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Comparative Uto-Aztecan Phonology

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Outline of Contents

open up

open up

open up

These are all separate sections

In the following pages we attempt to specify what we think can be really known or safely posited about Proto-Uto-Aztecan (henceforth pUA) phonology at the present time. In the process we evaluate the work of previous investigators. Our main contribution concerns the evidence for final features (*n and *h) for preconsonantal features (*n, *h, and *ʔ) and generally the establishable regular sound correspondences among UA languages with what they imply for pUA reconstruction. We believe we have resolved such controversial issues as the basis for reconstructing pUA *ŋ and *r. We claim that traditional *l is best labeled *n, that traditional *n is a phantasm, and that SUA medial n reflects pUA *ŋ. We take an especially strong negative position on certain hypotheses about 'lenition' in UA. We point out that extensive dictionaries, with specification of phonological base forms for all morphemes, especially from Tub, Se, Lu, Hop, YM, and Na, are a prerequisite for serious further advances in the reconstruction of pUA phonology.

Finally, one may note our frequent harping on the need for respect for the principles of the comparative method; we mean to be taken seriously on this matter. Comparative phonology has to be based on valid etymologies. As the rules of sound correspondence became more tightly defined, some seemingly valid etymologies, or parts of them, turn out to be unacceptable within the constraints of regular sound correspondence. We have examined <u>all</u> the proposed UA etymologies that have appeared in print, and Kaufman has found some new ones. There is a total of perhaps 600 proposed, maybe 550 valid ones. Of these, not all are found in most of the sub-families, but much more than a majority are. Thus our generalizations rest on a large data base.

The Citation of Data Supporting Specific Reconstructions

References to Voegelin-Voegelin-Hale and Miller are given for cognate sets cited here that those authorities recognize and document. Occasionally we reject some of the individual language forms cited by others as belonging to a specific cognate set; occasionally we add items they had not included. In both cases we pass over these disagreements in silence. Specifically we note that Na forms cited are those from our field work only; the YM forms are transcribed phonologically, and not in the broad phonetics of the sources. Numic forms are cited as p Num (reconstructions by Terrence Kaufman), unless only attested in one or two of the Numic languages. On 5 x 8 cards Kaufman has created a UtoAztecan etymological file which includes all the data cited in Sapir, Whorf, Voegelin-Hale, Miller, (Langacker, Heath, Crapo), as well as additions made by TK to preexisting etymologies, and new etymologies discovered by TK. [These files are the basis of the phonological equations set forth in this study.]

Kaufman has also made a Numic etymological file, a Takic etymological file, and a Cora-Huichol etymological file, all on 4 x 6 slips. From the vantage point of specialists in Mesoamerican languages of which the authors are two examples, there seems to exist an obvious and heavy bias towards using Numic languages as models for pUA, especially in phonology. A MesoAmericanists would never take Nahua for being particularly conservative. Perhaps the reason for the Numic bias on the part of most American Uto Aztecanists are purely linguistic, but we feel that an obvious conservatism in a few respects, particularly *n and *h in preconsonantal and stem-final position and the cultural simplicity of the majority of Numic-speaking groups has led many Uto Aztecanists who work primarily in North America to overrate the conservatism of Numic. We hope--in the interests of reason--to demythologize somewhat the archaicness assumed to be represented by Numic phonology.

In this paper we do not argue about the correctness of grammatical patterns whose reconstruction has been proposed--we do, however, evaluate proto-grammatical morphemes that have been proposed to phonological and semantic terms. We find that the study of accentual systems has one grammatical spinoff, that pUA probably had possessive prefixes on nouns (or proclitics in pre-noun position).

We will make the following points in this paper:

1. In the environment *VC, we can reconstruct *V_1 (i.e., vowel length) *h, *n, and *ʔ to pUA.
2. In morpheme-final position we can reconstruct *-V, *-VV_1, *Vh, and *-Vn.
3. Vowel length can be directly reconstructed from at least Tub, Se, Lu, Hop, PP, YM, and Na (but not from Num, Ca-Cu).
4. Numic languages should not be taken as the most archaic of the family.
5. Langacker's hypotheses about lenition in pUA are not well-founded.
6. pUA *ŋ cannot be explained away.
7. Across-the board [ŋ] in suffixes reflects pUA *ŋ.
8. pUA *[l] is probably */n/.
9. pUA *[ŋw] is */nw/.

Among the broader constributions of our work, not fully reported here for lack of space, are the following:

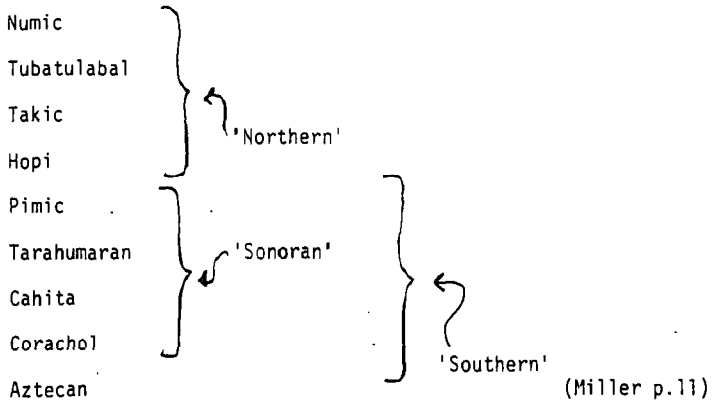
1. Correcting and augmenting Iannucci's Comparative Numic Phonology.
2. Reconstructing Takic comparative phonology on the basis of Bright and Hill's Linguistic History of Cupenyo, and Hill and Hill's Stress in Cupan Languages.
3. Stating how best to analyze Tub phonology.
4. Stating some rules of Hopi phonology.
5. Stating some rules of YM phonology.
6. Reconstructing with supporting evidence final and preconsonantal features (including *ʔ) in 160 p(N)UA stems.
7. Reconstructing with reference to supporting evidence in VH or M more than 100 pUA stems that do not show final and preconsonantal features.
8. Explaining some instances of preconsonantal ʔ and initial unlimited C in Ta.
9. Assembling ca 20 sets where pUA had multiple forms based on the same root ± infixation of *n, *h, or vowel length.
10. Making a diachronic analysis of postpositional elements.
11. Explaining the reflexes in PP of pUA *V and *$\bar{V}$.
12. Attempting to explain the rules of vowel dropping in Na nouns and adjectives.
13. Postulating a phonemic system and morpheme structure rules for pUA that are more detailed and integrative of more data than those of previous studies.

Certain important topics will not be covered, either through lack of data, or lack of time to track them down:

1. Length, accent, and preconsonantal features in Cora-Huichol.
2. Accent in Tepiman
3. Vowel leveling in various subfamilies, and the implications for reconstructing of specific V...V sequences to pUA.

Classification

In the body of this paper, when UA etymologies are cited, languages and subfamilies are given in essentially the same order as used by Miller in UACS. This order implies a classification with which we do not agree in all details, namely:



(Miller p.11)

(forms in ' ' not found in Miller)

First of all, there seems a clear separation in UA between a Northern Division and a Southern Division. Jeffrey Heath has provided some grammatical evidence for this separation. Phonological and lexical evidence abound in the present study. Within the Southern Division some view Aztecan as standing apart—others do not. Kenneth Hale has provided some lexical evidence for 'Sonoran' (Southern minus Aztecan). There is evidence that the Sonoran languages should be classified differently than as above, as we will discuss presently. Right now we will present a list of language and group names, along with the abbreviations used in this paper, cited in the order of what we consider to be the most enlightening classification. It is not, however, out intention here to make a definitive statement; we merely wish to assign some more structure than the mere listing of 8 or 9 subfamilies or 2 major divisions. We suggest that further research along lines indicated in our classification will have rewards, though we will not be surprised if some of the suggested intermediate groupings are disconfirmed.

In any event, the bracketing/tree diagram is an attempt at suggesting a believable accounting of linguistic splits within the UtoAztecan languages. Dotted lines represent very tentative hypotheses about immediate splits.

The ordering of SUA lgs is intended to place next to each other those lgs that share the most linguistic features, not to replicate the geographical distribution of the languages. Consequently, on our criteria, the ordering may seem strange to one used to citing the subfamilies in a 'traditional' order.

The glottochronological figures given below harmonize those of Hale and Swadesh.

(Internal Diversity) ... Give complete references

	1 trunc	2 'thou' pə	3 'his' -yə	4 -ka on num	5 loss of -ta	6 VC→VhC	7 w > g	8 u→ə
Num	-	-	acc	-	+	-	-	-
Tub	-	+	acc	-	-	-	-	-
Tak	+Se	+	acc	-	-	-	-	-
Hop	-	-	acc	-	+	-	-	-
					in nom			
PM	-	-	-	-	(+)	-	-	-
Tu	?	?	?	?	-	-	-	-
Op-Eu)	?	?	?	(+) acc	-	-	+	-
Tep	+	+	+	+	+	+	+	-
(Ta-Gu)	+	+	-	+	+	+	-	-
(Co-Hu)	+	+	+	+	+	+	-	+
Azt	-	-	-	-	-	-	-	+

leave line in

We lack sufficient data on Opata-Eudeve and Tubar. Points (1-6) generally group Tep, Ta-Gu, and Co-Hu against the rest. If (1-2) are retentions, they do not help group the languages. (4-5) however, do.

(7) shows a common innovation in Tep and Op-Eu.

(8) shows a common innovation in Co-Hu and Azt.

We judge (7) and (8) more easily diffused than the others.

The evidence referred to in the above chart does suggest that a more transparent ordering of the SUA languages would be as on that chart. Co-Hu shares 3 sound changes with Na: *u→ə, *v→h, and *w→h/#o. The third is found also in Ta-Gu; the first two no doubt indicate geographical adjacency at some point, but certainly not necessarily common development, and the time period of this adjacency has yet to be worked out.

We therefore suggest, but do not go so far as to urge, that the preceding classification of the UA languages is more promising, inasmuch as it accounts for more diachronic linguistic phenomena.

The following chart is an attempt to suggest where the various branches/groups may have been located geographically at a time after split and before the ~~immigra-~~ migrations that produced the known distribution.

[illegible] Uto-Aztecan family (UtA) 3

34c

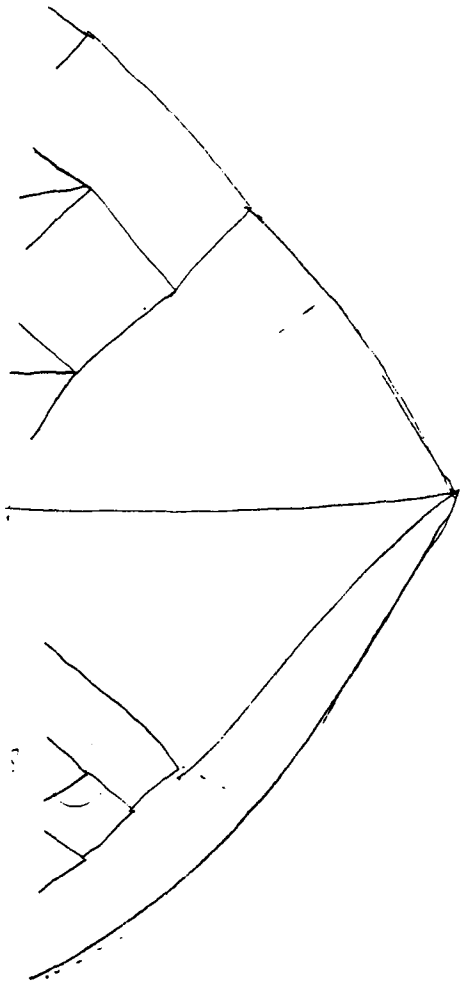
Northern Uto-Aztecan Division (NUA)

mic group 18c (Num)
Western Numic (WNum)
1 Mono (Mo)
2 Northern Paiute (NP)
Central Numic (CNum)
3 Panamint (Pa)
4 Shoshoni (Sh)
5 Comanche (Cm)
outhern Numic (SNum)
6 Kawaiisu (Ka)
Ute (Ut)
Southern Paiute-Chemehuevi (SP, Ch)

batulabal isolate (Tub)

kic branch 24c (Tak)
Serrano-Kitanemuk (Se, Ki)
Cupan (Cup)
11 Luiseño-Juaneño (Lu, Ju)
12 † Gabrielino-Fernandeño 10c (Ga, Fe)
13 Cahuilla (Ca)
14 Cupeño (Cu)

pi isolate (Hop)



UtoAztecan Division (NUA)

Numic group		(Num)
	Western Numic	(WNum)
1	Mono	(Mo)
2	Northern Paiute	(NP)
	Central Numic	(CNum)
3	Panamint	(Pa)
4	Shoshoni	(Sh)
5	Comanche	(Cm)
	Southern Numic	(SNum)
6	Kawaiisu	(Ka)
7	Ute	(Ut)
8	Southern Paiute-Chemehuevi	(SP, Ch)
9	Tubatulabal isolate	(Tub)
←	Takic branch	(Tak)
10	Serrano-Kitanemuk	(Se, Ki)
	Cupan	(Cup)
11	Luisenyo-Juanenyo	(lu, Ju)
12	† Gabrielino-Fernandenyo	(Ga, Fe)
13	Cahuilla	(Ca)
14	Cupenyo	(Cu)
15	Hopi isolate	(Hop)

Southern Uto-Aztecan Division (SUA) 39c

Aztecan branch 15c

16 † Pochutec (Pa)

17 Nahua-Pipil (Na)

'Sonoran'

Cahitan 15c (C---)

18 Cora (Co)

19 Huichol (Hu)

Tarahumaran group 7c (Tar)

20 Tarahumara (Ta)

21 Guarijío (Gu)

Tepiman group (Tep)

Piman

22 Pima-Papago (PP)

23 Pima Bajo (PB)

Tepehuán

24 Northern Tepehuán (NT)

25 Southern Tepehuán-Tepecano (ST, Te)

Opatan group (Opt)

26 † Opata-Jova (Op, Jo)

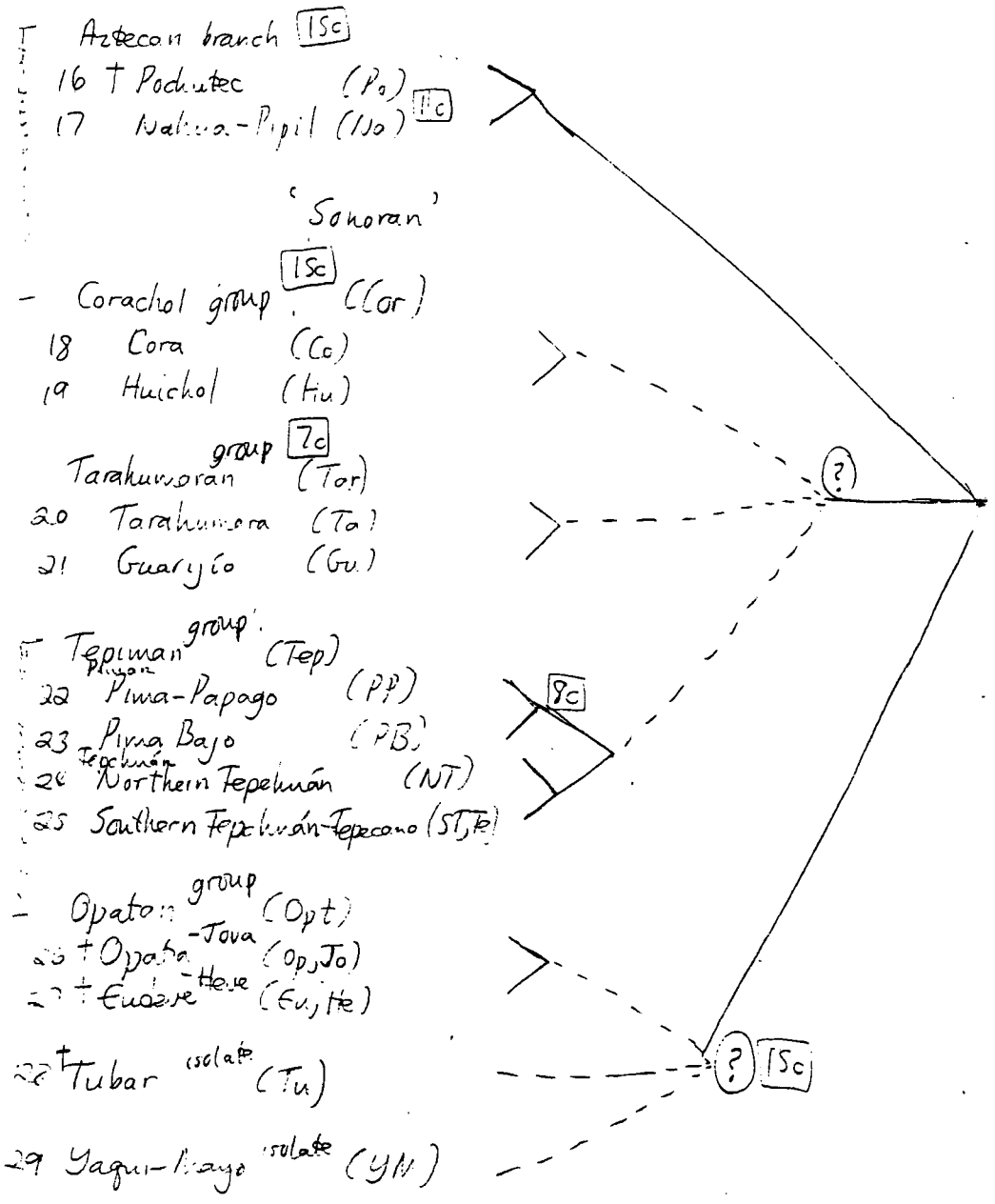
27 † Eudeve-Heve (Eu, He)

28 † Tubar isolate (Tu)

29 Yaqui-Mayo isolate (YM)

39c

Southern Uto-Aztecan Division (SUA)



Some evidence suggests that the Sonoran languages can be grouped in some detail, on the basis of the following seven traits.

(1) Truncation: Several SUA groups (Tep, Tar, Cor) have for verbs a completive stem that lacks the last syllable (-CV) of the base form. This last syllable is *not* necessarily a *suffix*, *rather* the *-CV# is chopped off*; it may be a suffix, or it may be part of a root. Se also has this phenomenon. Heath ( ) says Hop has (or had) it also, but we do not concur.

(2) *pə 'thou': Several SUA groups (Tep, Tar, Cor), as well as Tak and Tub, have this feature.

(3) *-yə 'his': Two SUA groups (Tep, Cor) have this feature. The same suffix in NUA marks 'accusative'. We take the NUA function to be original. RL views the Tep and Co-Hu function as pUA.

(4) Numerals in *-hka: Several SUA groups (Tep, Tar, Cor) add a suffix *-hka to form the free numeral stems 'two' 'three' and 'four'.

(5) Loss of pUA absolutive: Several SUA groups (Tep, Tar, Cor) as well as Hop and Num, lack the pUA absolutive *-ta in nouns. Though we do not suppose that pUA had an obligatory absolutive marker on nouns (we suppose that any noun with possible semantically-based exclusions could occur with it), languages which no longer allow this are assumed to have innovated.

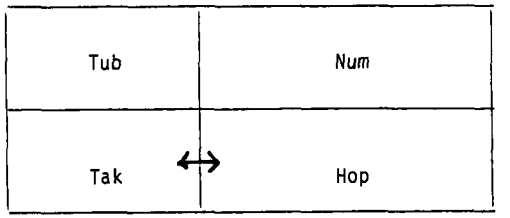
(6) Extrusion of preconsonantal h and loss of vowel length: two SUA groups (Tep, Tar) show this.

