa(pi), Ut nɬká-, Ka nika(pi), NP niká, Mo niga *dance.* *n *k

85. Co nímí, Sh niŋʷi, SP niŋʷú(ⁿpi), Ut núŋu(pɬ), NP nimí, Mo niwi *liver.* *n *m

86. Co nímí, Sh niwi, SP níŋʷi, Ut níŋʷi(cɬ), Ka niwi, NP nimí, Mo niimi *person.* *n *m

87. Co nínapɬ, Sh ninápi, Ut niábi, NP niŋábi *chest.* *n *ŋ *p

88. SP nɨbá(bi), Ut nuwái(bɨ), Ka nɨbo-(bi), NP nɨbá(bi), Mo nɨba *snow.* *n *p

89. Co páa, Sh paa?a, SP páa, Ut páa, NP pa, Mo pa(ya) *water.* *p

90. Co páhabɨ-, Sh pahabi-, NP paháb, Mo pahabi *to swim.* *p *h *p

91. Co páhi(htɨ), Sh pahai(ti), SP pai-, Ut paí(ni), Ka pehe(yu), NP pahí(?yu), Mo pahi *three.* *p *h

92. Co páhmU, Sh pahmu, NP pahmú *tobacco.* *p *m

93. Co pábi? Sh pabi?i, SP pabí-, Ut pabí(cɬ), Ka pabi(ne), NP pabí?i, Mo pabi?i *older brother.* *p *p

94. Co pása-, Sh pasa(pɨ), SP (ta)básu-, Ut (ta)bás(koapɬ), NP pasá(pɨ) *dry.* *p *s

95. Co pá?atɨ, SP pa?átu(gu-), Ut páto-(watA) *long.* *p *? *t

96. Co píhɨwa(htɨ), SP paŋʷáa-, Ka powaha(bɨ), NP pawáha(bɨ), Mo pawaha *meadow, prairie.* *p *w (?) *h

97. Co péhka-, Sh peka-, SP paqá-, Ut pAká-, Ka paka(dɨ), NP pacá (?), Mo paca (?) *to kill.* *p *k

98. Co pékʷi, Sh pⁿkʷi, SP pagí, Ut pagíɨ, Ka pagɨ(ʒe), NP pakʷí Mo pakʷi *fish.* *p *kʷ

99. Co pétí?, Sh pedi?ɨ, SP pací-, Ut pácɬ, Ka pedɨ(ne), NP pádi, Mo pedɨ *daughter.* *p *t

100. Co pía?, Sh pia?a, SP pía, piá(bi), Ut piá(bɬ), Ka piya(ne), NP pía, Mo piya *mother.* *p

101a. Co pícii?, SP píici(bi), NP piʒá *breast.* *p *c

101b. Co píci(pɬ), Sh píʒi?i, NP piʒá *milk.* *p *c

102. Co píhi, Sh pihi, SP píyɨ, NP piwí, Mo piwɨ *heart.* *p *h (?)

103. SP (su)hpíki, Ut (sA)píki(bɬ), Ka (woy)biki(be), Mo (co)pigi *brains.* *p *k

104. Co pihnáa?, Sh pihia?a, Ut piá-(dAmatɬ), NP pihá(bi) *sugar.* *p *n

105. Co pitɨ-, Sh pidɨ-, SP picɨ-, Ut picí, NP pití, Mo pitɨ *to arrive.* *p *t

106. Co pó?aa, Sh poa(ⁿpɨ), Ut pí?a(bɬ), NP po?á, *bark, skin.* *p *?

107. Co (to)poni(htɨ), Sh (to)ⁿponi(ti), SP pu(tú-), Ut píɨ(tAkʷadɬ), NP (pací)-puno(?a), Mo (?atɨ)pono *round.* *p *n