(7) *w > g, *y > d, *k^w > b. (Opt, Tep).

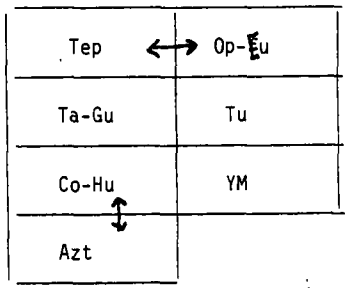
(8) *u → ə , *v → h, *w → h/_o (Cor, Azt).

Points (1) and (2) look like possible survivals, if truncation and *pə 'thou' are pUA features. We don't feel comfortable supposing so, but alternative hypotheses are not obvious. Points (3) thru (7) are probably or certainly innovations.

The arrows indicate common phonological changes which may have been diffused



Northern UA



Southern UA

Tak and Hop share *o → ** ɵ

Tep and Op- u share *y > **d, *w > **g, *k^w > **b

Co-Hu and Na *u → **ə, *v → **h, *w → **h/*_o

selected phonemic systems

Mono

p	t	c	k	k^w	ʔ		i	ə	u
			q	q^w			e	a	o
		s	x		h				
m	n								
		y		w					

k and q, k^w and q^w are mostly in CD

very few words end in a consonant

x, -ww-, -yy- are rare

CV

CVCV

CVC_2C_2V (= Lamb CVhCV)

hw = /qqw/ hy = /tt/

Comanche

p	t	c	k	k^w	ʔ		i	ə	u	V·
-v	-r	y		w			e	a	o	
		s			h					
m	n									

few or no words and in a consonant

-hw-, -hy- are rare or non-occurring

CV

CVCV

CV'CV

CVhCV

Southern Paiute

p	t	c	k	k^w	-ʔ-	i	ə	u
		s					a	o
m	n		ŋ	$-ŋ^w-$				
		y		w				

no word ends in a consonant

CV

CV· } contrast not sure

CV_1V_1 }

CVCV ⟨ $CVhC_2V$ where C = p t c k k^w

C_1VAC_2V where C_2 = p t c k k^w

Tubatulabal

p	t	ʧ		k	ʔ	i	ə	u	V:
		s			h	e	a	o	written VV_1
m	n			ŋ					
w	l		y						

e is rare

č, ~~are~~ rare

l is rare initially

CV

CV

CVC(V) ⟨ CVHC(V) ~~b, d, , , g~~

CV:C(V)

$C_1V^nC_2(V)$ where C_2 = p t c k h w

Luiseño

p	t	č	k	q	k^w	ʔ	i	u	V·
	s	s		x	x^w	h	e	o	V́
v	ɣ							a	
	r								
	l	y			w				
m	n		ŋ						

x x^w are rare initially

e o are rare or non-occurrent in unstressed syllables

CV(?)

CV·

CVC(V)

CV·C(V)

Cahuilla

p	t	č	k	q	q^w	ʔ	i	u
	s		x	x^w	h		e	
v	ɬ	l^y					a	
m	n	ñ	ŋ					
	r	y		w				

o occurs in loans from Spanish

r is rare

v x ɬ x^w are rare initially

CV

CVC(V)

Serrano ⟨c̣⟩

p	t	c̣	č	k	q	k^w	ʔ	i	ə	e	u
v	ð							a	a̤		
	˘	˙	š		x	h^w	h				
	ɬ		ɸ					V·			
m		n	ñ	ŋ							
	r		y		w						

e o f g occur in loans from Spanish

v ð x are rare initially

r ɸ ɬ s š h^w are rare

CV(?)

CV·

CVC(V) ⟩ CVCV·

CV·C(V) ⟩ CV·CV·

Hopi

p	t	c	k	q	k^w	ʔ	i	ə	
-v	r		y		w			e	o
		s				h	e	a	
m	n		$-ŋ^y$	ŋ	$-ŋ^w$				
							V:	V́	

CV

CV: ⟨ CVh

CVCV

CV:CV

CVhCV

few words end in a consonant

||V:|| = V: ~ V·

||V|| V ~ ø

||Vh|| = V:

Papago

p	t		č	k	ʔ	i	ə	u
b	d	-d̤	č̆	g			a	o
	s	š			h			
m		n	ñ			V·	V́	
v		ɾ						
CV(?)								
CV·								
CVC(V)								
CV·C(V)								

except in word final position,

[č č̆ ɾ s ñ] occur before V_h

[t d d̤ š n] occur before $V_ɬ$

Northern Tepehuán

p	t		k	-ʔ	i	ə	u
b	d		g			a	o
	s	š		h			
m	n	ñ					
v	r						

tones

few or no words end in a consonant

CV

CVCV

CVVCV

Tarahumara

p	t	č	k	ʔ	i	u
b	ř		g		e	o
		s		h		a
m	n					
w	r	v				v́

CV	no word ends in a consonant
CVCV	i and e are neutralized in unstressed position

Cáhita

p	t	č	k	b^w	ʔ	i	u	
		s			h	e	o	
v							a	
	r	y		w				
m	n							VV_1

$CV_1ʔV_1$

$CV·_1ʔV_1$ few words end in a consonant

CVCV

CV·CV

Cora

p	t	ɬ	č	k	ʔ	i	ə	u
p^w			$č^w$	k^w		e	a	
			š		h			
v	r		y	w		v́	V·	
m	n							
m^w								

few or no words end in a consonant

[canons not worked out]

Huichol

p	t	c	k	k^w	ʔ	i	ə	u
		š			h	e	a	
w	r	y		w				
m	n							

V· =pitch and stress phenomena

few or no words end in a consonant

[canons not worked out]

Aztec

p	t	(ƛ)	ɬ	č	k	k^w	h=ʔ
		-ɬ	s	š		w	
m-	n			y			

i o V·	only n, k and ʔare frequent finally
e a	some dialects lack ƛ, having t in its place
CV	h = ʔ('saltillo') is [?] in some dialects [h] in
CV·	others. Those with [h] have usually shifted
CVC(V)	some allophones of /w/ to [h] as well
CV·C(V)	
CVCV·	
CV·CV·	

In this section as a prelude to UA reconstruction we present phonological overviews of five major UA subgroups:

Numic, Tubatulabal, Takic, Hopi and yM.

Numic

A straightforward phonemic analysis which eliminates most instances of allomorphy can be done for most Numic languages by recognizing 3 types of consonants or consonant clusters occurring between vowels.

(a) single consonant

(b) consonant preceeded by h

(c) consonant preceeded by n

Single consonant is lenis, voiced, or spirantized; h + C is voiceless and may be geminate or preaspirated; n + C is prenasalized and may be voiced. Morpheme-final consonants in word-final positions are deleted.

Comanche has [β r;t c k k^w] as exponents of the single series, [hp ht hc hk hk^w] for the hC series, and [p, t, c, k, k^w] for the nC series. It is not clear if [t c k k^w] are lenis. Does Co lack lenition because it lost it (perhaps under contact with non UA languages) or because it never had it? We don't know. But it seems unlikely that lenition of the type found in SP or Mo existed in the same form in pUA, 5000 years ago. Lenition has taken place within a few hundred years in such languages as Brythonic (from Gaulish) and Western Romance (from Latin). Lenition (e.g. voicing and/or spirantizing of single intervocalic consonants) in Numic may well have begun at about the time the subfamily began to break up, and no earlier, perhaps later.

Common Numic has (double) vowels and vowel clusters which result from the loss of intervocalic consonants. Original UA vowel length (reconstructible from Tub, Lu, Hop, Tep, YM, Azt) ~~is not retained as such in Numic~~ was lost in pre Numic before the loss of certain intervocalic consonants.

Tubatulabal

Tub has voiced obstruents intervocalically and between nasal and vowel only. Initially and finally only voiceless obstruents occur. Medially they occur also, in contrast with voiced obstruents. A straightforward phonemicization analyzing voiceless intervocalic obstruents ~~are~~ as geminate eliminates the voiced obstruents from the set of putative phonemes and eliminates most instances of putative ~~voice~~ morphophonemic alternation. Obstruents are then automatically voiced in the environment V#V, and n#V. Thus Tub is structurally parallel to Numic. This analysis has a hocus-pocus aspect only in that medial phonemic geminates are not (known to be) phonetically geminate. It has the advantage of allowing direct phonological comparison between Tub and other UA languages. We write the "geminates" as HC, since in many cases H is a morpheme final feature, as is n. In a few cases Tub /h/ does occur before C, pronounced [x] . We write it /x/, ~~not to~~ not to beg the question of its real origin. PUA *h largely disappears from Tub, but some Tub h's seem to be from pUA *h anyway. Most cases of Tub /h/ come from pUA *k next to non-high vowels. We write these h's as q. These q's have only extra-Tubatulabal interest; for Tub internal purposes ~~are~~ one should replace them with h. Where Numic has /t/ after V, Tubatulabal normally has /l/ (falling together with the reflex of pUA *r). This is indeed an instance of lenition, presumably

$$[t] > \begin{cases} [d] \\ [r] \end{cases} > [\delta] > [\emptyset]$$

Numic /k/ corresponds to Tub /h/ next to non-high vowels; the change was probably [k] > [q] > [x] > [h] ; because of the fact that the change also occurs word-initially, it is not to be considered an instance of lenition. In fact, where Numic has medial /k/ next to a high vowel Tub has /k/ pronounced [g] — not a case of lenition. Stress is word-final in Tub. Original short vowels

drop off the ends of verbs, but original long vowels are preserved (though now short). Instances of diachronic word-medial vowel dropping are rare and apparently not regular.

Word-final H is not realized, but word final n is.

Takic

Takic is the current name of the "Southern California" subfamily of UA. The name has not yet been sanctified by being applied to the reconstruction of its common ancestor, but in the absence of a better competing term we will employ it. Takic contains 2 branches: Serrano and Cupan, which in turn contains Luisenyo, Gabrielino, Cupenyo, and Cahuilla (Kawiya). The Takic languages do have instances of phonemic lenition; these result from the widespread innovative loss of the first C of *hC and *nC clusters (analogous to Numic and Tub which protected the second C from lenition. The lenition applies to postvocalic *p *t *c *k (next to non-high vowels) so that they are realized as, roughly, [v] [ð] [s] [x]. The *ð means Cupan l = Se ç; the *x means Cupan x = Se ç. After *n or *h they are protected from lenition, being pronounced roughly [p] [t] [č] [q] (next to nonhigh vowels). But the consonant that protected the following C from lenition, namely *n or *h, disappeared in Cupan, leaving vowel length in its place (falling together with inherited vowel length). The same thing also happened, basically, in Serrano, except that some cases of preconsonantal *h or *n survive as the segment /h/. The other *h's and *n's were converted into vowel length. Stress in these languages tends to be initial, unless the first syllable is short and the second heavy or long. This is the postulated situation for proto-Takic, and it depends on the preconsonantal feature(s) still being present--or at least realized as vowel length. In Cupenyo and Cahuilla vowel length has basically disappeared, leaving free

(i.e. unpredictable) stress and non-lenition in its wake.] In Luisenyo non-stressed long V's become short and non-stressed short V's drop if possible (as it did for the ancestor of Cu, Ca).

Final vowels followed by *H do not drop (or do they?). Serrano largely agrees with Lu on the placing of long V's, but does not drop as many originally unstressed short V's. Briefly Cupan, especially Lu, can be compared directly to other UA subfamilies when underlying V's are established and non-lenited medial consonants convert the preceeding V length into *H (standing for either *h or *n).

Takic is the one subfamily of UA which shows thorough going lenition in its common ancestor, but this ancestor is only about 2400 years old. Lenition could have originated in Takic and diffused to Numic, which has a time depth of about 1800 years.

Hopi

Hopi does not have lenition of intervocalic C's, except that /p/ > [v] in this context. Corresponding to preconsonantal *n or *h of Numic (or Tub), or the *H of Takic, is h in Hopi, which in the dialect documented by the Voegelins merges with vowel length. Thus, in that dialect, the only trace of earlier putative preconsonantal *h or *n is /p/ (rather than [v]) after a long vowel. This makes most urgent the documentation of those variants of Hopi which preserve pre-consonantal h.

Hopi has rules for stress, vowel shortening and vowel-loss. Stress refers to the underlying forms of morphemes. It falls on the second syllable of tri-syllabic stems whose first syllable is short. Otherwise it falls on the first syllable of disyllables or of trisyllables whose first syllable is long or heavy. Short vowels after stressed vowels drop if a cluster of no more than 2 C's would result.

Long vowels shorten in unstressed syllables. In unstressed cyllables Vh goes to V: and is not shortened. V: or Vh- which come to stand in the closed syllable through loss of the following unstressed short V- are shortened. (pUA stem final *n before Hop -wə augmentative yields Hop -ŋʷə, otherwise.)

Hop completely merges putative preconsonantal *n and *h, but clearly distinguishes their product from original vowel length or its lack. The syllable-final feature *h is deleted in word final position: Its existence is manifested only when suffixes are added and the available attestation of Hopi only shows (rare) plual -t and augmentative -wə which reveal whether final *h is there in the underlying form and only in a handful of words.

The following chart, figure 2, shows the Hopi canonical forms and their proposed pUA origins:

Whorf Toreva	Voegelin	pUA Heath	pUA TK
CV́hCV (> CVCV unstressed)	CV:CV	*CV'CV stop	*CVnCV and CVhCV
CV:CV	CV:CV		*CV̄CV
CV́GV (> CVCV unstressed)	CVCV	*CVCV	*CVCV
CVCV	CVCV	*CV'CV non-stop	*CVCV

Figure 2

Summary of some Hopi phonological rules (operating on base forms):

(1) underlying length is given (as is ..VhC..)

(2) stress is assigned [as described above]

(3) reduplication is CV́- before CV̄.. CV́- before CV̌..

4 ☛ unaccented vowels lose one mora

5 (4) p → v/V(V)_

6 (5) v → p/_C (but not C_)

A morphophonemic rule in Hopi is that noun stems containing underlying VV_1 in the first syllable have V in place of it when possessed. This is due to analogical levelling. 'thy' is ʔəh- and 'our' is ʔitah-; since they end in h, they draw the accent, and the first vowel of the noun stem, being unaccented, is shortened. This short vowel is levelled throughout the paradigm (e.g. with 'my' ʔi- which does not draw the account).

Yaqui-Mayo

To understand how YM may be used in the reconstruction of UA phonology, we must understand the basic principles of YM phonology.

segments (spread out)

p	t	c	k	b^{w*}	ʔ	i	u
		s			h	e*	o
m	n*					a	
v	l,r*	y		w			

canons

CV(ʔ)CV(ʔ)CV CVV

CVVCV(ʔ)CV

underlying VV is first syllable only

*Notes: e is from pUA *ə

b^w " $*k^w$

n is the merger of pUA *ŋ, and initial *n

l and r are recently differentiated: they represent pUA medial *n and *r. Otherwise the pUA system of segmental phonemes survives basically unchanged.

Phonemic analysis (a) [Vu, Vi] are /Vw,Vy/ } there are no vowel clusters except V_1V_1 (i.e. vowel length).

(b) [iV,uV] are /iyV,uwV/ }

Some phonological rules:

A. ordered

(1) final i is dropped in words of 3 or more syllables

(2) $V_1V_1 \rightarrow V$ in words of 3 or more syllables

(3) stress the second mora of all words except those having the shape CV̌(C)CV(C); in these, stress the first mora

(4) double intervocalic C (except ʔ) after V́ in disyllabic words

(5) insert epenthetic V_1 after syllable-final ʔ

(6) drop ʔ in environment VʔC#.

B. unordered

(7) CV(V) → $CVV_1ʔV_1$ /_#

(8) drop word final V in phrases and compounds not already covered by rule 1.

(9) c → t /_#,_C

(10) s → h /_C (not _#)

(11) v → p /_C

(12) r → ɾ /_C

(13) $V_1V_1 \rightarrow$ V /_C#,_C.

(14) nasals assimilate in position to following obstruent

(15) $tb^w \rightarrow kb^w$ in Mayo

Illustrations

a 'snake'	b 'snakes'	c 'squash'	d 'squashes'
//vaakoci//	//vaakocimi//	//ʔaaya²wi//	//ʔaaya²wimi//
vaakoc (1)	vaakocim (1)	ʔaaya²w (1)	ʔaaya²wim (1)
vaakot (9)	vakocim (2)	ʔaáya²w (3)	ʔaya²wim (2)
vaákot (3)	vakócim (3)	ʔaáyaw (6)	ʔayá²wim (3)
		or w/order reversed	ʔayá²awim (5)
			or w/ order reversed

f 'ears'	g 'in a cave'	h 'in the house'	i 'to laugh at'
//nakami//	//teesopo//	//káaripo//	//ʔaace+b^{w}a//
nakam (1)	teespo (8)	káarpo (8)	ʔaacb^{w}a (8)
nákam (3)	tespo (13)	káapo (12)	ʔacb^{w}a (13)
nákkam (4)	tehpo (10)		ʔatb^{w}a (9)
	téhpo (3)		ʔakb^{w}a (Mayo only) (15)

Note: underlying form must be //kaCri// otherwise stress must be assigned to the underlying form, as above. This word is from pUA *kanni where the V length is a reflex of the first n.

j 'can hit'	k 'water'	l diachronically, 'to dream'
//véeva+he//	//vaa//	*təə - muuku
véevne (8)	vaaʔa (7)	teemuuku (*ə→e in YM)
véepne (11)	vaáʔa (3)	teemuku (by morpheme structure rules)
vépne (13)		teemku (8)
		temku (13)
		tenku (14)
		ténku (3)

The consequences of the synchronic phonological rules, given here, which are also diachronic rules, are that non-alternating stems in YM may show C-clusters or short vowels where pre YM or pUA have no clusters or long vowels. 3-syllable words with the first vowel short may have had a long vowel in the first syllable and thus such words are not in disagreement with evidence for vowel length in other languages.

UA accent

The accentual [redacted] + length systems of Cora, Huichol, NT and ST are very complex and not well understood (though see Woo on NT). The accentual systems of the remaining sub-branches can be described in fairly simple terms, and related to a postulated pUA phonological system which has neither phonemic tone nor stress. We may feel confident that since PP has no tone and probably never had it, that NT and ST will provide no evidence for pUA pitch-tone and that Coran is hardly likely to do so either. Pamela Munro (1978) surveyed accentual systems and developed a proposal for what pUA accent was like. Her conclusions were basically that pUA had stress on the second mora of stems. Langacker (UAG 22-23) paraphrases Munro's results and adds an interpretation of his own (namely that UA was perhaps like Hopi).

Our own survey of UA accentual systems yields the outline seen in the following table:

	Keep $\bar{V}$	medial V drop	$\hat{S}$econd mora accent	If not 2d mora, which?	possessive prefixes
Num	-	-	+		+
Tub	+	-	-	final	- (suffixes)
Lu	+	+	-	initial	+
Hop	+	+	+		+
PP	-	-	-	initial	(+) not stressed
Ta-Gu	+	-	+		- (proclitics)
yM	+	+	+		~~+ (proclitics)~~
Na	+	+	-	initial	+ (< reflexives)

Figure 3

from originals [redacted]; otherwise proclitics

Stress Rules

Num	second syllable (or second mora)
Tub	final syllable (once final short syllables have been dropped)
Tak	first heavy syllable; first syllable if none heavy; presupposes $\hat{S}$ pNUA *CV?CV̄h
Hop	second syllable in trisyllables if first light; otherwise first syllable; presupposes pNUA *CV?CV̄h, i.e. a ranking of heavy syllables
PP	first syllable
Ta-Gu	second syllable, based on *first syllable
yM	like Hop, but presupposes other rules which are not old
Na	first syllable

Comments

Numic reflexes of *hw are (hy show that their reflexes in W Num depend on whether the accent preceded or followed (or maybe didn't precede) we assume strengthened reflex after stress, weak reflex otherwise. Such being the case, stress was normally on second mora in pre Western Numic. This is still preserved in NP. SP and Ch also have 2d mora stress, and we attribute this to proto Numic. W Numic has possessive prefixes which C/S Numic have replaced with genitive pronouns.

Tub has final stress (...CV?V_1C is [CV̄?V_1C]) thus no doubt /..CV?C/, but this stress is assigned only after final syllables of shape -V and -Vh (and -Vn?) have been dropped, and final -VV has been shortened. Tub also lacks possessive prefixes, and consequently Tub tells us nothing about pUA stress.

Tak has basically first syllable stress, but a heavy non-initial syllable takes stress away from an initial light syllable. Reflexes of *CV?CVh suggest that

CVh outranked CV? for heaviness in pre Takic. Possessive prefixes are usually unstressed, but in a number of cases involving core vocabulary, possessive prefixes on nouns are stressed. (This situation is described synchronically by stating that the stems in question lack underlying lexical stress.)

Hop has basically first syllable stress, but in trisyllables of shape CV̆CV̆CV, stress falls on the second vowel. Reflexes of *CV?CVh suggest that CVh outranked CV? for heaviness in pre Hopi.

common Sonoran (but not necessarily pre Nahua) doubling of C_2 after short V_1 suggest that stress was initial (at least on the Hop variant) in common Sonoran.

PP has first syllable stress, but possessive prefixes are not stressed.

Ta-Gu have mainly second syllable stress, but (a) it is Sonoran and shows reflexes of Sonoran initial (Hopi-like stress, and further many items in Ta, by non-lenition of C, show that the underlying synchronic stress in Ta must be taken as falling on V_1.

YM has Hopi-like stress, but this is applied after many obviously late rules of vowel shortening and vowel dropping. YM does not have possessive prefixes.

Na has penult stress now, but the vowel-dropping that has occurred diachronically in NA shows that ~~others~~ stress was ~~were~~ word-initial, and furthermore, that possessive prefixes were stressed.

All the above evidence suggest the following formulation for pUA.

(1) pUA had possessive prefixes on nouns

(a) supported by stress phenomena: Tak, Hop, Na

(b) not so supported: Num

(2) stress fell on the earliest heavy syllable (V? was light)

heavy	light
Vh	V?
Vn	V
VV_1	

What we don't yet have worked out is whether the various kinds of heavy syllables have relative ranking as well, i.e. whether *Vn outranks *Vh outranks *VV_1.

(3) with no heavy syllable we may take the Hop Num Ta-Gu and YM evidence as suggesting second-syllable stress. Hop and YM have 2d syllable stress only in CVCVCV words, Num and Ta-Gu have it generally (they lack $\bar{V}$).

Developments.

A. common Sonoran has primarily first syllable stress (this may depend on loss of final features) and so does pre Nq. (Here it seems independent of final features since ~~once~~ they seem to be preserved as $\bar{V}$, though later shortened).

B. Tub shifts to last-syllable stress after loss of *-V(h).

C. Num and Ta-Gu shift to second syllable stress except in a few forms. Num gets VV clusters by loss of intervocalic C, especially *y.

D. Tak has initial stress, unless an initial syllable is light, and a non-initial one is heavy. It has wiped out the rule [CV̆CV̆CV]

E. Hop and YM will have preserved the pUA rule, though same generalization has occurred in YM at least, since CVCVCV(C) forms are stressed CVCV́C(C), even though the underlying form may be //C$\bar{V}$CVCV//.

Comparative Numic phonology

Although Kaufman worked out the major part of what we will outline as our view of pNum phonology in 1965, it was not published and David Iannucci's 1973 Cornell University disssertation which regularly cites data from Mo, NP, Pa, Co, Sh, SP

and contains 299 29

(~~with about 290~~ cognate sets) will be cited as the base line for our corrections and amplifications.

Iannucci's dissertation, though unpublished, is available through University Microfilms, and though we regret that most people do not have a copy to hand, we point out that this chapter would be too long if we could not take this particular short-cut. Specialists should acquire a copy.

Sheldon Klein: Comparative Mono-Kawaiisu IJAL 25.233-238 1959 (105 sets) and Irvine Davis: Numic consonantal correspondences IJAL 32.124-140 1966 (185 sets) are both referred to in a few cases where they attest to valid etymologies not included by Iannucci.

We will make the following corrections and additions to Iannucci.

1. DI says *hN and *nN did not both occur. We disagree and point out why.
2. We correct certain reconstructions by reference to extra-Numic data.
3. We simplify some reconstructions where DI reconstructed more than one pNum form.
4. We sort out by subgroup some cases where it is in fact necessary to reconstruct more than one pNum antecedent.
5. We show that pNum phonological correspondences require reconstruction of more cases of *hy and *hw than DI recognized, and that as well we must reconstruct *ʔs, *nw, and two kinds of hiatus between vowels, which we label *C and *H.
6. We clarify the reflexes of pNum medial *w, *h, *ʔ.
7. We offer several new Numic etymologies cited here only by pNum reconstruction.
8. We relate pNum phonology explicitly to pUA phonology.

Where we do not make corrections in DI's reconstructions, it may be assumed we find his reconstructions acceptable. We do not, however, undertake to list such cases.

Our transcription for Numic languages and for pNum differs from Iannucci's in the following ways:

3c

	DI	TK
(1)	e	a change this to e
(2)	initial V	~~ʔV~~ ʔV
(3)	ɨ	ə
(4)	final N	n
(5)	hN (N=any nasal)	nN

When citing our own or Iannucci's Numic forms, we use the symbols in the TK column. The last change rests on DI's statement that pNum had no possible contrast between *hN and *nN, and that he chooses to write *hN. We claim there was a contrast, but since most items have *nN, not *hN, we rewrite Iannucci's reconstructions *nN.

Numic *hN and *nN

Within Numic the evidence for N + N versus H + N is not extensive, in fact, practically non-existent; basically, we get *nm, *hn, and *hŋ. These three clusters have regular reflexes outside Numic (the others, *hm, *nn, and *nŋ, basically do not). Outside Numic what corresponds to *nm is like *m or *V_1m; and what corresponds to *hŋ is like *V_1ŋ. Thus only Numic provides distinctive evidence for *hŋ, but for *nm and Num *hn (= UA *nn) distinctive reflexes do occur in other UA branches. The following are some examples:

nm	hm
*tonmo 'winter' UA	*tahma 'spring (season)'
*kanma 'to taste' UA	*kuhma 'Hu' ~ *kuma
*kanmɛ 'jackrabbit'	< PUA *kuŋa
*kinma 'to come' UA	*pahmu 'tobacco'
*nanmiʔ 'ySi'	< PUA *piipah
*tanmu 'sinew' < *tap, **tah	two of these are special in same way
*tan-mə 'we-incl'	

hn

*kahni 'house' UA

*pohni(tt)ya 'skunk' diffused

*kohno 'cradle'

*ʔoh(ni) 'to cough'

*pih(na) 'sweet'

*pə[illegible]niʔ 'ySi' W [illegible]

One case of *nn is reconstructible:

*hanni 'to do'

*[illegible]oŋo '[illegible]'

*ʔoŋa 'salt' UA

*naŋa(h)pə 'chest' 'basket'

*taŋŋah 'knee'; 'to kick' UA (+ Tub only)

only one case

*ʔohŋaaʔ 'baby'

*yəhŋən 'porcupine' UA

*ʔahŋa 'armpit' UA

*cuhn^u/ih pipe;bone UA

*kəna(h) 'beard' diffused?

Numic medial *hw, *hy and *nw

In Numic (N)UA medial *y drops.

Medial *w drops also except in WNumic.

In WNumic morpheme final h combines with morpheme initial w or y to form a stop-onglided semivowel:

kk^w and tt in Mo;

k^w and t^y in NP

Further these h+w and h+y clusters are reflected as w and y in C and S Numic, i.e. they do not drop.

Thus Numic *hw and *hy are reconstructed.

But there are also cases where the Numic languages have medial /w/ and /y/ across the board.

So, is it that (N)UA *w and *y do not in fact always drop? No. If we call upon the [illegible] bable f[illegible] (or proto) Numic has second-mora stress, w[illegible] g n r ll, W Numic [illegible] s s[illegible]r [illegible] g[illegible] n d [illegible] of *[illegible] *[illegible] immediately after stress, and Numic generally has [w] and [y] before stress. Pre-stress across-the-board /w/ and /[illegible]/ in Numic are taken as reflexes of *hw and *hy before the accent. Medial *w and *y are in fact reflected according to the initial statement, i.e. *y drops, and *w is presented only in W Numic.

In fact proto Numic needs both *hw and *nw, the latter being the notorious pUA *[ŋ^w].

In a few cases, in order for the above stated rules to work, stress must be assumed to fall on a first rather than a second syllable. In Figure 3 are given the sound correspondences and a list of all forms containing pNumic *hw, *hy and *nw with stressed marked.

The pNumic clusters *hw and *hy are typically reflected as V$_1$w and V$_1$y in those other UA languages that have vowel length. However externally V̄w and V̄y reconstructed from non Numic-languages do not necessarily yield Vhw and Vhy in Numic. So unless some of the Numic forms (either those with Vhw/y or those with Vw/y) from pUA have been arbitrarily mangled, we must *hy and *hw, as well as *nw, for preNumic i.e. for pUA.

Consider the following items:

	'knife'	'awl'
	*wihi < **wihcV	*wihyi
1.	wihi	wihti
2.	wihi	
3.		
4.	wihi(n)	
5.	wihi	
6.		
7.	wihi	
8.	wi(h)ih	wii-

I-278

*wihi(h)

'awl' *wihyi and 'knife' *wihi are doublets from pUA *wihcV (cf Se wicə?t, Ta wicá)

	*-hw	*-ʔnw-	*-nw	*nw *[w̃]	-hy-	-hy-
1.	Hw		Hw	w, m; ↓	ht	y
2.	Hw		Hw	w	c	h, ∅~ʔ
3.	w	ŋŋ^{w}	w	w *[w̃]	χ	χ
4.	[w]	ŋw	w	m, w; ↓	[y]h	y~h(y)~∅
5.	w	n		w	y..	y, h, ∅
6.	w	n		w		
7.	[w]	ʔ(ŋ)^{w}				
8.	[w]	ʔŋ^{w}	ŋ^{w}	ŋ^{w}	[y]	y

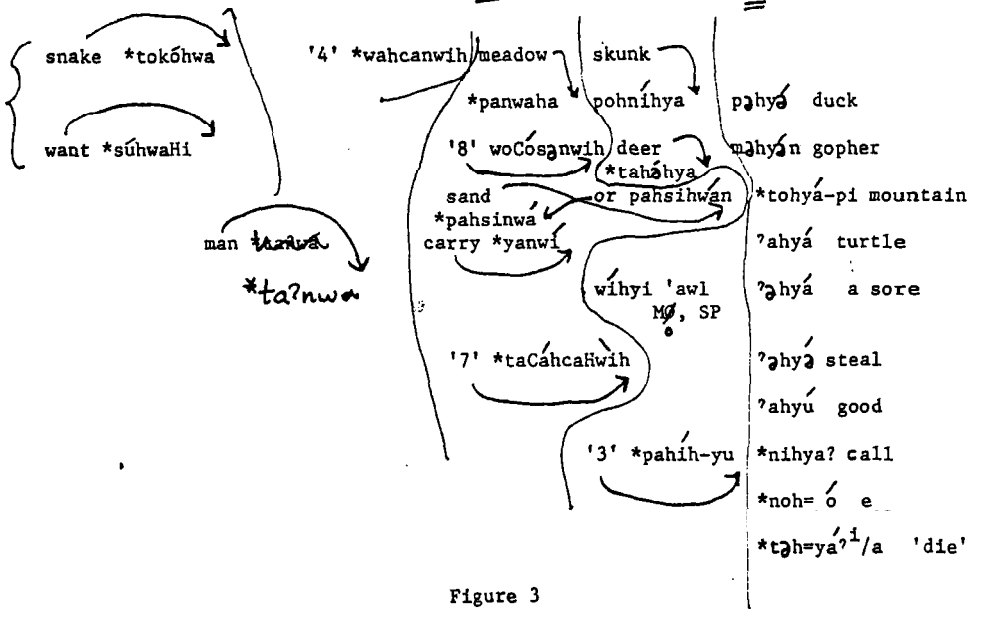


Figure 3

If hc → hy/Vh__, does hc → h/Vh__ i? Yes!

pUA **wihcV 'knife'

pNum *wihi(h) (Iannucci 278)

wihi	1	wihi(n)	4	wihi	7
wihi	2	wihi	5	wi(h)ih	8
	3		6		

Iannucci does not recognize *nw, nor most of the cases of *hw and *hy that we reconstruct.

Note that for one item *ta?nwá 'man' we reconstruct a pre-cluster *?. This somewhat hokey device stands for a unique correspondence that clearly reflects both velar nasality and labiality; inasmuch as SNum has [?ŋw], it is at least plausible that something of this phonetic nature was the pNum pronunciation. Tub has a cognate [taatwa-l] where the second [t] may correspond to the Numic ?. But the Tub form may be reduplicated, i.e. [taatwa-l] < taa-H-]tawa-l leaving Numic ?ŋ^{w} corresponding to Tub w.

Numic medial *?s from UA *nc (via *ns)

This correspondence is not recognized by Iannucci. It can be arrived at only by extrapolation from pUA *nc (to be justified later).

The reconstruction of *?s may seem arbitrary. To justify our reconstruction we need to refer to what happens to medial UA *s in Numic. In all Numic the reflex of UA medial *s is *h in a couple of words, and phonetically long [s·] otherwise. This [s·] is not subject to lenition or any other change by preceding final features at morpheme boundaries. One might consider phonologizing it *hs, except that such a choice would be vacuous by comparison to simple *s. Also extra-Numic facts suggest no *hs for pUA. The reflex of UA *nc (or *ns) in Numic is found in at most 3 known etymologies. The reflexes in various languages are hs, s, h, and ?. Obviously, if Num *[s·] is */s/, the

reflex of *ns has not falled together with it. Our choice, *?s, is merely suggestive of its various reflexes. Another scholar, or we ourselves on another occasion, might suggest Num *hs < UA *s and Num *s < UA *ns.

Numic words with *?s

Mo	puhsi	wihsi	
NP	pui		pusi?i
Pa	?m]pui		
Sh	puih < puhi	wisun	posiatih
Cm	pui(h)	wiyaa?	pusi?a
Ka			
Ut	pu?i[pi		poo?api
SP-Ch	pu?i		po?a
	I-155 *pu?i(h)	5-280 *wisu(n)	I-161
	TK *pu?si	TK *wi?sV	TK *po?siCa
	'eye'	'string'	'louse'
	pUA *punci	pUA wincV	

Numic *nc

This cluster does not descend from any pUA cluster.

In two cases the possibility presents itself that Numic *nc arises from the infixing of *n before UA *s.

(a) Num *wonc(i)a 'fox'. Cf. Tak *qVwee {sV? / w} iHta

(Lu qiwéewi-š, CA qáwi?si-š, Cu kawís?i-š).

The proximate antecedent would be *woosin, or possibly *wonsiCV. If the former, Num would have *nc (< *ns) by feature jumping. The remaining discrepancies suggest diffusion.

(b) Num *mosoCi 'mustache' and *mocon ~ *monco 'beard' are doublets, both derived from pUA *musan 'whiskers'. The nowel sequence *u...a has been leveled to *o...o and *mosoCi has a suffix. *monco comes from *moson by feature jumping, and *mocon shows secondary feature jumping based on *monco.

UA *musa ~ *muusi

'beard' ⟶ 'mustache'

1.		
2.		mosui
3.	om]moco	
4.	mocon	
5.	moco	
6.		
7.	?	?
8.	monco	mošoi
	I-96	I-95
	*moco(N)	*mosui

Medial Consonants that drop (or go to ?) in some languages

The most apparently disorderly aspect of Numic medials, apart from *hw *hy *nw and *?s, concerns VV sequences (both V_1V_1 and V_1V_2) and medial glottal stops. Iannucci did not work this out satisfactorily. We have made it systematic by

(a) establishing the regular sound correspondences within Numic, however many they might be.

(b) relating them to UA phonemes established on extra-Numic data.

We do not, of course, know where all the Numic words with medial *C, *H, and *? come from. We do know, however, where many of them come from and we can state the relation between the (N)UA phonological state and the Num phonological state in terms of regular sound change.

Non-initial *?

There are 3 correspondences that we assign to *?, one medial, 2 final:

(a) medial, (b) final after $\breve{V}$, (c) final after $\bar{V}$

Mo	Ø;?/V_1=V_1	(?V_1)	..V_1V_1?V_1 / .. V?V
NP	Ø(;?);?/V_1=V_1	?V_1	
Pa	?(,Ø)	--	..V?V
Sh	Ø	Ø	..V_1(?)V_1
Cm	Ø;?/V_1=V_1	?	..V_1V_1?
Ka	?~Ø	--	--
Ut	?	--	--
SP-Ch	?	Ø	..V_1V_1

line up

cases showing (a) *wa?V 'pintle', *ya?V 'die', *kə?i/ə 'bite', *si?i/a 'piss', *yə?ə 'swallow', *ko?i 'kill', *na?i 'burn', *wi?an 'acorn', *pa?ah 'up', *ca?i 'hold', *wo?a 'bark', *pa?i 'hit', etc.

↑ raise ↑ raise

cases shing (b) *kənu? 'GrFa'. *papi? 'eBr', *kaku? 'FaMo', *toko? 'MoFa, DaCh', *sɔmə? 'one', *ʔətə? 'hot', *paci? 'eSi'.

cases showing (c) *taCipoo? 'white man', *satɨ? 'dog', *natənoo? 'saddle', *kəmaa? 'edge.

correspondence (a) regularly corresponds to extra-Numic *ʔ.

correspondence (b) seems an innovation in Numic as does (c).

Two kinds of hiatus, *C and *H

	*C	*H
Mo	Ø	ʔ;y/V_1=V_1
N	Ø	Ø(,ʔ)
Pa	Ø	Ø(,ʔ)
Sh	Ø	Ø(,ʔ)
Cm	Ø	ʔ
Ka	Ø	--
Ut	Ø	ʔ
SP-Ch	Ø	Ø

The symbol *H that is used to represent this correspondence has no special motivation; we need to differentiate it from *ʔ, from *C (an across-the-board disappeared consonant), and *X (a missing consonant but not attested across-the-board, where we can't say with certainty whether it was *ʔ, *C, or *H). To repeat, *C, *ʔ, and *H represent recurrent correspondences, which cannot be collapsed. When external evidence is available, *ʔ corresponds to **ʔ, *C corresponds (among other things) to **w and **y after long vowels, and *H corresponds (among other things) to **w, **y, and **h after short vowels.