108. Co pisunɨi? (?), Sh pohnia(ci), SP puní, punía, Ut pɨní, Ka ponnia, NP poŋí(ja), Mo pohi(ta) *skunk.* *p *n

109. Co pú?e, Sh pue-, SP púu, Ut píɨ, NP po, Mo po(yo) *path.* *p *?

110. Co púih, Sh pui, SP pu?úy, pu?í-, Ut pu?í(bɬ), Ka pu?i(bi), NP puí, Mo pusi *eye.* *p *s (?)

111. Co púha, Sh puha(gaⁿtɨ), SP puá-, NP pɨhá, Mo puha *supernatural power.* *p *h

112. Sh puhui(geti), Ka puhi(gidɨ), NP puí-, Mo puhi *green.* *p *h

113. Co púku, Sh puⁿku, SP púⁿku, Ut púⁿkɬ, Ka pugu(ʒe), NP pugú, Mo puku *dog, horse.* *p *k

114. SP pu?íca(ci), Ut pucá(cɬ), Ka pumica(diʒe), NP poŋáʒi, Mo puweʒi *mouse.* *p *m (?) *c

115. Co púni-, Sh pui-, SP pɨní-, Ut pɨní-, NP puní, Mo punni *to see.* *p *n

116. Co púsi?a, Sh pusia?a, SP pú?a- (?), Ut pí?a(bI) (?), NP puzí?i *louse.* *p *s *? (?)

117. Co pí(da), Sh pu(yu), NP pɨ(hí), Mo pɨ(yɨ) *duck.* *p

118. Co píhɨ, Sh pɨhɨ, SP píɨ(bɨ), Ut puú(bɬ), Ka pɨhɨɨ(bɨ), NP pɨhí, Mo pɨhɨ *feather, hair, fur.* *p *h

119. Co píihpi, Sh pɨipi, SP paípi, Ut paápɬ, Ka pɨipi, NP pípi, Mo paapi *blood.* *p *p

120. Co pída, Sh pɨda, SP pída, Ut pɨdá(bɬ), Ka pɨda(bubbi), NP pɨtá, Mo pɨta *arm.* *p *t

121. Co sána(hpi), Sh sana(geti), SP saná(pi), Ut saná(kʷoabI), NP saná(ka?yu) *sticky, gum.* *s *n

122. Co sápɬ, Sh sapɨ, SP sapí-, Ut sápɬ, NP sapí *stomach.* *s *p

123. Co sádii?, Sh sadi?i, SP sadíi-, Ut sadíi(cɬ), NP sadí?ɨ *dog.* *s *t

124. Co (?étɬ)si(pɬ), Sh (ku)si(pɨ), SP (ku)čá- (?), Ut (kɬ)cá(pɬ) (?), NP (kutú)-si(ba), Mo (?e)si(ya) *ashes.* *c or *s

125. Co (pi)sikóo(ʔi), Ut (pibí)sokʷa(i), Ka sigo(ydi), Mo sigo *to slide.* *s *k

126. Co síiku, Sh siigu, SP sigú-, Ut sigí *navel.* *s *k

127. Co síbe-, Sh sibe-, SP sibá-, Ut (kI)síbai, NP (wi)sípi *to scrape.* *s *p

128. Co (má)sito, Sh (ta)sitoʔo, SP (ma)síčuu(bi), Ut (ma)sicú-, Ka (ta)sito-(bbi), NP (ma)cídu, Mo (ma)sidu *claw, fingernail.* *c or *s *t

129. Co (pá)siwa(pi), Sh (pa)sigʷa(ⁿpi), (pa)siwa(ⁿpi), SP siu-, Ut siuwá(ⁿpɬ), NP (pa)síwa(bi), (pa)zíwa(bi), Mo (pa)siwah *sand.* *s *w (?)