Some examples of *C:

*piCa 'big'; 'mother'; 'leave', *təhoCi/a 'hunt', *wihtuCa 'basket', *muCih 'fly', *təCah 'little', *tuCah 'child', *kiCihpə 'elbow', *noCo 'carry', *haCinci 'friend', *hupiCah 'sing/song', *suCah 'think', *ʔaCə-ka 'new', *məCa 'moon', *ʔəCa (SP) 'plant', *pa-kəCu 'fish', *taCipoo? 'white man'.

Some examples of *H:

*poHo 'road', *paHa 'water', *woHa 'worm', *toHi 'pipe', *poHa 'skin', *miHa 'go', *suHa 'eat up', *wənaHi 'throw down', *hoHa 'back', *ʔoCoHi 'puke'.

UA	*sŭwa	'use up'	>	*suHa
UA	*mĭya	'go'	>	*miHa
UA	*hŏ-waa	'back'	>	*hoHa
UA	*pŏ-waa (or *pohaa)	'skin'	>	*poHa
UA	*poh-hV_1 (or *po-hV_1)	'road'	>	*poHə
NUA	*məəya	'moon'	>	*məCa
NUA	*ʔəəya	'plant'	>	(SP) ʔəCa
NUA	*ʔaayə	'new/now'	>	*ʔaCə-ka
NUA	*kəyuu	'fish'	>	pa-kəCu SNum
NUA	*suuwə	'believe'	>	*suCah

here before *V̄.

NUA *kʷiCin 'smoke' > pre Num *kʷiŋin > *kʷiCih ~ *kʷihi

NUA *maaci 'visible' > pre Num *maayi > *maCih ~ *mahi?

NUA	pre-Num k^{w}iiyin	
k^{w}ucin	'smoke'	> k^{w}iCih ~ k^{w}ihi
maaci	'visible'	maCih ~ mahi?
	pre Num Maayi	

Numic medial postvocalic *w drops in all Numic languages but Mo and NP (occassionally perhaps also kept in Pa). Numic medial *h drops in Pa, Ut, SP (not Ch) and occasionally in Sh. Thus

	*w	*h
Mo	w	h
NP	w	h
Pa	∅(,w)	∅
Sh	∅	h,∅
Cm	∅	h
Ka	∅	h
Ut	∅	h
SP=Ch	∅	SP ∅ = Ch h

Examples of medial postvocalic *w where DI incorrectly reconstructs something else are:

*kawi-pa	'mountain'
*nawi	'girl'
*yaʒwaʒh	'opening'
*caʒwaʒ	'to count'
*cawVh	'good'
*sawi	'to melt'
*wawakaĉo	'frog' [R]

What Happens to NUA Monosyllabic Noun Stems in Numic

pUA has monosyllabic noun stems--Numic does not. (Hopi doesn't either.) Original monosyllabic noun stems get an extra syllable in Numic. Unlike Hopi, however, where -(h)ə is universally added, there is more than one increment in Numic, and they probably represent etymologically different suffixes. In the list that follows, we can make the following observations.

(1) Num *huCa (~ *huCu) 'arrow' can come from NUA *huuya and is cognate with Ca/Cu huya-l 'idem'.

(2) Num *woCo(h) can come from NUA *wooyo (for which there is no evidence).

(3) 'soot', 'guts', 'hair', and 'breast' end in *-hV$_{1}$, (somewhat like Hopi -hə and possibly cognate with it). There is no evidence from other UA that these stems ended in *-h, rather the evidence is that they ended in a long vowel.

(4) 'sun' and 'hand' occur only as prepounds, thus are always parts of at least disyllabic stems.

(5) 'road', 'egg', and 'two' for which outside evidence suggests that they ended in *h.

All plausibly reflect NUA *h:

Num *poHo 'road' can be from NUA *poh-V$_{1}$ (or *pŏyo).

Num *nohyo 'egg' reflects *noh (+ yo otherwise unknown).

Num *waha 'two' reflects *-h- but implies that the preceding vowel was long, for which there is no outside evidence (only *wah- is supported).

Num *woCosənwih '8' comes from UA *woh- 'two' but the precise identity and source of the additional material is unclear.

	UA		Num
A.	*CVV		~huCu
	*huu	'arrow'	huCa C/S Num < *huuya
	*woo	'head hair'	woCo(h) W Num < *wooyo
	*paa	'water'	paHa; pa = ~ pah = ~ pan =
	*tuu	'soot'	tuhu
	*sii	'guts'	sihi
	*pəə	'hair'	pəhə
	*pii	'breast'	pi-ci W/E ~ pihi S piCa 'mother pihwə W/E ~ pihyə C/S 'heart'
	only as prepounds		
	*taa	'sun'	ta=
	*maa(~*mah)	'hand'	ma = ~mah =
B.	*CVh		
	*poh	'road'	poHo
	*noh	'egg'	nohyo (and noCV ?)
	*woh~wah	'two'	waha woCo[w]ih '8' < woho...

spread out

Numic medial consonants correspondences are shown in the following chart (figure 4).

Summary: Sound Correspondences for Selected Medials

	*w	*h	*?	*C	*H	*hy	*hw	*nw (when different from *hw)	*?s
Mo (1)	w	h	∅;?/V_1=V_1	∅	?;y/V_1=V_1	-ht/y-	-hkw/w-	w,m	hs
NP (2)	w	h	∅;?/V_1=V_1	∅	∅	-c(?)-	-k^w/w-	=Ø	∅,s
Pa (3)	∅	∅	?	∅	∅	y	w	=Ø	∅
Sh (4)	∅	h,∅	∅	∅	∅	y	w	w,m	∅,s
Cm (5)	∅	h	∅;?/V_1=V_1	∅	?	y	w	=Ø	∅/y,s
Ka (6)	∅	h	?~∅	∅	(?)	y	w	=Ø	(?)
Ut (7)	∅	∅	?	∅	(?)	y	w	(?)	?
SP (8)	∅	∅	?	∅	∅	y	w	(?)	?
Ch (8)	∅	h	?	∅	∅	y	w	$ŋ^w$	?

Figure 4

'Instrumental Prefixes' in Numic

Across the board, Numic languages have on the order of 20 elements each that function as prepounds in compound noun and verb stems. In verb stems they indicate the manner or instrument of the action; in noun stems they indicate a noun modifier. At least eighteen of these items, conventionally known as 'instrumental prefixes' can be reconstructed to pNumic (See chart at end of this section.) Two of them (12) 'water' and (13) 'sun' are noun modifiers only; the rest may also be verb modifiers.

All these instrumental prefixes are monosyllabic. In most languages they all (but (#12) *pa:= 'water' and (#13) *ta:= 'sun') end in h. In a few languages 2 or 3 or them end in a vowel ((#11) *ma(h)=, 'hand', (#10) *mu(h)= 'nose', (#18) *su(h)= 'mind'), and one ends in n (#8 *tɔn= 'stone').

*CV(h)=# forms might well be reconstructed *CV=, with h added in some languages by analogy with the remaining instrumental suffixes. Thus 12 of them end in h. Four of the items in final h are identical with independent noun and adjective stems occurring outside Numic.

(5) *wəh= 'long'

(6) *pih= 'behind'

(7) *kun= 'fire'

(9) *səh= 'cold'

The rest of the items in final h (7 of them) are (apparently) shortened from independent disyllabic stems reconstructible from data outside Numic

(3) *cah= < *ca?i

(4) *kəh= < *kə?i/a

(5) *wəh= < *wəpaa.. 'whipping'

< verb

(14) *coh= < *cohɲi

(15) *tah= < *tannah

(16) *toh= < *toɲoo

(17) * uh= < *punci

< noun

SUA *cohɲi may contain a derivational suffix, thus supporting pUA root *coh= which however has little other support than this putative segmentation.

In two cases the originally independent root cannot be identified:

(1) *cih=

(2) *toh=

The prepounds that are derived from disyllabic noun or verb roots have the shape CVh-# even though C_2 would be reflected as a Numic word-medial nasal in the uncontracted form. This is a mystery, unless pattern pressure has analogically converted expected CVn to CVh in these prepounds (except (#8) *tɔn= 'stone').

Those that are derived from monosyllabic roots keep the original shape of the root unchanged.

The prepounds ending in a vowel can be related to UA forms ending in a vowel or containing a semivowel.

(10) *mu- 'nose' of *mu(k)=pi(h)

(11) *ma- 'hand' UA *maa ~ mah

(18) *su- 'mind' UA *suuwah

The conversion of syllable-final obstruent and nasal C to *h in Numic in these instances foreshadows a general conclusion that we will eventually be able to come to: immediately before or after pUA times UA morphemes could end in a variety of consonants other than the *h and *n that we can reconstruct on the basis of regular sound correspondences. Some of these consonants may have dropped without a trace, others turned into vowel length, others became *n, and most became *h. This is not to suggest that there may not have been a majority of stems that ended pristinely in a vowel (perhaps only short).

Corresponding functionally to Numic instrumental prefixes are bound prepounds in such other languages as Cahuilla-Cupenyo and Pima-Pa a o, but the forms of the few items that are cognate between Numic and these other languages seem to show that the monosyllabic prepounds derived from originally disyllabic stems are independent developments. That is, though pUA may well have had patterns of first position incorporation of a limited set of noun and verb modifiers, they did not have special reduced phonological forms at the pUA stage.

DATA

2 source unknown

(1) *cih= 'point' W/C/S

(2) *toh= 'fist' (W)/C/S

3 from verb

(3) *cah= 'pulling, grasping' W/C/[S] < Num *ca?i 'to catch, grasp'

(4) *kəh= 'biting, teeth' W/C/S < UA *kə?i/ə 'to bite'

(5) *wəh= 'long, whipping' W/C/S < UA *wəpaa.. 'to whip'
and UA *wəh 'big'

8(9) from (and same as) monosyllabic noun root

(6) *pih= 'behind, buttocks' (W)/C/S = UA *pih 'back'

(7) *kuh= 'fire' W/C/S = UA *kuh

(8) TK *tan= WM *tah= 'stone' W/C/S = UA *tən (Num *tənpih)

(10) *mu(h)= 'nose' W/C/S = UA *mu(k)=pi(h) (Num *mupih)

(11) *ma(h)= 'hand' (W)/C/S = UA *maa~mah (W Num *maHa)

(12) *pa= 'water' (bound noun only) W/C/S = UA *paa (Num *paHa)

(13) *ta= 'sun' (bound noun only) = UA *taa

(9) *səh= 'cold' C/S = UA *səp > *səh

(14) *cohn= 'head' W/C/S < UA *cohni 'head'

(15) *tah= 'foot' (W)/C/S < UA *tannah 'foot'

(16) *toh= 'foot, leg' W/C < UA *tonoo 'knee'

(17) *puh= 'eye' W/C/S < UA *punci 'eye' (Num *pu?si)

(18) *su(h)= 'mind' W/(C)/(S) ? UA *suuna 'heart'; but cf UA *suuwah→Num *suCah 'breath', YM suuwa 'to notice, believe' which is more likely.

- 5(9) from disyllabic noun stem

Figure 5

Feature Jumping in Numic

There are 2 ways in which the features in stem final position or before C_2 can show discrepancy:

(a) the various Numic languages do not attest a single p̂Num form.

(b) Numic across-the-board disagrees with other UA languages.

Typically in these cases, some or all Numic languages have taken a stem-final feature and jumped it to before C_2.

UA *wokon 'pine' → Num *wokon [S] (~ *wonko) [W/C]

UA *musan 'whiskers' (→moson → monso) → *monco (~*mocon)

Sometimes the opposite occurs:

(UA *punci→) Num *pu?si (→puhi→puih Sh) 'eye'

We hope interested scholars may be able to point out additional examples of feature jumping.

In some cases a Numic final *n or *h has been copied from C_2 or C_1:

UA *huumaa → Num hunan 'badger'

UA *nəəmaa → Num nəmən 'liver'

Other discrepancies:

UA *paakaa 'reed' → Num *pakan

UA *?anən 'ant' → Num *?ani

We reconstruct the following phonemes to p Numic

consonants

p t c k k^w ?

s h -H-

m n -ŋ

y- w

vowels

i ə u

o

a a:

stress: on second vowel

Note that *-ŋ is medial only. Unlike DI, we are not in doubt as to its reality for pNum. Note also that *y does not occur after V. *-H- is a special correspondence treated earlier.

Morpheme canons

$$CV \begin{Bmatrix} h \\ n \end{Bmatrix} \left(CV_2 \begin{Bmatrix} h \\ n \end{Bmatrix} \right)$$

*s *h *? do not occur with preceeding *h or *n

*ny is not known to occur

all other $*\begin{Bmatrix} h \\ n \end{Bmatrix}$ C combinations are attested

V_1V_1 and V_1V_2 clusters occur (we write them *VCV)

The regular sound correspondences among the Numic languages, apart from those already treated above, are as follows:

p t 'c k k^w s m n w y h ?

These consonants have identical reflexes in all the languages, except that *k > k/q and $*k^w > k^w/q^w$ in Mo, and *h > ʔ (i.e. ?) in SP.

Note: there is no initial *ŋ

Other Numic correspondences are presented in Figure 6.

Medial Obstruents

pNum	Mo	NP	Pa	Sh	Co	Ch	SP	pNum [...]
p	p	p	p	p	v/β	p	p	*[b, β, v]
hp	pp	pp	pp	pp	hp/p	pp	pp	
np	pp	pp	mp	mp	p	mp	mp	
t	t	t	t	[r]/[ð]/t/	r	[r]/t/c	[r̄]/t/c	*[r, ð] V̄r̄ Vr
ht	tt	tt	tt	tt	ht	tt/c	tt/cc	
nt	tt			nt				
c	c	c		c	c	c	c	
hc	cc	cc	cc	cc	hc	c	cc	
nc	cc				c	nc	nc	
k	k/q	k	k	k	k	k;w/u	k;k^w/u	*[g, ɣ, g, ɣ]
hk	kk/qq	kk	kk	kk	kh	kk;kk^w/u	kk;kk^w/u	
nk	kk/qq	kk	ŋk	ŋk	·k	ŋk	ŋk	
k^w	k^w/q^w	k^w		k^w	k^w	w	k^w	*[g^w, $ɣ^w$, g^w, $ɣ^w$]
hk^w FN	kk^w/qq^w	kk^w	kk^w	kk^w	k^w		kk^w	
nk^w	kk^w/qq^w	kk^w		$ŋk^w$	k^w	$ŋk^w$	$ŋk^w$	

Figure 6a.

Note:
consonants written double without square brackets are phonemically /hC/ when C is obstruent, /nC/ when C is nasal.

FN the best examples are *yəhk^{w}i 'sit (durative)' and *tahk^{w}a 'hard'

Medial Nasals

pNum /.../	Mo	NP	Pa	Sh	Co	Ch	Sp
m	w	m	m	m	m	w	[ŋʷ]/m/
nm	mm	mm	mm	mm	mm	mm	mm
hm	mm	mm	?	hm	hm	mm	mm
n	n	n		n	n	n	n
nn		(n)n	nn	nn	n		
hn	h	h,nn	hn	hn	hn		nn
ŋ	n	ŋ	ŋŋ	n	n,m	∅	∅
nŋ	?	ŋ	ŋŋ	nn,ŋk	n	ŋŋ	ŋŋ
hŋ	var.:	ŋ(hn)			hn	ŋŋ	ŋŋ (ʔ?)
	h(wm,w)			hn(hm)			

Figure 6b.

Note: Mono changes CVhCV to CVCV in prefixed stems.

Vowels

pNum	Mo	NP	Pa	Sh	Co	Ch	SP
i	i	i		i	i	i	i
ə	ə	ə		ə	ə	ə	ə
u	u	u		u	u	u	u
o	o	o		o	o	o	o
a	a	a		a/e	a/e	a	a
a:	e	a(i)	e	e	e	a	a

Figure 6c.

The evidence seems clear that pNum had a six-vowel system. The sixth vowel *a: conditions certain consonant reflexes like the other front vowel *i, even in languages where *a: has shifted to a. As it turns out pNum *a: comes from pUA *a when its source is known. How it developed is still unclear. We use the symbol *a: instead of DI's *e to show its wider UA correspondence, but there is no principled reason for avoiding *e in pNum reconstructions. It should be noted that the CNum [e]< pNum *a is a different situation that does not in any way show that pNum lacked a pheneme *a: (or *e).

Summary: How Numic developed from pNUA.

As will be shown below, pUA had certain specific medial clusters of the shape *hC, *nC, and *?C. (The phoneme system of pUA is also outlined later.) We indicate here how Num develops phonologically from pUA via pNUA.

pUA pNUA

*c → *y/ə_

*hc → *hy/V_V

*ŋ → *n in affixes

pNUA → pre Num

*c → *y /_i

*nc(→ns)→ *?s

pNUA Num

? → Ø/_C

initial *ŋ → n

*s...n(→ ns) → *nc

*V̄ → V̆

*Hop stress > second { mora / stress (vowel) / (syllable) }

medial { *w / *h / *y } → *H/V̆__

medial *y → Ø/V̄__

*s → *h/V_V

These statements may serve as an index of how Numic is not phonologically conservative.

We have stated (in anticipation of what pUA really was like, which we will justify below) how Numic deviates phonologically from p(N)UA. Numic is valuable for *hŋ, *hy, *hw, *nm, *nn and *{n/h}C and final *{n/h} generally. Since Numic is one of the few UA branches to provide no direct (and little indirect) evidence for pUA vowel length, we find the view, expressed by some, that pUA may not have had vowel length, to show an unwarranted Numic bias.

The following lists (a) make specific modifications in DI's pNum reconstructions, (b) highlight particular reconstructions we with to be considered in detail by the reader, (c) name Numic etymologies not treated by DI (without, however, citing supporting data--to the undoubted chagrin of some).

Medial *hm and *nm

TK	*kuhma → *kuma	'Hu'	(not I-66 *ku(n)ma)
TK	*pahmu	'tobacco'	(not I-133 *panmu(h)) W/C Num
TK	*tahmu	'spring (season)'	(not I-203 *ta(n)ma)
TK	*tanmu	'sinew'	I-204 OK
TK	*kanmə	'jackrabbit'	I-51 OK
TK	*kanmạ	'to taste'	I-50 OK
TK	*tonmo	'winter, year'	I-216 OK
	in ablaut relation with *tomoh 'cloud'		
K	*kinma	'to come'	I-43 OK
New TK	*nanmi?	'ySi'	C/S^Num
TK	*ta(n)-mə	'we - incl'	(not I-205 *ta(n)-mV, *ta(n)-nV)
New TK	*-Hma..	'with'	W/S^Num

Medial *hn and *nn

New TK	*kohno 'cradle'	C/SNum	
TK	*pohnihya 'skunk'	(not I-152 *poni(a))	
	This is an areal word		
TK	*kahni 'house'	(not I-52 *kanni)	
TK	*ʔohni or *ʔoh..'to cough'	(not I-14 *ʔonni)	
TK	*pihna or *piha or *pih 'sweet'	(not I-163 *pih(C)a)	
TK	*hanni 'to do'	(not I-29 *ha(n)ni)	
TK	*pəⁿnniʔ 'yɔ̂i'	(I-171 *pənni(ʔi))	
	is W$\hat{}$Num only so PNum *nn or *hn cannot be established		
New TK	*təhna(a) 'hunting, meat'	W/SNum	(ID-162)

medial *n, *hⁿ, and *nⁿ

*nəⁿnⁿa(h)pə

TK	~~*na na(h)~~p 'chest'	(not I-125 *nⁿⁿa(h)pəh)	
TK	*ʔoⁿa 'salt'	(not I-16 *ʔoⁿa)	
TK	*soⁿo 'lungs'	(not I-182 *soⁿo)	
New TK	*kanⁿ(h) 'beard'	W/S Num	should have *ⁿ; diffused?
TK	*tanⁿah 'knee'	(not I-208 *tanⁿa)	
TK	*ʔohⁿaaʔ 'baby'	(not I-15 *ʔoⁿa(a)(ʔa))	
TK	*yəhⁿən 'porcupine'	(not I-296 *yənnəh)	
New TK	*cuⁿⁿuh SNum 'pipe'		
	*cuhⁿi(h) CNum 'bone'		
TK	*ʔahⁿa 'armpit'	(not I-1 *ʔahna)	

panwáha

	*-nw- and *-hw- 'meadow'	(not I-144 *paʷ/maha)	
	from pUA *paa 'water' + *waasa 'field'		
	*pasinwá or *pasihwán 'sand'	(not I-194 *(pa)siwa(h))	
	from pUA *paa 'water' + *sihYa.. 'sand'		
	*yanwí 'to take, carry'	(not I-289 *yaa)	
	*woCósən-wìh 'eight'	(not I-271 *woosəᵐ/wih)	
	*taCáhcə-wìh 'seven'	(not I-200 *taa(h)cəʷ/ɨih)	
	*wahcən-wih 'four'	(not I-268 *wa(h)cə)	
	*taʔnwá 'man'	(not I-213 *tena)	
ewTK	*ʔahwə.. 'ground squirrel'	(Mo ʔehkʷə, Ka ʔewuh-ce)	
TK	*tokóhwa '(rattle)snake'	(not I-219 *toko(h)wa)	
TK	*súhwaHi 'to want'	(not I-185 *su(h)waʔi)	

*hw and *nw have distinct reflexes only in SP which relates irregularly to pUA *hw and *nw ; so that perhaps pUA *nw and *hw have fallen together in Numic and re-split (irregularly?) in SP.

*-hy-

New TK	*wihyi 'awl'	w/S Num	
TK	*pohnihya 'skunk'	(not I-152 *poni(a))	
TK	*pahíh(yu) 'three'	(not 1-132 *pahi)	
TK	*təhəhya 'deer'	(not I-237 *təhə)	
TK	*məhyən 'gopher'	(not I-103 *məyə(n))	W/S$\hat{}$Num
New TK	*ʔahyú 'good'	S$\hat{}$Num	

New TK	*ʔahyá 'turtle'	S͡Num
TK	*tohyá-pi 'mountain'	(not I-221 *toya) W/CNum
TK	*(tə̰h=)yáʔⁱ/a 'to die'	(not I-251 *tə̰ya)
	*tə̰h = is from pUA *tə̰h=# 'supernatural', *yaʔⁱ/a is from pUA *yaʔa 'yearn after, feel strong emotion'	
TK	*nihyá 'to name/call'	(not I-117 *ni(C)a)
TK	*pə̰hyə̰́ 'duck'	(not I-169 *pə̰..)
TK	*nohyó 'egg'	(not I-115 *no(yo))
	and *noCo	
New TK	*ʔə̰hyá 'a sore'	WNum
New TK	*ʔə̰hyə̰́- 'to steal'	SNum
New TK	*tomoh-yáka 'thunder'	W/CNum

Final ʔ

TK	*tokoʔ 'MoFa, DaCh'	(not I-218 *toko͡(ʔo))
TK	*kaku? 'FaMo'	(not I-53 *kaku(ʔu)) W/SNum
TK	*papiʔ 'eBr'	(not I-139 *papi(ʔi))
TK	*sə̰mə̰ʔ 'one'	(not I-198 *sə̰mə̰(ʔə̰))
TK	*kə̰nuʔ 'GrFa'	(not I-75 *kə̰nu(ʔu))
TK	*paciʔ ' ʔi'	(not I-143 *paci(ʔi))
TK	*ʔə̰tə̰ʔ 'hot'	(not I-26 *ʔə̰tə̰(h))
TK	*natə̰noo? 'saddle'	(not I-11 *nat no?o)
TK	*satii?~*satə̰ə̰ʔ 'dog'	(not I-179 *satii, *sati(?i))
TK	*taCipooʔ 'white man'	(not I-201 *ta(C)ipo(ʔo))
TK	*kə̰maaʔ 'edge'	(not I-74 *kə̰maa, *kə̰ma(ʔa))
TK	*ʔokyaaʔ 'baby'	(not I-15 *ʔoŋaCa(ʔa))

*-ʔs- from pUA *-nc-

TK	*puʔsi 'eye, seed'	(not I-155 *puʔi(h)): pUA *punci
TK	*wiʔsV 'string'	(not I-280 *wisu(n)): pUA *wincV
TK	*poʔsiCa 'louse'	(not I-161 *p^{u}/o͡siʔa): no outside cognate (replaces pUA *ʔatə̰)

*-nc-

New TK	*wanci 'antelope'	C/SNum
New TK	*yonco(ka) 'soft'	W/CNum
TK	*wonca WNum *wonciXa SNum } 'fox'	
TK	*haCinci 'friend'	I-27 OK
TK	*monco 'whiskers'	(not I-96 *moco(n))

-C-

New TK	*ʔoCoHi 'to puke'	W/CNum
New TK	*huCa 'arrow'	C/SNum
TK	*noCo 'to carry on back, haul'	(not I-112 *no(ʔ)o)
TK	*piCa 'big'	(not I-168 *pi(y)a) C/SNum
New TK	*ʔaCə̰-ka 'new'	C/SNum
TK	*wihtuCa 'bucket, pot'	(not I-279 *wihtua)
TK	*taCipooʔ 'white man'	(not I-201 *ta(C)ipo(ʔo)) W/CNum
TK	*tə̰Cah 'small'	(not I-235 *tə̰(e)(h), *tə̰(ə̰)(h)) W/CNum
TK	*tuCah 'son, child'	(not I-233 *tu(w)ah, *tu(w)a(ʔa))
TK	*kiCipə̰ 'elbow'	(not I-70 *kii(h)pə̰)
TK	*haCinci 'friend'	(not I-27 *ha(C)inci(h))

TK *pa-kəCu 'fish' (not I-146 *p^{a}/enk^{w}i)

→ *pank^{w}i C/SNum (< *pankuCi < pa(n)kiCu < pa(n)kəYu)

pUA *kəcuu 'fish'

TK *piCa 'to leave behind' (not I-174 *pəya)

TK *məCa 'moon' (not I-102 *mə?a(h), *məha(h))

TK *hupiCah 'to sing; song' (not I-38 *hupi(y)a)

TK *suCah 'breath' (not I-187 *su(w)ah)

TK *muCih 'fly' (not I-98 *mui(h))

TK *təhoC^{i}/a 'to go hunting' (not I-236 *tə(ho))

TK *piCa 'Mo' (not I-167 *pi(y)a)

TK *səCəmah 'ten' (not I-199 *səəma(h)) W/CNum

~→ *səmwi or *səmi SNum

New TK *paCi 'to call' W/CNum

New TK *poCo 'to cut off, cut hair' W/SNum

TK *maCih 'to find, be visible' (not I-93 *mayə(h))

TK *huCih(pi) 'tree' (not I-35 *huuh)

TK *k^{w}iCih 'smoke' (not I-83 *k^{w}iih, *kuhih)

TK *wənaHi 'to throw' (not I-286 *wəna?i)

TK *suHa 'to use up' (not I-183 *su?a)

TK *hoHa 'back' (not I-273 *wo?a(a)) W/SNum

TK *poHo 'road' (not I-154 *poyo, *po?e, *po?i)

→ CNum *po?a

TK *paHa 'water' (not I-127 *paa)

TK *woHa 'worm' (not I-272 *wo?a)

New TK *toHi 'tobacco pipe' W/CNum

TK *poHa 'skin' (not I-149 *po?a(a)(n))

TK *mitta 'to go/walk' (not I-101 *mi?a)

TK *waHihpə? 'woman' (not I-266 *wa?ihpə(?ə)) CNum only!

New TK *coHo 'GrGr^{Pa}/Ch' W/CNum

~~New TK *?oCoHi 'to puke' W/CNum~~

-X- undeterminable dropped middle consonant

New TK *siXa 'leaf, skin' W/SNum

TK *nəXa 'to blow-wind' (not I-119 *nəe)

New TK *coXa(h)pə 'shoulder' C/SNum

TK *siko(Xi) 'to slide' (not I-190 *siko(ə))

New TK *wohciXa SNum
→ *wonca WNum
} 'fox (SK-104)

TK *wiCan (< *wi?an) 'acorn' (not I-281 *wiya(h))

cases of the diminutive suffix *-ci

TK *təpi(-ci) 'very' (not I-248 *təpici)

TK *pa-ci? 'eSi' (not I-143 *paci(?i)) C/SNum

TK *ta-ci-{nuh, hun}-pi 'star' (not I-212 *taci) W/CNum

The sequence *ta-ci- is from pUA *taa 'sun' + *-ci 'diminutive', SNum puuhci-p^{i}/ə is probably = 'little eye'; pNum *pu?si 'eye' SNum puhi).

New TK *hu-ci 'FaMo'

New TK *(pa-)yak^{w}a-ci/ni 'frog'

TK *pi-ci? 'breast' (not I-166 *pici(?i)) W/CNum

TK *haCin-ci 'friend' (not I-27 *ha(C)inci(h))

simplifying multiple reconstructions

TK *ʔəma 'to rain' (not I-23 *ʔə(n)ma)

TK *wanah 'net' (not I-269 *wana(h))

This item is possibly diffused

TK *pawəhpi 'blood' (not I-128 *pa ə hpi, *pəəhpi)

TK *sawa̤n 'raw' (not I-175 *sa(a)N)

TK *ta̤nkih 'grasshopper' (not I-214 *(n)a(a))teŋkih) W/SNum

TK *kawa 'woodrat' (not I-47 *ka(wa))

TK *mona 'SoLa' (not I-94 *m^{o}/una) C/SNum

TK *hunan 'badger' (not I-43 *$h^{ə}$/unan)

TK *ʔawah 'horn' (not I-6 *ʔawa^{h}/n)

TK *yaka 'to cry' (not I-290 *yak^{a}/e)

TK *nohko 'to roast meat' (not I-I14 (no(h)ko) W/CNum

TK *tuhka̤h 'under' (not I-227 *tuh(k^{w})e(h))

TK *co^{h}_{a}=pihki 'brains' (not I-257 *cohpi(h)ki)

*coh= is 'head'

TK *wəʔah 'pintle' (not I-284 *wəʔa^{h}/n)

TK *sipa 'to scrape, shave' (not I-192 *sip^{e}/a)

TK *təpih 'earth' (not I-247 *təpi(h))

indent→ NP and Ka *tihpə is metathesized from *təpih

TK *tacah 'summer' (not I-211 *taca(h))

TK *tapun 'cottontail' (not I-210 *tapun, *tapu(ʔu))

TK *tə̤npih 'rock, stone' (not I-243 *tə̤mpi^{h}/n)

TK *nəmə 'person, Indian' (not I-122 *nə(n)mə)

TK *tuhuh 'black' (not I-224 *tu(h)u(h))

TK *caʔi 'to hold, catch' (not I-253 *ca(ʔ)i, *ce(e))

[simplifying multiple reconstructions]

TK *ko(h)p^{i}/a 'to break' (not I-60 *ko(h)p^{i}/a, *ka(a)(h)pi, (*kə(h)paʔ))

TK *tan=pih 'heel' (not I-206 *ta^{h}/npih)

UA *tannah 'foot' + *pih 'back'. Sh tahpih.. inolves replacement of tan= by Num *tah= 'with the foot'

TK *ʔən 'thou' (not I-22 *ʔə^{h}/n)

TK *ʔi 'this' (not I-21 *ʔi(sə(N))

TK *nə̤mə 'we-excl' (not I-121 *nə(n)-mV, *nə(n)-nV)

TK *ʔu 'that' (not I-18 *ʔu(sə(N)))

TK *k^{w}iʔnaCa 'eagle' (not I-86 *k^{w}i(ʔ)naa(ʔ))

TK *tuʔu 'to fetch' (not I-223 *tu(ʔ)u) W/SNum

TK *wihi 'knife' (not I-278 *wihi(h))

TK *k^{w}asi 'tail' (not I-81 *k^{we}/asi)

TK *kuhtoCo 'to set a fire' (not I-61 *kohtoo, *kuhtuu) W/CNum

I-195 *səʔa WNum '(young) girl' must be etymologically the same as I-196 *səʔa(h) 'to bloom'

TK *tomoh 'cloud' (not I-215 *to(o)(h))

indent This item shows ablaut with *tonmo 'winter'

TK *ʔisa (~ *ʔica.. 'ablaut' variant) (not I-19 *ʔisa '(to)lie',

indent→ I-20 *ʔisa, *ʔica 'coyote') W/CNum

TK *k^{w}asu 'dress, shirt' (not I-79 *$k^{w}as^{u}$/ə)

TK *huhkunpə 'dust' (not I-36 *huhkunpə(h))

sorting out multiple reconstructions

TK *pəta
→ *pəhta WNum } 'arm' (not I-172 *pə(h)ta)

TK *kuta
→ *kuhta WNum } 'neck' (not I-67 *ku(h)ta)

TK *maka
→ *mahka WNum } 'to give' (not I-91 *ma(h)ka

TK *ʔəkʷi
→ WNum ʔekʷi
→ SNum ʔukʷi } 'to smell' (not I-8 *ʔᵊ/ekʷi)

TK *yoko
→ *yoko WNum } 'to fuck' (not I-291 *yo(h)ko)

TK *təka SNum
*təki CNum
*təka WNum } 'to put' (not I-239 *təkV)

TK *nanka 'ear, to hear'
→ WNum *nanki 'ear' } (not I-109 *nankᵃ/i

TK *cuma 'to close the eyes'
→ SP cuʔmmᵃᵃ/i
→ CNum ʔɟh-cumᵃ/i } (not I-259 *cu(ʔ)(h)mᵃ/i

TK *təma 'to close'
*tama 'to tie' } (not I-241 *təma, *tama)

TK *yəʔəh- 'to swallow'
W/CNum *yəhwi < **yəʔəh-wi
SNum *yəʔəh-ki } (not I-299 *yə(h)wi)

TK *paha 'aunt' (not I-134 *pah(w)a)
WNum [pahwa] does not shift //hw// to [kkʷ]

[sorting out multiple reconstructions]

TK *muhu.. WNum
*mu(hu)n CNum } 'owl' (not I-97 *mu(hu(h)))
*muhuh SNum

TK *pạhka C/SNum } 'to kill' (not I-45 *pᵃ/ehka, *pahca)
*pahca WNum

TK *woʔa } 'to shout/bark' (not I-274 *wohi, *woʔa, *waʔa, *woʔo)
→ *wohi WNum

TK *sunpa 'to know, etc.' (not I-186 *sunpᵃ/i)
→WNum su(h)pi

TK *(p)əwi 'to sleep'
WNum ʔə(ʔ)wi
CNum ʔəhpə[w]i
SNum ʔahpə[ɰ̃]i } (not I-24 *ʔəhpəʔi, *ʔə(ʔ) wi)

TK *kʷahti WNum } 'to shoot' (not I-77 *kʷᵃ/əhti)
*kʷəhti CNum

TK *piwəh 'heart' (not I-164 *pi(h)wə, *pi(h)yə)
→*pihi CNum (? < *pihyə < *piyəh < *piwəh)

TK *kʷihta 'to shit'
*kʷitah 'shit' } (not I-87 *kʷi(h)tah)
→WNum *kʷihtah

*kʷihtun SNum 'buttocks, arse'

I-41 *həhkʷa 'to blow; wind' (WNum) is from *həhka-wa-
(cf. Tub ʔəxkowaʔ 'to blow' *həhka-wa-). This is an infixed or initially reduplicated form of pNum *həka (I-44) 'shade; cool' (W/CNum). The forms (h)apa, həpa cited by DI seem non-cognate.

[sorting out multiple reconstructions]

*səmə? 'one' → *səmi SNum (not I-198 *səmə(?ə))

*sə(C)əmah 'ten' → *ma-səmi SNum (not I-199 *səəma(h))

*yoci~yohci 'to fly' → *yə(h)cə, *yoti CNum (not I-292 *yo(h)ci, *ho(h)ti, *yə(h)tə, *yə(h)cə)

*mu-ci CNum, *mukV WNum 'sharp point' (not I-99 *muki(h), (*muci?))