130. Co sómo, Sh soo(ⁿko), SP suú(bi), Ut sɨ́(pI), Ka soo(bi), NP soŋó. Mo sono *lungs.* *s *ŋ

131. Co súa(hketi), Sh suwa-, SP suá(kai), Ut siá(kai), Ka soo(kʷidi), NP soŋáha, Mo suwa(ka) *to breathe.* *s *ŋ

132. Co súpa(naʔi-), Sh suⁿpa(di), NP subí(dagʷatu) *to know.* *s *p

133. Co súwaai-, Sh suwai(ⁿti), NP sugʷáʔi *to want.* *s *kʷ or *w *ʔ

134. Co síhi(bi), Sh soho(bi), SP sii-, Ka sii(bi), NP sí(bi), Mo sihi *willow.* *s *h

135. Co símiʔ, Sh simiʔi, SP suu-, Ut suwí(sɬ), NP simí(ʔyu), Mo simiʔi *one.* *s m*

136. Co ta-, Sh ta-, SP ta-, Ut ta-, Ka ta-, NP ta-, Mo ta- *prefix referring to the foot.* *t

137. Co táca(ti), Sh taci, SP táča, Ut tácA, tacá(tɬ), Ka taʒa, NP taʒá, Mo taʒa(wano) *summer.* *t *c

138. Co táma, Sh taŋʷa, SP táŋʷa, Ut táwA, taŋʷá(tɬ), Ka tawa(ⁿpi), NP tamá, Mo tawa *tooth.* *t *m

139. Co tahmani-, Sh tahmani, SP tamána, Ut tamána(tɬ), Ka tammana, NP tamánu, Mo tawano *spring.* *t *m *n

140. Co táni, Sh tamiʔi, SP taŋʷa-, Ut támI, NP tamí, Mo tami *we (incl.).* *t *m

141. Co támU, Sh tamu, SP tamú(bi), Ut támU, NP tamú *sinew, thread.* *t *m

142. Co tána(pɬ), Sh taⁿka(pi), SP taŋá-, Ut táŋA, taá(bI), Ka tanaa(mi), NP taŋá(pisa), Mo tonno(bodo) *knee.* *t *ŋ

143. Co tábe, Sh tabe, SP tába, Ut tabá (cɬ), Ka tabe, NP tabá, Mo tabe *sun.* *t *p

144. Co táiboo?, Sh taibo?o, NP táibo *white man.* *t *p

145. Co tabú(?kina?), Sh tabu, SP tabú-, Ut tabú(cɬ), NP tabúʔu, Mo teewa (?) *rabbit.* *t *p

146. Co téna(hpiʔ), Sh tena(piʔi), SP taʔŋʷá-, Ut taʔŋʷá(cɬ) *man.* *t *ŋ (?)

147. Sh togoaʔa, SP (pa)dúgua(bi), Ut togʷóa(bɬ), Ka togowa, NP togógʷa, Mo toqoqʷa *snake.* *t *k *kʷ or *w

148. Co tómo-, Sh tomo, SP túmu, Ut timí(tɬ), Ka tomo, NP tomó, Mo too(wano) *winter.* *t *m

149. Co tósa-, Sh tosa(biti), SP tusá-, Ut sá(gadɬ), Ka toso-, NP tohá-, Mo toci *white.* *t *c or *s

150. Co túhu-, Sh tuhu(biti), SP túu-(kʷadi), Ut tuú(kʷadɬ), Ka tuhu(kʷidi), NP tuhú-, Mo tuhu-, tumu *black.* *t *h (?)

151. Co túka(ni). Sh tuga(nipi), SP tugʷá-, Ut tugʷá(natɬ), Ka tugʷo(no), NP togá(nu), Mo toga *night.* *t *k

152. Co túhku, Sh tuku, SP tuhkú(abi), Ut tUkú(ʔabI), NP tukú *flesh.* *t *k

153. Co túibihciʔ, Sh tuibiciʔi, NP túibici *young man.* *t *p *c

154. Co túsu-, Sh tusu, SP tuhsú-, NP tusú *to grind.* *t *s

155. Co túsi-, Sh tusi, NP tuhí, Mo tuhi *to spit.* *t *s

156. Co túaʔ, Sh tuaʔa, SP tua-, Ut towá(cɬ), Ka tuwaa(na), NP túa, Mo tuwa *son.* *t

157. Co tí(hoi-), Sh ti(hoi-), SP ti(náa-), Ut ti(náʔawani), NP ti(hiáwai), Mo to-(yaniwi) (?) *to go hunting.* *t

158. Co tíe(ti), Sh tie-, SP -tua(ci-), NP tí(ciʔyu) *small.* *t

159. Co tíhi(ya), Sh tihi(yaʔa), SP ti(gía), Ut tií, NP tihí(ja), Mo tihi(ta) *deer, horse.* *t *h

160. Co tíhka-, Sh tika, SP tiqá-, Ut tɬká-, NP tiká, Mo tika *to eat.* *t *k

161. Co tíki-, Sh tigi, SP tigá, Ut tigá-, NP tigí, Mo tigi *to put.* *t *k

162. Co tína(hyaa-), Sh tina(ya-), SP tiná- *to pursue.* *t *n

163. Co (tí)dana, Sh (ti)dina, SP tiná(bi), Ut tiná(bɬ), NP tiná *root.* *t *n