*k^wihi → *k^wiCih CNum 'smoke' (not I-83 *k^wiih, *kuhih)

*?ahta → *?ata WNum 'jaw' (not I-3 *?a(h)ta)

From DI's set 1-166 *pici(?i), *pica 'breast/milk/suck(le)'

We establish--along with some other data--three etyma:

(a) *pici(?) 'breast' W/CNum (contains *-ci 'diminutive')

(b) *pihi(n) 'breast' SNum = 'heart' CNum

(c) *picV 'to suck(le); milk'

other changes

TK	*tukun (-pan/-pin)	'sky'	(not I-229 *tukun)
TK	*wokon	'pine'	(not I-275 *wonko(n))
	→W/CNum *wonko by feature jumping		
TK	*kənkə	'foot'	(not I-73 *kəhkə) WNum only
TK	*wihkun	'buzzard'	(not I-277 *wi..)
TK	*-nank^wah	'side, direction'	(not I-110 *nank^wVh)
	*ma-nank^wah	'far'	(not I-89 *ma(a)na(a)nk^wa/ə(h))

TK	*kawi-pa	'mountain'	(not I-49 *kaipa) W/SNum
TK	*nawi	'girl'	(not I-105 (na(C)i) C/SNum
TK	*yəwəh	'opening'	(not I-295 *-yə-) W/CNum
TK	*cəwə	'to count'	(not I-263 *-ca-) W/CNum
TK	*səhə-pi	'willow'	(not I-197 *səhə)
TK	*soho(pih)	'cottonwood'	(not I-180 *soopih)
TK	*k^wəhə	'to take'	(not I-88 *k^wəha (prob. a misprint)
TK	*?ama(htan)	'ribs'	(not I-4 *?ama(h)(tan))
TK	*cawVh	'good'	(not I-252 *ca(a)-)
TK	*k^winVha	'north'	(not I-85 *k^wi-)
TK	*?əcən	'cold'	(see I-262 *-cə, *-sə)
TK	*pa?ah	'high, long, tall'	(not I-129 *pa?a)
TK	*?atəh	'bow'	(not I-10 *?etə)
TK	*sawi	'to melt'	(not I-176 *sa?i)
TK	*(tə-)yə(h)k^wi	'to say/tell'	(not I-82 *-k^wi(i)) W/CNum
TK	*(pa)sa(h)k^wi/a	'mud'	(not I-141 *pasehk^wi(na))
TK	*nə(?ə)	'I'	(not I-118 *nə)
TK	*hi(i)n	'what'	(not I-31 *hi(i))
TK	*pasa → *pasə SNum	'dry'	(not I-140 *pasa(h))

changes

TK	*k^wasəh(pə)	'cooked, ripe'	(not I-80 *k^wasə)
TK	*ponV..	'round'	(not I-141 *pono) W/CNum
TK	*tosa(h)	'white'	(not I-220 *tosa)
TK	*puŋa(ci) → SNum *pu?ŋica	'mouse'	(not I-148 *p^o/u..)

possibly diffused

New TK *ʔa̤si 'gray'

~~New~~ TK *səsᵊka 'weasel' W/SNum (SK-81)

~~New~~ TK *nosi 'to dream' W/SNum (SK-49)

TK *wihᵊ 'fat, lard' C/SNum

~~additional new sets~~

~~New~~ TK *kəʔ^{i}/ə 'to bite' W/SNum (SK-31, ID-52)

New TK *pa-katᵊ(h)-tV 'lake' C/SNum

New TK *ʔahta SNum. } 'crow'

~~New~~ *ʔatah WNum }

~~New~~ TK *na.. 'Fa' (see I-2) (SK-46)

New TK *tuka 'to put out' W/SNum

New TK *wəkə.. 'cunt' w/SNum

Found in one branch only, but with outside cognates

Southern Numic

New	*səpo	'eyebrow'	pUA	*səʔ-poho
New	*tahk^{w}a..	'stiff'	pUA	*tahk^{w}a..
New	*tahpi-ca	'to tie'	pUA	*tahpi
New	*pihka	'hard, sore'	pUA	*pikah
New	*tonohki	'hill'	cf PP	toonk
New	*ca-məhk^{a}/i	'to die off'	pUA	*məʔa-ka
New	*ʔəhyə..	'to steal'	pUA	*ʔəhcə
New	*wəC..	'long ago'	pUA	*wəh
New	*k^{w}iCa	'scrub oak'	NUA	*k^{w}iiya
New	*k^{w}ətə	'to arise, get up'	pUA	*k^{w}ətə
New	*kuHmi	'corn'	pUA	*kunmi
New	*kuna	'bag'	NUA	*ku(u)na
New	k^{w}anan SP	'eagle'	pUA	*k^{w}aa(ʔa)
New	təən SP	'well'	NUA	*təwə..
New	*yakaCa	'nose, end'	pUA	*yakaa
New	*ʔahtah	'crow'	NUA	*ʔata..
New	*ʔəCa	'to sow, plant'	pUA	*ʔəəca
New	*səhpə, *səh[tuʔi..	'cold'	pUA	*səhpə, *səhᵊ
New	*sak^{w}a	'blue, green'	pUA	*sak^{w}a
New	waə SP	'to roast meat'	pUA	*waaʔi
New	*ʔa̤tə	'house'	pUA	*ʔataH̃
New	*ʃihku..	'squirrel'	cf Tak	*ʃiɣəkaa-wəH-ta
New	*cəka	'duck'	cf 'top	cə̆kəᵊ 'chipmunk'

*hopi 'wood' (not I-276 *wopi(n))

*waXakaCo 'frog' (not I-265 *waako(ø))

**wa-waaka-wəh R, amgm.

*tuka(-nV) 'might' (not I-228 *tuka)

other revisions

*-282 *wə.. 'to sweep, etc' contains the i.p. *wəh= (I-283). It is not a separate etymology.

I-65 *kuh..sɨ(h) 'ashes' contains *kuh = 'fire', but the rest of DI's set is not uniform. What is cognate goes back (maybe) to *kuhtusi(h)p^{a}/ə W/CNum, *kuhcah(pə) C/SNum.

I-92 *manəki(h) 'five' contains *ma- 'hand' and a numeral suffix *-ki

I-131 *pa-hapi 'to swim' contains *pa= 'water' plus *hapi 'to lie down -sg' (I-31)

I-95 *mosui 'mustache' (TK *mosoCi) and I-96 *moco(n) (TK *monco) 'beard/ facial hair' can hardly be separate etymologies, though SP does have reflexes of both proposed etyma.

The probable UA ancestor of the Numic words ~~*m~~ *muusi 'face hair → catfish' ~ *musa.. 'arrow feather→cotton/wool.' (I-96) I suggest pUA *musan → Num *moson → *monso → *monco

→ *mosoCi (I-95)

additional new sets

~~New~~ TK *paha(a)	'pestle'	W/SNum	(SK-56)
~~New TK *pəkin~~	~~'to stick something to/go, walk'~~	~~W/SNum~~	
New TK *pihta..	'south'		
New TK *pətə ~ *pəhtəh	'heavy'	C/SNum	
New TK *tə?asə(h)	'ice; freeze'	(cf I-262)	
New TK *?ika	'to enter -sg'		
New TK *(pa=)?ahkən	'sunflower'		
~~New TK *nənka~~	~~'to dance'~~		
New TK *cinkono..	'ankle'	W/CNum	
New TK *naka..	'mountain sheep'	W/SNum	
~~New~~ TK *tənihk^{w}ə	'to say/tell'	(ID-164)	
New TK *ka(h)ki	'necklace, beads'		
New TK *?atah	'MoBr'	W/CNum	
~~New~~ TK *nacuku	'FaBr'	W/CNum	(cf SK-13)
New TK *yahi(h)	'FaLa'		
New TK *k^{w}anəki	'nine'	W/CNum	
New TK *k^{w}ahatə	'antelope'	W/CNum	
~~New~~ TK *sihi	'guts'	W/SNum	(SK-76)
New TK *wa?ah	'cedar'	C/SNum	
New TK *po?o	'to write'	C/SNum	
New TK *manV$_1$	'to cover'	W/SNum	
New TK *manV$_2$	'to cross over, move about'		
New TK *mata	'metate'	W/SNum	

Western Numic

New	puuhi	Mo	'to blow with mouth'	pUA	*puhca
New	poci	Mo	'navel'	pUA	*po(o)ci
New	kutu?	Mo	'stick of wood'	pUA	*kutah
New	kuhsi	Mo	'wood, stick'	pUA	*ku(X)si
New	huhka	Mo	'leg'	pUA	*huka
New	wəə	Mo	'to hold in arms'	pUA	*wə..
I-270	*woCo(h)	W◡Num	'head hair'	NUA	*woo..
New	cihku	Mo	'basket'	pUA	*ciHku
I-173	*pətə(h)	W◡Num	'new'	pUA	*pəə
I-258	*cuhpa (TK)	Mo	'to disappear'	pUA	*cuhpaa

Central Numic

New	nahwooi(h)	Co	'to cry'	pUA	*ŋa..
New	-kupa-	Co	'to kill'	pUA	*kuHp^{a}/i
New	wih-	Co	'fat'	pUA	*wih (< *wip)

Found in one branch only, without outside cognate

I-138	*panpi	'head'	C◡Num	
I-266	*wa?ihpə(?ə)	'woman'	C◡Num	(Tk *waHihpə?)
I-25	*?ətə	'long, tall'	W◡Num	

These items should not be called pNumic

Items which cannot be reasonably reconstructed on the data cited by Iannucci.

I-42 'spit' (n)

I-17 'to fart' (+UA)

1-58 'to bend/bent'

I-46 'to trap'

I-I1 'pebbles/round object' (+UA

I-113 'to boil'

I-28 'yes'

I-255 'wet/soak(ed)'

I-261 'bird'

I-288 'to laugh'

I-32 'dove' is borrowed from Hopi hewih

1-48 'quail' is diffused and has no proper reconstruction

Comparative Takic Phonology

This section is based on the following data and publications:

BH Bright and Hill

HH, Hill and Hill ( )

Bright ( )

Kroeber and Grace, Sparkman Grammar ( )

Lexical file for Servano: K Hill ( )

Lexical file for Cupeno: J Hill ( )

M

VVH, _____

All linguistic forms have been verified in primary sources, except in the case of Cahuilla.

Notes on Comparative Takic Phonology

This chapter is based on the following data and publications:

BH Bright and Hill: The Linguistic History of the Cupeño

HH Hill and Hill: Stress in Cupan languages

Bright, Luiseno Dictionary

Kroeber and Grace: The Sparkman Grammar of Luiseno

Lexical file for Serrano: K. Hill

Lexical file for Cupeno: J. Hill

Miller, UA cognate sets

VVH

All linguistic forms have been verified in primary sources, except in the case of Cahuilla

Takic consists of the language Serrano (Kitanemuk is probably a dialect of Serrano) and the group Cupan. Cupan consists of Luisenyo, Gabrielino, Fernandenyo, Cupeñyo, and Cahuilla. We use data from Se, Lu, Cu, and Ca. We reconstruct one following sound system for Takic.

p Takic sound system

p	t	č	k	q	k^w	?	i	ə	u
-v	-ð	s		-x		h		o	
m	n			ŋ	$-ŋ^w$			a	
		y			w				

Concerning Tak *-v *-ð *-x, these are the reflexes of UA *p *t *k respectively directly after vowel (in the case of *-x, postvocalic next to a low vowel). In phonetic terms Tak *-v is voiced in all languages, but the correspondences underlying *-ð could as easily support some other choice [θ]; *-x [x̣] is in the position of *q, and *-v [β] is bilabial. Perhaps a better symbolization would be *-v *-ṭ -q̇, but this is clumsy typographically. *-ƀ *-d *-g would be purely formulaic, and would not suggest the attested phonology at all, nor any likely intermediate stage. *-v *-l *-x, as in Cupan, would have been easiest typographically, and will perhaps be adopted by some scholars.

The vowel system reconstructed for pTak is the same as the antecedent of the Hop system (wherein *u → o and *a peels off a few e's). There are a (limited but noticeable) number of ways in which Tak and Hop share isoglosses. It is not yet clear whether these similarities have any significance other than the fact that pre-Tak and pre-Hop probably occupied adjacent areas in the pNUA homeland.

The basis of Takic *H (and *N).

Tak, NUA *p *t *[q] *c lenite to v ð x s directly after a vowel, but remain as p t q č after UA *n or *h. If the vowel preceeding the unlenited obstruents is stressed in Lu or Se, that vowel is long in nouns, usually short in verbs. In monosyllabic nouns stems UA *h is reflected as non-lenition of the following C, but the preceeding V is not lengthened (at least not in Cupan). In monosyllabic noun stems UA *n is reflected as non-lenition of the following C, but the preceeding V is lengthened. In the second instance we reconstruct p Tak *N; in all other cases we reconstruct pTak *H.

In a few stems which require reconstructing pTak *N, *n/_C is unlikely to have been present in the pre-Tak model.

e.g. *kiN-ta 'house' : pNUA *kii

*qawiN-ta 'mountain' : pNUA *kawii

*kihaN-ta 'child' < ?

A possible explanation is as follows: the pre-Tak absolutive is *-ta. This develops to *-ðə and *-ta by lenition and phonetic loss of preconsonantal *h and *n. After iH, *ta is č(a) in all Tak languages, at least if the preceeding V was stressed. Thus -ta, -ča, and -ðə are all surface absolutive forms. In a few cases in cognate terms the Tak languages do not agree on which absolutive is used. One or more of the languages has innovated.

In the case of the 3 items referred to above, all (or most of) the Takic languages have innovated by replacing the expected suffix *-ðə, which occurs after *V and *VV with *-ta, which occurs after VH. The vowel, however, is kept long, which is why the form looks like it has developed out of *..CVN-ta. When there is discrepancy between Lu and Ca/Cu in the form of absolutive, Se normally agrees with Lu. Figure 7 shows the Takic sound correspondences.

Takic Sound Correspondences

(a) non-idencial (or not like UA)

pTak	Lu	Cu/Ca	Se	UA source
*-v	v	v	v	*p /V_
*-ð	l	l	ç	*t /V_, *-r
*-x	x	x	q	*[q]/V_
*-s	ş,s	ş,s	s,h	*c /V_,*s
*q	q	q	k^w/_θ;q_	*[q]/k/
*k^w	k^w,q^w	k^w,q^w	k^w	*k^w
*č	č	č	č	*c,*t/iH_
*-$ŋ^w$	ŋ,w	ŋ,w	ŋ,w	*nw
*ə	o	ə/e	ə	*ə
*θ	e	i	θ	*o
*$\bar{V}$	$\bar{V}$	V	$\bar{V}$	*$\bar{V}$
*w	w	w	ϑ	*w
*y	y	y	h,y	*y

(b) identical in all Tak (and identical with UA)

*p *k *h *? *m *n *ŋ *i *a *u

Figure 7.

The preceeding chart shows that once voel length and preconsonantal *H are reconstructed, stress is predicatble in cTakic on segmental grounds alone. The basic rule is that stress falls on the first heavy (*VV or *VH) syllable, or on the first syllable if none is heavy. A few typically possessed noun stems show vowel reduction that could have occurred only if their possessive prefix was stressed. This shows three things about Tak diachronically:

(a) pTak could occur with possessive prefixes;

(b) words with prefixes were accented according to the rule sketched above;

(c) most nouns in their possessed form were analogically restored by reference to the absolutive form, which did not have prefixes, and consequently a different stress pattern.

In Lu, after V drop a long vowel may not occur in a closed syllable--though earlier sources than Bright do have cases of long V in a closed syllable, often morphophonemically or diachronically correct, though occasionally not. Short vowels in word-final position are dropped in all Tak languages. This may apply to *-VH as well, but seems not to apply to *-VV, at least in Luisenyo.

We have not worked out the conditions under which final stem vowels in verbs are kept or lost. It is also not clear under what conditions original long vowels are shortened in verbs in Lu. Generally Se agrees for vowel length in verbs with pUA, but in many cases where Se has a long vowel, Lu has a short vowel, even before p, t, č, q which are only preserved intervocalically by having been preceeded by *H (= *h or *n). We assume Lu has analogically shortened the vowel in such verbs to conform with the majority of original CVCV verb roots according to whose paradigm some or most original CVVCV and CVHCV roots are also inflected.

In Lu there are several verbs of the shape CV̆pV, CV̆tV, CV̆qV, and CV̆čV. Postvocalic p, t, q, and č came from *Cp, *Ct, *C[q], and *Cc, so the preceding V

should be long. In fact, a sizable number of CV•CV verb stems exists in Lu. The explanation of CV̆pV, CV̆tV, CV̆qV, and CV̆čV stems in Lu may be due to paradigmatic association with non-geminated versions of the same roots having shape CVvV CV̆šV, CVxV and CVṣV, which in certain cases may not have survived.

Following are rules deriving Takic from pNUA.

backing of *k

*k → [q] next to low vowels

fronting of *o

*o → ö

lenition

$$\begin{Bmatrix} *p \\ *t \\ *[q] \\ *c \end{Bmatrix} \rightarrow \begin{Bmatrix} v \\ ð \\ x \\ x \end{Bmatrix} \quad /V\_\_$$

Takic *n^w

*nw → $ŋ^w$ (counts as a cluster)

Preconsonantal and final festures

*CVh•ta → CV•C(a) (symbolized *H-C)

*CVn•ta → CVV•C(a) (symbolized *N-C)

*...CV$\begin{Bmatrix} h \\ n \end{Bmatrix}$.CV... → CVV•CV (symbolized *H-C)

*$\begin{Bmatrix} h \\ n \end{Bmatrix}$C → V•C in nouns ← (symbolized *HC) → in verbs, largely (this may be an illusuion due to analogical shortening)
→ V̆

Miscellaneous

*c → č
*r → ð (falls together with lenited *t)

proto-Takic and proto-Cupan reconstructions

The Cup and Tak reconstructions are based on data cited in BH and HH, as well as some added or assembled by TK. The reconstructions given in BH and HH are cited, but the present reconstructions are not based on (restatement of) them. A goodly number of UA etyma preserved in but one Tak language are not cited here, because their forms do not allow an unambiguous pTak reconstruction, though they fit in with forms in other UA languages such that a pTak reconstruction could be projected--though not on the basis of Tak languages alone.

TAKIC

To pCupan (Bright & Hill) we have added Luisenyo (with V̄ marked) from Bright's Dictionary, Cupeño from Jane Hill's files, and Serrano from Ken Hill's files, as well as Serrano from Miller's UA Cognate Sets. It is clear that Serrano is somewhat more distantly related to Cupan than the Cupan languages are among themselves. Serrano, in fact, keeps more traces of reconstructable p(N)UA phonology and lexicon than Cupan. About morphology we can say little at the moment.

[CV́·-ʒa]

Tak	*paa-ʒa	'water'	BH	*pála; Se paa-ç	(UA)
Tak	*tuu-ʒa	'charcoal'	BH	*túla; Se tuu-ç	(UA)
pre-Lu	*huu-ʒa	'arrow'	BH	*hu-	(UA)
Cup	*yuu-ʒa	'head hair'	TK	(Lu yuu-la, Cu yú-l, Ca yú-ly)	

*CVH-ta

Cup+	*poH-ta	'road'	BH	*pét; Se peeq-t, -pee?	(UA)
Tak	*kuH-ta	'fire'	BH	*kút; Se ku-t, kukuh-t 'ashes	(UA)
Cup+	*noH-ta	'pregnant woman'	BH	*nét; Se neeq-t, neeh-t 'woman'	(UA)
pre Lu	*?eH-ta	'foot, leg'	TK	(Lu ?é-t; Se ?ee-ç 'bone')	(UA)

*CVH-ta (continued)

Cup+	*taH-ta	'sinew'	BH	*ta; Se -ta[w(a)	(UA)
Cup+	*piH-ta	'breast'	BH	*pi; Se -pi?(a)	(UA)
Cup+	*wiH-ta	'fat'	BH	*wi-; Se wip-t, -wiip	(UA)
Cup+	*-wəH-ta	'augmentative suffix'	BH	*-wət?	(UA)

CV́N-ta

Tak	*kiN-ta	'house'	BH	*kíca; Se kii-č	(UA)
Tak	*kiH-tu..	'to build a house'	TK	(Lu kíi-ču-, Se kii-ču?(a))	(UA)
Cup	*kiH-taamV	'south'	BH	*kicam, HH kičam-	
Cup+	*təN-ta	'stone'	TK	(Lu → tóo-ta; Se tə[mə-t ~ tə[mət(a))	(UA)
Tak	*hiN-ta	'what'	BH	*híc-; Se his ~ hiit	(UA)

Could be reconstructed *CV́VH-ta

[CVCV́·-ðə]

Tak	*səvəə-ðə	'sycamore'	BH	*sevela, HH *savé·la; Se havəə-ç
Cup	*?amuu-ðə	'agave' (century plant, mescal plant)	BH	*?amúl, HH *?amú·l
Cup	*?awaa-ðə	'dog'	BH	*?awál, HH *?awá·l
Cup	*?iyaa-ðə	'poison oak'	BH	*?iyála, HH *?iyá·la
Tak	*kiyuu-ðə	'fish'	BH	*keyúl?, HH *kiyú·l; Se kihuu-ç (UA)
Cup+	*qaxaa-ðə	'quail'	BH	*qaxál?, HH *qaxá·l; Se qaqaa[ta? areal
Cup	*maðaa-ðə	'metate'	BH	*malál, HH *malá·l (UA)
Cup	*panaa-ðə	'yucca, whipple'	BH	*panál, HH *paná·l
Cup+	*maxəə-ðə	'dove' (Lu mixéel, Cu məxílʸ, Ca máxilyʌ < *mVxái-, *mVxiá-)	BH	*mVxél, HH *maxé·l; Se maqahʷ(u)-t
Cup+	*nawii-ðə	'girl' (Se < *naawi-ðə)	BH	*nawí-, HH *nawí; Se naa(h)-ç (UA) an ablaut variant
Cup	*kʷasii-ðə	'tail'	TK	(Lu -qʷsiivV.., Ca-qwasi-lʸ) move over
Tak	*mahaa-ðə	'five'	TK	(Lu mahá́ar, Se mahaç) move over
Cup+	*suŋʷaa-a	'woman'	TK	(Lu ṣuŋaa-l; Se -ṣuuŋ 'Da(of man)') move over (UA)
Cup	*-suŋʷaa-maa	'Da of man'	BH	*ṣunama?
pre Se	*masaa-ðə	'feather'	TK	(Se mahaa-ç) move over (UA)
Cup	*-maa-ðə	'diminutive suffix'	BH	*-ma-l?