164. Co tínikʷi-, Sh tinikʷi, SP tinía- (?), NP tinikʷi *to sing, to tell.* *t *n *kʷ

165. Sh tiba, SP tíba, NP tipá, Mo tipa?a *pine nut.* *t *p

166. Co típe, Sh tiⁿpe, SP tíⁿpa, Ut túpA, Ka tíⁿpi(bi), NP tipá, Mo tipe *mouth, lips.* *t *p

167. Co típi, Sh tíⁿpi, SP tíⁿpi, Ut tipí(cɬ), Ka tiⁿpi, NP tipí, Mo tipi *stone.* *t *p

168. Co tíbicI, Sh tibici, SP tibici-, Ut tuwísa(pɬ) (?), NP tibíci *very.* *t *p *c

169. Co (?ó)htapɬ, SP tibí-, Ut tibú(pɬ), Ka tiipi, NP típa, Mo tibih, tibooh *earth.* *t *p

170. Co tíhbi, Sh tibi(gi), SP tibí-, NP tibí(hi) *skin, hide.* *t *p

171. Sh wacu(witi), SP waci(ŋʷi-), Ut wɬcú(ini), Ka wacu(yi), NP wací(gʷi?yu), Mo waʒi *four.* *w *c

172. Co wáhah-, Sh waha(tiwa), SP waa-, Ut waá(ni), Ka waha(yu), NP wahá-(?yu), Mo waha *two.* *w *h

173. Co wána(pɬ), Sh wana(pi), SP wána, NP waná(pi), Mo wa?naa(qa) *cloth, net.* *w *n

174. Co wíhi, Sh wihi, SP wií(ci), Ut wií(cɬ), Ka wihi(ce) NP wihí, Mo wihi *knife.* *w *h

175. Co wíhtua, Sh witua?a, NP witúa, widúa *bucket, pot.* *w *t

176. Co wóko(bi), Sh woⁿko(bi), SP ?ugú(ⁿpi), NP wogó(pi), Mo woqo *pine.* *w *k

177. Co wíni-, Sh wini-, SP winí-, Ut winí-, Ka wini(di), NP winí, Mo winih *to stand.* *w *n

178. Co (tí)yaai-, Sh (ti)ye-, SP yá?a, Ut yá?a-, NP ya?í, Mo (ti)ya- *to die.* *y *?

179. Co yáke-, Sh yaga-, SP yagá-, Ut yagá-, Ka yade(di) (?), NP yaká, yagá, Mo yaga *to cry.* *y *k

180. Co yá(hne-), Sh ya(hnai), SP (ki)yá-, Ut (ki)á(nibatɬ), Ka (ki)ya(di), Mo ya(wi) *to laugh.* *y

181. Co yúhu, Sh yuhu, SP yuú-, Ut yuú(bɬ), Ka yihuu(bi), NP yuhú, Mo yuhu *grease.* *y *h

182. Co yíwi-, Sh yuwi(kʷa), SP yi?í(ki), Ut yi?í(kI), NP yigʷí, Mo yikʷi *to swallow.* *y *kʷ or *w

183. Co yíci-, Sh yiʒi-, SP yáasa- (?), Ut yícɬ, Ka yoʒi(di), NP yocí, Mo yoci *to fly.* *y *c

184. Co yíhni, Sh yihni, SP yiŋí- *porcupine.* *y *ŋ

185. Co yíba(na), Sh yiba(ni), SP yibá(na), Ut yugʷá(nata), Ka yibu(na), Mo yiba *autumn.* *y *p

INDEX. arm 120, armpit 3, arrive 105, ashes 124, autumn 185, baby 11, bark 106, beard 68, bird 26, bite 52, black 150, blood 119, boil 82, bone 10, bow 7, brains 103, break 46, breast 101a, breathe 131, brother 93, bucket 175, buffalo 48, burn 73, chest 87, claw 128, cloth 173, cold 16, come 43, cooked 58, cough 13, cow 48, cry 179, dance 84, daughter 99, deer 159, die 178, dig 33, do 29, dog 113, 123, dress 57, drink 32, dry 94, duck 117, ear 75b, earth 169, eat 160, edge 54, egg 81, elbow 44, excrement 60, eye 110, face 47, feather 40, 118, feed 64, find 63, fingernail 128, fire 50, 73, firewood 50, fish 98, five 65, flesh 152, fly 69, 183, foot 78, 136, four 171, friend 27, fur 118, girl 74, give 64, grandmother 35, grease 181, green 112, grind 154, grown 76, gum 121, hair 118, hand 67, head 25, hear 75a, heart 102, hide 170, horn 1, horse 113, 159, hot 21, house 38, hunt 157, husband 49, I 83a, jackrabbit 37, jaw 4, kill 45, 97, knee 142, knife 174, know 132, laugh 180, lead 22, lie 30, lips 166, liver 85, long 95, louse 116, lungs 130, man 76, 146, 153, meadow 96, milk 101b, moon 72, mother 100, mountain