[CVCV́H-ta]

Tak	*wi?aH-ta	'oak$_2$'	BH	wi?a-; Se wi?ah-t (UA)
Tak	*təvaH-ta	'pinyon'	BH	*tevat, HH *təvat 'conifer sp'; Se tava-t (UA)
Tak	*saxaH-ta	'willow'	TK	(Lu saxá-t, ṣaxáa-, Se haqat(a)) (UA)
Tak	*sawəH-ta	'raw'	BH	*sawit?; Se saəə-t (UA)
Tak	*su?iH-ta	'jackrabbit'	BH	(su?ic; HH *su?iš; Se hʷii?-t ~ hʷuii?-t (UA)
Tak	*kʷasiH-ta	'cooked, ripe'	BH	*qwaṣ-; Se kʷahi? (UA)
Tak	*waniH-ta	'river'	BH	*wanic; HH *waniš; Se wanə-t
Cup	*wəxəH-ta	'pine'	BH	*wexét-, HH *wəxé- (UA)
Tak	*waxaH-ta	'frog'	BH	*waxa-, HH waxa·-; Se waqa-t (UA)
Cup	*suðaH-ta	'claw/nail'	BH	*ṣula- (UA)
Cup+	*tamaH-ta	'mouth/tooth'	TK	(Lu tama-t); Se tama-ç (UA)
pre Lu	*qəðaH-ta	'nape'	BH	*qel- (UA)
Tak	*?əyəH-ta	'thief' (<√b)	TK	(Lu ?uyó-t, Cu ?əyə-t, Se ?əyə-t) (UA)
Tak	*wə?əH-ta	'grasshopper'	TK	(Cu wí?a-t, Se wə?ə(h)-t) (UA)
Tak	*pa?iH-ta	'rat'	TK	(Lu pa?a-š, Se pa?i(i)-š (!))
pre Lu	*məkaH-ta	'big'	TK	(Lu muká-t) (UA)
pre Lu	*pikaH-ta	'stone knife'	TK	(Lu piká-t) (UA)
Tak	*tu?aH-ta	'flour' (<vb)	TK	(Ca tu?a-t, Se tua?-t) (UA)
pre Lu	*kaðaH-ta	'nape'	TK	(Lu kalá-t) (UA)

(Lu wi?ə́-t, Cu wí?ə́ə-t, Ca wí?ə́t, Se wə?ə(h)-t)

[CVhVH-ta]

Cup+	*muhuH-ta	'owl'	BH *múhuta; Se muum(u)-t < *muXmun-ta [R]	(UA)
Cup+	*məhəH-ta	'gopher'	BH *mə́həta; Se miiŋah-t	(UA)
Tak	*kuhuH-ta	'elderberry'	TK (Lu kuu-ta, Cu kú?u-t, Se kuuht(a)	(UA)
Cup	*nəhəH-ta	'chief'	BH *néta	

*CVCV́VN-ta

Tak	*qawiN-ta	'mountain'	BH *qawíca?, HH qawí·ɣa; Se qaii-ɗ	(UA)
Cup	*kihaN-ta	'child'	BH *kiha-	

Could be reconstructed *CVCV́VH-ta

[CVCV́·CVH-ta]

Cup	*hunuuvaH-ta	'yucca mohavensis'	BH *hunúvat, HH *hunú·vat	
Cup	*yuŋaaviH-ta	'buzzard' (cf Lu yuŋáavay-wu-t 'condor')	BH *yuŋávic, HH yuŋá·viš	
Tak	*s^{i}/əkaa-wəH-ta	'chipmunk'	BH *sVkáwat; HH *sVká·wət Se hikaaw-t	(UA)
Tak	*kučaa-wəH-ta	'wood'	BH *kəláwat, HH *kəlá·wVt; Se kuçaa-t	(UA)
Cup	*tamaH-wəH-ta	'mocking-bird'	BH *tamá-wət, HH *tamá-wət	

[CVCV́·CV..]

Cup	*?ayaamaa-ɣa	'racoon'	BH *?ayámal, HH ?ayá·mal	
Cup	*kavaa?V-maa-ɣa	'pot'	BH (= HH) *kavá?mal	
Cup	*təmaa-mV..	'north'	BH *təmám; HH tamá·m-	
Tak	*pavaahi..	'six'	TK (Lu paváahay, Se parvahi^{h}/?)	(UA)
Tak	*nawiHta..	'girl'	(Lu nawítmal, Cu nəwíšmal, Ca náwišmal^{y}, náwital^{y}, Se naač(a)-t)	(UA)
Cup	*naxaHču..	'to get old'	BH *naxá-, HH *naxá -	

[CV́CV̆-ɣa]

Tak	*pik^{w}a-ɣa	'berry'	TK (Lu pík^{w}-la, Se pik^{w}a-ç)	
~~Cup~~	~~*?əwə-ɣa~~	~~'blood'~~	~~BH *?áwila (;Se ?oe(a)-ç is from *?əra)~~	~~(UA)~~
Tak	*kisV-ɣa	'hawk'	TK (Cu kísi-l^{y}, Se paa]kiha-ç)	
Cup	*təŋ^{w}a-ɣa	'name'	TK (Lu túŋ-la; Ca tewa-l, Cu téwə-l)	(UA)
Tak	*təŋ^{w}a-ni..	'(to) name'	(Lu tuŋáni-, Se t wan-č)	(UA)
Tak	*te?V-ɣa	'belly'	TK (Lu tée?-la, Se -te?	(UA)
pre Lu	*wə?V-ɣa	'man's penis'	TK (Lu wó?-la)	(UA)

[CV́CV̆-ð́a]

Cup	*súyV-ð́a	'scorpion'	BH	*súyila	
Cup	*?ə́ŋi-ð́a	'salt'	TK	(Lu ?éŋ-la, Ca ?íŋi-l^{y}; cf Se ?əəŋa?- 'lazy'	(UA)
Cup	*ð́á?a-ð́a	'goose'	BH	*lá?ala	
Cup	*sə́yV-ð́a	'reed'	BH	*sə́yila	
Cup	*?áyV-ð́a	'turtle'	BH	*?áyila	(UA)
~~pre Lu~~	~~*kúnV-ð́a~~	~~'bag'~~	~~TK~~	~~(Lu kún-la)~~	~~(UA)~~
Tak	*?áyə-ð́a	'good'	TK	(Se ?a(a)?ayə-ç [R], Cu ?áyə-)	(UA)
pre Lu	*sáyV-ð́a	'mudhen'		(Lu ṣáy-la)	(UA)
Cup	*púhV-ð́a	'shaman'	BH	*púla 'doctor'	(UA)
pre Lu	*qəŋ^{w}a-ð́a	'snake'		(Lu qəqə́ŋ-la [R] 'ringsnake', pii]qwa-la 'snake')	(UA)
Cup	*k^{w}á̆ð́V(-ma..)	'armpit'	BH	*kwál-	
Cup	*tə̆ð́VmV..	'hell'	BH	*tə́lmik	

[illegible]

Cu/Ca	*hú̆ya-ð́a	'arrow'	TK	(Lu huula, Cu huy l, Ca hú̆yal)	(UA)

Putative Tak stems of shape *CV̆CV̆-ð́a and *CV́CV̆-ð́a can probably all be derived from *CVVCV-ð́a, since there is no cogent evidence for UA noun srems of the shape *CV̆CV̆. Some items having clear outside cognates are:

*tə?V-ð́a	'belly'	would be	*təə?V-ð́a	*too?V
*?əŋi-ð́a	'salt'	would be	*?əəŋə-ð́a	*?ooŋa
*?áyV-ð́a	'turtle'	would be	*?aayV-ð́a	*?ahya
~~*kúnV-ð́a~~	~~'bag'~~	~~would be~~	~~*kuunV-ð́a~~	~~*kuuna~~
*?áyə-ð́a	'good'	would be	*?aayə-ð́a	*?ahyə
*púhV-ð́a	'shaman'	would be	*puuhV-ð́a	*puuha
*qə́ŋ^{w}a-ð́a	'snake'	would be	*qəŋwa-ð́a	*konwa
*?ə́wə̆-ð́a	'blood'	would be	~~*?əəwə-ð́a~~ *?ɔɔwə̆-ð́a,	*?ənwa
*təŋ^{w}a-ð́a	'name'	would be	*təŋwa-ð́a	*tənwa

p(N)tn

This also suggests that what we have reconstructed as *ŋ^{w} has the weight of two consonants. If so *səəŋ^{w}əH-ta 'rattlesnake' comes from *səŋwə-

[CV́·CV̌-ǯa]

Tak	*k^{w}aa?a-ǯa	'hawk'	TK	(Lu k^{w}á?-la, Ca q^{w}a?a-l, Se k^{w}aa?-ç)	(UA)
Tak	*suu?u-ǯa	'star'	BH	*su?- ; Se h^{w}uu?-ç	(UA)
Tak	*k^{w}iiyV-ǯa	'oak/acorn'	BH	*kwinila? 'oak$_1$'; Se k^{w}iih-ç, k^{w}iiy-t	(UA)
Tak	*puHčí-ǯa	'eye/seed'	BH	*púcila; Se -puuč(a)	(UA)
Cup	*nəHčí-ǯa	'old woman'	BH	*néc-	(UA)
Cup+	*?aHčí-ǯa	'pet'	BH	*?áci(la); Se -?aači, -?aašta-(pl)	(UA)
Tak	*?əəxi-ǯa	'sand'	TK	(Lu //?eexi-la//, Se ?əəq-ç)	
Tak	*suuna-ǯa	'heart'	BH	*-sún; Se -h^{w}uun(a)	(UA)
Cup+	*naHqa-ǯa	'ear'	BH	*náqala; Se qav(a)-ç < naHqa-vV	(UA)
Tak	*məəya-ǯa	'moon'	BH	*mánila?; Se məaa-ç	(UA)
Tak	*yuuya-ǯa	'spruce'	BH	*yúyila; Se yuhaa-ç 'pine'	
Tak	*qaawa-ǯa	'rat'	BH	*qáwala; Se qaa-ç	(UA)
Cup	*wuláHqa-ǯa	'buckwheat'	BH	*huláqala	
Cup	*paaxV-wəH-ta	'young jack-rabbit'	BH	*páxwut	areal
Tak	*taawə-ǯa	'thunder'	BH	*táw-; Se taəə-ç	
Tak	*taamə-ǯa	'knee'	TK	Cu -támi, Se taam(ə)-ç	(UA)
Tak	*piisa-ǯa	'sweet/sugar'	TK	Cu pis[kə.., Se piih(V)-ç, pisa..	(UA)
Cup	*?əəwə-ǯa	'blood'	BH	*?áwila(; Se ?əç(a)-ç is from *?əra)	(UA)
Cup	*kuunV-ǯa	'bag'	TK	(Lu //kuunV-la//, Ca kúnu-l9, Cu kúnu-l9), [CV́·CVCV..]	CUA
Cup+	*?əHčVvaH	'left hand'	BH	*?écva-, HH *?e-čava, Se -?əəč(a)	
Cup	*naHqa-ma..	'to hear'	BH	*naqma-	(UA)

[CV́·CV·-ǯa]

Cup+	*huunaa-ǯa	'badger'	TK	(Lu húuna-l, Ca húnal; Se huuna-t)	(UA)
Cup	*kəəǯəə-ǯa	'manzanita'	BH	*kálVl	
Cup+	*qaasii-ǯa	'sagebrush'	BH	*qásil, *qa·se·l; Se qaaq^{w}-č	(UA)
Cup	*muusii-ǯa	'beard'	TK	(Lu múusi-l, -múusi; Cu -muš?ə)	(UA)
Cup	*muHtaa-ǯa	'cholla cactus'	BH	*mútal	
Tak	*paaxaa-ǯa	'reed'	TK	(Ca paxa-l, Se paaqa-ç)	(UA)
Tak	*təəvaa-ǯa	'earth'	TK	(Lu tóova-l, Se təəva-ç)	(UA)
Tak	*paasii-ǯa	'chia'	BH	*pásal; Se paahi[na-ç	(UA)
Tak	*paa-?Hqaa-ǯa	'sunflower'	BH	*pá?aq-?; Se pa?aq-ç	(UA)
pre Lu	*təHpaa-ǯa	'mortar'	TK	(Lu tóopa-l)	(UA)
Cup	*?əəǯaHpaa-ǯa	'bedrock mortar'	BH	*?élapal	
pre Lu	*qaasii-ǯa	'thigh'	TK	(Lu qaasi-l)	(UA)
pre Lu	*waanaa-ǯa	'net'	TK	(Lu wáana-l)	(UA)
Cup	*-taaxaa-wi	'body'	BH	*táxawi-	(UA)
Cup	*muuvii-ǯa	'nose'		(Lu múuvi-l)	(UA)
Cup	*?ayaamaa-ǯa	'raccoon'	BH	*?ayamál, HH ?ayá·mal	
Cup	*kavaa?aa-ǯa	'pot'	TK	(Lu kaváa?a-l)	
Cup	*təə-maa-ǯa	'earth' (contains *təN- 'stone'?)	BH	*tə-mal	
Cup	*muukii-ǯa	'a sore' (< vb)	BH	*múkil	(UA)

Tak	*saa?iH-ta	'shit' (<vb)	BH	*sá?i- 'guts'; Se ṣai?-č	(UA)
Tak	*naavəH-ta	'prickly pear'	BH	*návət; Se naav(ə)-t	(UA)
Cup	*?eeviH-ta	'awl'	BH	*?évic	(UA)
Tak	*paa?aH-t	'mountain sheep'	TK	(Lu páa?a-t, Cu páqə-t, Se paa?t(a).	
Tak	*piivaH-ta	'tobacco'	BH	*pívat; Se piiv(a)-t	(UA)
Tak	*saamaH-ta	'grass'	BH	*sámVt; Se haam(a)-t	(UA)
Tak	*sukaH-ta	'deer'	BH	*súqat?; Se hukah-t	areal
pre Se	*taavuh-ta	'cottontail'	Se	taavuh-t	(UA)
Tak	*wiiwiH-t	'acorn mush'	BH	*wíw-; Se wii-č	(UA)
Cup	*waaviH-ta	'foxtail grass' (<vb?)	BH	*wávic	
Cup	*waHčiH-ta	'artemisia dracunculus'	BH	*wácic	
Tak	*yuuyaH-ta	'snow' (<vb?)	TK	(Lu yúuyi-t, Se yua(a)-t)	
Cup	*čaa?iH-ta	'bluebird'	BH	*cá?ic	(UA)
Tak	*?aan H-ta	'ant'	BH	*?ánVt; Se ąanəh-t	(UA)
Cup	*?iikaH-ta	'carrying net'	BH	*?íkat	(UA)
Cup	*neexiH-ta	'gourd'	BH	*néxic	
Cup	*saanaH-ta	'gum'	BH	*sánat	(UA)
Tak	*tukuH-ta	'wildcat'	BH	*túkut; Se tuku-t	(UA)
Tak	*qeeniH-ta	'squirrel'	BH	*qenic; Se k^{w}een(a)-t	
Tak	*maaniH-ta	'jimson week'	TK	(Cu mánit, Se maanič)	areal
Tak	*məəmaH-ta	'ocean'	TK	(Lu mooma-t, Cu m^{ə}mə-t, Se məəm-t)	
Cup	*waa?iH-ta	'meat (ub)	BH	*wá?ic	(UA)
Tak	*mee?aH-ta	'smoke'	BH	*mi-; Se meaa?-t //mee?aH-t//	
Tak	*təəviH-ta	'white clay'	TK	(Lu tóovi-š, Se təəvi-č/t)	(UA)
Tak	*səəŋwəH-ta	'rattlesnake'	BH	*səwət; Se heeŋ(a)-t (cf Ch Saaŋa 'king snake')	(UA)
Tak	*ciivuH-ta	'bitterness'	TK	(Lu čí·vu-t, Cu číva-t, Se čivu?-t)	(UA)
Cup	*?eeðaHpaa-ða	'bedrock mortar'	BH	*?élapal?	
Tak	*paa-?aHqaa-ða	'sunflower'	BH	*pá?aq-?; Se pa?aq-ç	(UA)
pre Lu	*tee?iH-ta	'cattail'	TK	(Lu tée?i-š)	(UA)

(BH *tax)

Tak	*piisaH-ta	'pintle' (Se -piir)	TK	(Ca pisa-t 'urine', Lu pisá-ŋa- 'urinate', Se -piir)	(UA)
Tak	*taaxaH-ta	'person'	TK	(Se taaqt(a), Lu ?ataaxa-m pl.	(UA)
Tak	*saawVH-ta	'acorn bread'	TK	(Cu/Ca ṣáwiš, Se ṣaaw(a)-t	
Cup	*taasaHpa	'springtime'	BH	*táṣpa	(UA)
Cup	*taawaHpa	'summer'	BH	*táwpa	(UA)
Cup	*kuHtaHpiH-ta	'bow'	TK	(Lu kútapi-š, Cu kútəpi-š)	
Tak	*waHqaH-ta	'shoe'	BH	*wá..at, Se waqaa-t	areal

CV́·CV̌CVH-ta

Tak	*wiNču?aH-ta	'string'	TK	(Lu wíičú-t, Se wiičua?-t	(UA)
Cup	*təəvV=kiH-ta	'cave'	BH	*tə́kic? 'burrow' ['earth house']	
Cup	*waamV=kiH-ta	'brush lean-to' ['x house']	BH	*wámkic 'ceremonial enclosure'	
Tak	*qəənVxaH-ta	'necklace, beads'	TK	(Lu qénxa-t, Cu qínxə-t, Se k^{w}əənxa-t)	
Tak	*paaha-wəH-ta	'pestle'	TK	(Ca páwu-l, Se paahu?-t)	(UA)
Tak	*huuna-wəH-ta	'bear'	BH	*húnwət; Se huuna(v)-t	(UA)
Tak	*naHqa-wəH-ta	'sumac'	BH	*nákwət; Se nahqə?-t	(UA)
Cup	*?iisV-wəH-ta	'wolf'	BH	*?íswət	(UA)
Cup	*?aasV-wəH-ta	'eagle'	BH	*?áswət	(UA)
Tak	*saa?V-wəH-ta	'nit'	BH	*sá?wV-; Se ?a[ṣa?w^{a}/u-	(UA)
Tak	*taamiyaH-ta	'sun, day'	BH	*tVmet; HH *tamet; Se taamia-t	(UA)
	(If, as HH suggest, Se is not cognate, Cup *təməH-ta is indicated)				
Tak	*maahVwa-ǰa	'palm tree'	BH	*máxwal?; Se mamah^{w}-ç [R]	areal
Cup	*haHčVǰa-	'to sweat oneself'	BH	*hácla-	

CV́·CVCV-ǰa

Tak	*paakisa-ǰa	'chicken hawk'	TK	(Lu páakiš-la, Se paakiha-ç)	
pre Se	*pəənivV-ǰa	'skunk'	TK	(Se pə^{ə}/rniv^{ə}/$_{ə}$-ç)	areal

CV́CV̌CVH-ta

Tak	*?aǰa-wəH-ta	'crow'	BH	*?alwVt; Se ạçaw(ə)-t	(UA)

A Note on Tak morphophenemics.

and *CVVCVH, *CV(V)CVV → cvVcv when a suffix is added

but *CVCVV and *CVCVH do not shorten the second syllable under the same circumstances.