39, mouse 114, mouth 166, name 80, navel 126, neck 51, net 173, new 17, night 151, no 42, nose 71, one 135, onion 53, owl 70, path 109, person 86, pine 176, pine nut 165, pointed 23, procupine 184, pot 175, power 111, prairie 96, pursue 162, put 161, rabbit 37, 145, rain 19, rat 34, red 5, ribs 2, ripe 58, root 163, round 107, saddle 79, salt 12, sand 129, scrape 127, see 115, shirt 57, shoot 62, sinew 141, sing 164, sit 41, six 77, skin 106, 170, skunk 108, sleep 20, slide 125, small 158, smell 18, smelly 55, smoke 59, snake 147, snow 88, son 156, spit 155, spring 139, stand 177, star 24, sticky 121, stomach 122, stone 167, sugar 104, summer 137, sun 143, swallow 182, swim 90, tail 56, take 61, taste 36, tell 164, that 14, this 8, thread 141, three 91, tobacco 92, tongue 6, tooth 138, two 172, very 168, walk 66, want 133, water 89, we 83b, 140, what 31, which 28, white 149, white man 144, who 28, willow 134, wing 40, winter 148, yellow 9, you 15.

4. Bibliography of references cited now follows.

E. Canonge, Voiceless Vowels in Comanche, IJAL 23.63–67 (1957).

——, Comanche Texts, Norman, Oklahoma, 1958, 169 pp.

J. B. Casagrande, Comanche Baby Talk, IJAL 14.11–14 (1948).

——, Comanche Linguistic Acculturation, IJAL 20.140–151, 217–237 (1954), 21.8–25 (1955).

K. Hale, Internal Diversity in Uto-Aztecan, IJAL 24.101–107 (1958), 25.114–121 (1959).

J. P. Harrington, The Phonetic System of the Ute Language, University of Colorado Studies 8.199–222 (1910).

S. Klein, Comparative Mono-Kawaiisu, IJAL 25.233–238 (1959).

A. L. Kroeber, Shoshonean Dialects of California, UCPAAE 4.65–165 (1906).

——, Notes on the Ute Language, AA 10.74–87 (1908).

——, The Bannock and Shoshoni Languages, AA 11.266–277 (1909).

——, Notes on Shoshonean Dialects of Southern California, UCPAAE 8.256–262 (1909).

S. M. Lamb, Northfork Mono Grammar, University of California (Berkeley) Doctoral Dissertation, 1958.

——, Linguistic Prehistory in the Great Basin, IJAL 24.95–100 (1958).

S. Liljeblad, Bannack I: Phonemes, IJAL 16.126–131 (1950).

W. L. Marsden, The Northern Paiute Language of Oregon UCPAAE 20.175–191 (1923).

W. R. Miller, Review of The Sparkman Grammar of Luiseño by A. L. Kroeber and George William Grace, Lg 37.186–189 (1961).

G. Natches, Northern Paiute Verbs, UCPAAE 20.245–259 (1923).

H. Osborn and W. Smalley, Formulae for Comanche Stem and Word Formation, IJAL 15.93–99 (1949).

V. Riggs, Alternate Phonemic Analyses of Comanche, IJAL 15.229–231 (1949).

E. Sapir, Some Fundamental Characteristics of the Ute Language, Science 31.350–352 (1910).

——, Southern Paiute and Nahuatl, JSAP 10.379–425, 11.443–488 (1913–1919), AA 17.98–120, 306, 328 (1915).

——, The Southern Paiute Language, Proceedings of the American Academy of Arts and Science 55.1–730 (1930).

D. B. Shimkin, Shoshone, IJAL 15.175–188, 203–212 (1949).

W. A. Smalley, Phonemic Rhythm in Comanche, IJAL 19.297–301 (1953).

C. F. and F. M. Voegelin and K. L. Hale, Typological and Comparative Grammar of Uto-Aztecan: I (Phonology), IUPAL 17, 1962.

T. T. Waterman, The Phonetic Elements of the Northern Paiute Language, UCPAAE 10.13–44 (1911).

B. L. Whorf, The Comparative Linguistics of Uto-Aztecan, AA 37.600–608 (1935).