(a) huunaa- 'badger' + wəH 'big' → *huunǎwəH-ta 'bear'

(b) kiyuu- 'fish' + wəH 'big' → kiyuuwəH-ta 'whale' (→ Lu)

kuǰaH- 'wood' + wəH 'big' → kuǰaawəH-ta 'firewood'

tamaH- 'mouth' + wəH 'big' *tamaawəH-ta 'mockingbird'

If this is true, putative Tak *?aǰa-wəH-ta must really be *?aaǰa-wəH-ta since only *?aaǰa- and *?aǰaa- are possible as antecedents of the complex, and *?aǰaa- would not shorten its second vowel.

[-CV?]

Tak	*-k^{w}a?	'MoFa'	BH	*-k^{w}a; Se -k^{w}aa[r(i?)	(UA)
Cup	*-su?	'MoMo'	TK	-su, Ca -su?	(UA)
Tak	*-na?	'Fa'	BH	*-na; Se -na?	(UA)
Tak	*-qa?	'FaFa'	BH	*-qa; Se -ka? 'SoCh'	(UA)
Tak	*-yə?	'Mo'	BH	*-yə; Se -yə?	(UA)

[-CVH]

Tak	*-maa ~ *-maH	'hand'	BH *-ma; Se -maa Lu má-t < maH-ta	(UA)
Cup	*miH-	'which'	BH mí- 'when'	
Cup	*həə	'yes'	BH *hə	(UA)

[CV́CV]

Tak	*-paha	'FaSi'	BH *-pa; Se -pah(a)	(UA)
Cup	*-nəsV	'MoSi'	BH *-nəs	(UA)
	(or *-nəəsV ?)			
Cup+	*-ʔesV	'teardrop'	BH *-ʔés; Se -ʔesp(a)	
Tak	*-pehV	'bodyhair'	BH *pé? (Lu pée=, -pé?, Cu -pí-ʔi, Ca -píh-ʔi, Se -peh(a))	(UA)
Cup	*haxi	'who'	BH *háx-; Se ha⌈mi?	(UA)
Tak	*wehV	'two'	BH *weh	(UA)
Tak	*qayV	'no(t)'	TK (Lu qáy, Cu qay, Se qai)	(UA)
Cup	*su=puʔV	'one'	HH *supu(-)	(UA)

[CV· CV̌]

Tak	*ʔəə mV	'ye'	TK (Cu ʔə́m, Se ʔəəm)	(UA)
Tak	*-qeʔesV	'eSi'	BH *-qé..S; Se -kʷeer, -kʷeeha- (Lu -qée?is is deviant)	(UA)
Tak	*-piHtV	'ySi'	TK (Lu -píit, Se -piit(a); cf Cu -piyə́wət 'Sila'; p Tak may be *-píiyVHtV)	(UA)
Tak	*-peHtV	'yBr'	(Lu -péet, Se -peit(a); p Tak may be *-péeyVHtV)	
Tak	*-paasV	'eBr'	BH -pás ?; Se -paar/-paaha- (Lu -paa?aṣ ~ -paaṣ is slightly deviant)	(UA)
Tak	*-taasV	'MoBr'	TK (Cu -tásmə; Se -taar/-taaha-	(UA)
Cup	*-kuunV	'Hu'	TK (Lu -kúuŋ, Cu -kún, -kuŋlu- 'get warned')	(UA)
Tak	*-suuna	'heart'	(Lu -sú·n, Cu -sú·n, Ca -sun, Se -huun(a)	(UA)
pre Se	*-yəə sV	'MoySi'	(Se -yəər/-yəəha-)	(UA)
Tak	*(ʔi-)čaamV	'we'	BH *c..m; Se ʔačam (Lu čá(a)ʔam is deviant)	(UA)
Tak	*nə-əʔV	'I'	BH *nə ; Se nəəʔ	(UA)
Cup+	*pə-əʔV	'he'	BH *pə 'that'; Se pə⌈m 'they'	(UA)
Tak	*-taaxaH	'self'	(Lu -taax)	(UA)
Tak	*-ʔaawaH	'horn'	TK (Lu -ʔáaw, Cu -ʔáw⌈ʔə, Ca ʔawa-, Se -ʔaaʔ)	(UA)
Tak	*ciivuH	'bitter'	(Lu čiiv, Cu cív, Cu čiv, Se čivuʔ)	(UA)

to -CV́·CVH p. 96

(Cup *-ʔəəwV 'blood' TK (Lu -ʔoow, Ca -ʔew) (UA)

[-CV́CV·]

Tak	*-kʷasii	'tail'	BH	*-qwas?; Se -waď(a)	(UA)
pre Se	*-qaŋaa	'beard'	TK	(Se -qaŋ(a))	areal

[-CV́·CV·]

Cup+	*-nəəmaa	'liver'	TK	(Lu -nóoma, Cu -nə́m-?ə, Se -nəm)	(UA)
pre Lu	*-muuvii	'nose'		(Lu -múuvi, Cu/Ca -muv 'snot')	(UA)
pre Lu	*-qaasii	'thigh'		(Lu -qáasi)	(UA)
Tak	*-səəkaa	'shoulder'	GH	*-sə́ka; Se -səəka?	(UA)
Cup	*-muusii	'beard'		(Lu -múusi)	(UA)
Cup	*-piiwii	'GrGrPa/Ch	TK	(Lu -píiwi, Cu -píw)	

[*CV́CVH]

Cup	*suďaH	'claw/nail'	TK	(Lu -šla, Cu -sul-?ə, Ca -sál-?u)	(UA)
Cup+	*-tamaH	'tooth/mouth'	BH	*-tama; HH *-tama(a), Se -taam(a)	(UA)
Cup	*-qeďaH	'nape	TK	(Lu -qle, Cu -qíl^{y}-?ə, Ca -qíl^{y}-?i)	(UA)
pre Se	*-navəH	'foot, ankle'		(Se -nav(ə?)	(UA)
Tak	*?-vi?	'this'	BH	*?i(ví), HH *?ivíi-	(UA)
Tak	*pəďə?	'heavy'	TK	(Ca peli?[ma, Se peçe?-	(UA)
Tak	*puǰuH	'ball-shaped'	TK	(Lu purú-, Se puçu-)	

[-CV́·CVH]

Tak	*səəkaH	'shoulder'	BH	*-sə́ka; Se -səəka?	(UA)
Tak	*-saa?iH	'shit'		(Cu -sá?i, Se -saa?)	(UA)
Tak	*-pïsaH	'pintle'		(Se -piir)	(UA)
Tak	*paahiH(yV)	'three'	BH	*pah-; Se paahi?, -paahča- < *paahiH-ta- (Lu paačum (pl. anim) < *pahiH-ta-mə)	(UA)

add *-taaxaH, *-ʔaawaH, *-cuuuH from p. 94

With discrepant final features.

Tak *tukuHpa.. 'sky' (Bh *tú..ac): Lu túupa-š, tukúupa-wu-t 'oriole'; Cu túkvəʔə-c, tuku-čí-, Ca túkva-š, Se tukuhp(a)-ç. Cup has final *H + unexplained ta>ča; Se presupposes absence of final feature. Ca/Cu túkva.. is from **tú(u)ku-pa-; all other NUA languages (plus Cu tuku-čí-) attest to final feature *tuuku]n.

Tak	*kuka..	'spider'	TK	Cu kúkə-t, Se kuka-ç	(UA)
Tak	*tamə?a..	'winter'	TK	Cu támi?[və, Se tamoa?[p	(UA)
Tak	*?əmi..	'thou'	BH	*?ə (Lu ?óm); Se ?əmi?	(UA)
Cup	*sii?i..	'piss'	BH	(Lu síi?i-š, Ca sí?i-ly)	(UA)

With Unclear Final Features.

Tak	*?aǰə..	'louse'	TK	(Cu ?álə-, Se ?açə[-m (pl))	(UA)
Tak	*-nukV..	'cousin'	TK	(Cu -núk[mə, Se -nuku?)	
Tak	*-?aasisV..	'SbCh'		(Cu -?asis[mə, Se -?aahir/-?aahia-	
Cup	*təə=	'down'	GH	*tʒ-	
Tak	*səǰV..	'red'	TK	(Ca sel-ek, Se ṣəri-)	(UA)
pre Se	*?əǰə ...	'hot'	TK	(Se ?əçəə)	(UA)
pre Se	*?əHčǰə..	'cold' (ej)	TK	(Se ?əčəə)	(UA)
Tak	*su..	'one'	BH	su-; HH supul(-), Se h(o)uu[kʷp	(UA)
Cup	*paǰa..	'leaf'	GH	*pala-	
Tak	*paani..	'egg'	BH	*pán-, Se ?a]pạ(ạ)n(a)	
Tak	*naŋi..	'tongue'	TK	(Ca -naŋily, Cu náŋiš, Se -naŋ)	(UA)
Tak	*səə?V..	'flower'		(Lu -ṣóo?, Cu pə]ṣá?ə, Ca sé?i-š, Se -sə̃ʔ/?	(UA)
Tak	*tuukV..	'night'		(Lu túukumi-t, Cu túkmə-t, Ca túkma-š, Se tuuk(a)	(UA)

— 11 —

Tak	*-ǰa	'absolute suffix' after V(V)__	BH *-la	~~(UA)~~ (UA)
Tak	*-ta	'absolute suffix' after VH__ (t→č if V is *i)	BH *-ta, *-ca	~~(UA)~~

CV·CV verbs (Lu V̄, Cu/Ca V̌, Se V̄)

Cup	*ŋaa]ŋaa [R]	'to wee'p	BH	*ŋa-	(UA)
Cup	*waaǰi	'to stir, dig'	BH	*wáli-	
Tak	*ha?tiisV	'to sneeze'		(Lu hatíis(a)-, Cu ?ətís-, Se ha?tisq(ə/a)	symbolic
Tak	*wiiǰV	'to play the flute'	TK	(Lu wíiru-/wíiǰu-, Se wiiroi?n(i) (n)	
Tak	*saawV	'to make bread'	BH	*ṣáw-; Se ṣaaw-t(n)	
Tak	*?aaǰVvV	'to tell a story'	BH	*?á?al-; Se ?aav(ə)	
Cup	*kuǰaawV	'to gather wood'	BH	*kəláw-	(UA)
Cup	*waa?V	'to roast meat'	BH	*wá-	(UA)
Tak	*paa=?i	'to drink'	BH	*pa-; Se paa?-	(UA)
Tak	*čuuŋV	'to suck'	TK	(Lu čúuŋi-, Se čuuŋ(a))	(UA)
Cup	*sii?a..	'to hull acorns'	BH	*si?a-	
Tak	*waaxV	'to get dry'	BH	*wáx-; Se waaq(ə)	(UA)
Cup	*haaǰV	'to look for'	BH	*hal-	
Cup	*tuuči	'to tie'	BH	*túci-	
Cup	*saamVsa	'to buy'	BH	*sámsa-?	areal
Cup	*naawi	'to be jealous'	BH	*náw-	
Tak	*?aasV	'to bathe'	BH	*?áṣ-; Se ?a?a(ə)	(UA)
Tak	*yaawV	'to bring/take'	BH	*yáw-; Se yaa?-, yaə..	(UA)
Tak	*təə?ə	'to borrow'	BH	*tə?-, Se təə?ə[n(a)	
Cup	*tuu?V	'to bear fruit'	BH	*tú-	
Tak	*səə?V	'to bloom'	BH	*ṣá-, Se ṣəə?(a)	(UA)
pre Lu	*?əəyV	'to set bird'	TK	(Lu ?óoyi-)	(UA)
Cup	*muukV	'to die'			(UA)
Cup	*məəčV	'to chew'	BH	*mé-	
Cup	*?aamu	'to hunt'	BH	*?ámu-	(UA)
Cup	*tuukV	'to pass the night'	BH	*tuk-	(UA)
Tak	*naami	'to race'	BH	*nami-, Se naami?n(ə)	

CV•CV verbs where Lu has a short vowel (and Se has a long V)

Tak	*təə̰wV	'to see, find'	BH	*təw-, Se təəva̰(a) [if cognate]	(UA)
Tak	*nəəmi	'to bend'	BH	*nemi-?; Se nəəm-	(UA)
Tak	*siivV	'to shave'	TK	(Lu ṣív^{a}/i-, Cu sív-, Se ṣiiv(a))	(UA)
Tak	*kəə?V	'to bite'	BH	*kə-?, Se kəə?(a)	(UA)
Tak	*pii?V	'to bewitch'	BH	*pi-, Se pii?-	
Tak	*təəŋV	'to be hot'/ to doctor/ 'summer (time)'	BH	*teŋ-, Cu tíŋ, Se təəŋa[va? ———	(UA)
Tak	*wiiwV	'to cook acorn mush'	TK	(Lu wíw-, Se wii-č̆ (n))	(UA)
Tak	*k^{w}əəðV	'to rise'	TK	(Cu k^{w}ələ-, Se k^{w}əəç-	(UA)
Tak	*k^{w}əətV	'to rise'		(Lu k^{w}ot^{a}/i, Se k^{w}əət-)	(UA)

CV•CV verbs where Lu is not attested (and Se has a long V)

Tak	*huu?V	'to fart'	TK	(Cu hú, Se huu?)	(UA)
Tak	*mii?a	'to go/come'	TK	(Cu mí?a-, Se mii(a?)	(UA)
Tak	*piisV	'to nurse'	TK	(Cu pís, Se piih(a)	(UA)
Tak	*piiva	'to smoke'	BH	*pív-, Se piiva?	(UA)
pre Se	*maaðV	'to hear'		Se maaç(ə)	(UA)
pre Se	*taavV	'to shine'	TK	(Se taav-)	(UA)
pre Se	*təə?V	'to roast'	TK	(Se təə?(a))	(UA)

Cupan CVCV verbs where Se is not attested.

Cup	*məðǐ	'to twist'	BH	*məri-	
Cup	*?uðǎ?	'to sew'	BH	*?ula-	
Cup	*hamVV	'to be ashamed'	BH	*hamV́-	
Cup	*qayV	'to wash'	BH	*qáyi-	
Cup	*čuxi	'to spit'	TK	(Lu čúxi-, Cu čúxi-)	
Cup	*kusV	'to take'	BH	*kuṣ-	(UA)
Cup	*nuðǐ	'to push'	BH	*nu-	
Cup	*siðǐ	'to pour'	BH	*síli-	
Cup	*mənV	'to come/go'	BH	*mən-	(UA)
Cup	*čəðǐ	'to cut'	TK	(Lu čóri-, Cu čə́li-)	
Cup	*čak^{w}i	'to catch'	TK	(Lu čáq^{w}i-, Cu čák^{w}i-)	
Cup	*na?V	'to get burnt'	BH	*na-	(UA)
Cup	*čuŋi	'to kiss'		(Lu-Cu čúŋi-) (~ *čuuŋi)	(UA)
Cup	*yuðV	'to build/ string beads'	BH	*yú(l)- 'to put on'	
Cup	*yumu?V	'to put on a hat'	BH	*yumu-	
Cup	*ŋəyV	'to go home/ return'	BH	*ŋe-	(UA)
Cup	*paHčikV	'to leach'	BH	*pácik-	

CVCV verbs

Tak	*maxa	'to give'	BH	*max-, Se maqa⌈i	(UA)
Tak	*təmV	'to close'		(Cu témi-, Se təm(ə)(h))	(UA)
Tak	*nəmV	'to walk'		(Ca némi- 'to chase', Se nəm(ə))	(UA)
Tak	*pisV	'to rot'	BH	*pisa?-, Se pisqa?-	
Tak	*qaǰV	'to sit/ be there'	BH	*qá- 'be$_1$', Se qaç(ə)	(UA)
Tak	*piŋV	'to beat'	TK	(Cu píŋ 'to knock', Se piŋ(a) 'to crumble'	
Tak	*tukV	'to carry'	BH	*tuk-, Se tuk(a)	
Tak	*tavV	'to put'	BH	*tav-, Se təv(ə)	(UA)
Tak	*wənV	'to stand/ be there'	TK	(Lu wón-, Ca wen-, Se wən(^{a}/ə)	(UA)
Tak	*k^{w}asV	'to get ripe'	TK	(Cu k^{w}ás-, Se k^{w}ah⌈i	(UA)
Tak	*yuyV	'to snow'	BH	*yúy, Se yuy(V)	
Tak	*qə?V	'to kill several'	TK	(Lu q?ée-, Se k^{w}ə?(a)	(UA)
Tak	*ya?V	'to run'	BH	*ya?-, Se ya?-	
Tak	*k^{w}a?V	'to eat'	BH	*qwa-, Se k^{w}a?i-	(UA)
Tak	*?əyə	'to steal'	TK	(Lu ?uyóo-tu-, ?óyəɔ, Cu ?əyə-, Se ?əy(ə))	(UA)
Tak	*ču^{H}uu=paxV	'to enter'	TK	(Lu čulúupax, Se čurupq(^{ə}/a)	(UA)
pre Se	*kimV	'to come'	TK	(Se kim(a))	(UA)
pre Se	*mə?V	'to die'	TK	(Se mə⌋mə?	(UA)
pre Se	*qamV	'to get drunk'	TK	(Se qama? 'drunk')	(UA)

CVHCV verbs (with short V in both Lu and Se)

Tak	*paHqV	'to slap'	TK	(Lu páq^{a}/i-, Cu páqi-, Se paq-)	(UA)
Tak	*məHqa	'to kill'	BH	*mə́q-?, Se məqa⌈an(a)	(UA)
Cup+	*kuHpV	'to sleep'	BH	*kup-, Se kuu⌈man(a)	(UA)
Tak	*piHtV	'to arrive'	TK	(Ca pís-, Cu píč-, Se pič(ə)	(UA)
Cup	*təHpi	'to track'	BH	*tə́pi-	
Cup	*wiHčV	'to throw away'	BH	*wíc-	(UA)
Cup+	*waHqi	'to sweep'	BH	*wáq-?, Se wəəq-	
pre Lu	*saHqi	'to be hot'	TK	(Lu ṣáqi-)	(UA)
pre Lu	*puHci	'to winnow'	TK	(Lu púči-)	(UA)
pre Lu	*čuHpa	'to ge gathered'	TK	(Lu čúpa-)	(UA)
Cup	*puǰuHća	'to go out/ away'	TK	(Lu puǰúca-, Cu púlučə)	
Cup	*k^{w}aHtV	'to wake'	BH	*k^{w}a-	

Areal Words in Takic Languages (found in BH and HH)

roadrunner (+Se)	
fox (+Se)	
net	Lu, Se
nettle	
flea	
tick (+Se)	
horned toad	
lizard sp.	
butterfly	Lu, Se
Mexican	Lu, Cu
mistletoe	
wing	
quail	
shoe	
racer snake/clown	
skunk (TK)	Se
to buy	
young jackrabbit	
deer	(+Se)
jimsonweed	Cu, Se
palm tree	(+Se)
beard (TK)	Se

These items sometimes violate the sound correspondences set up for Tak in preceeding sections. Though a few may be genuine UA words, the sound correspondences are sometimes discrepant, suggesting intra-UA diffusion. Most of these items have no UA analogues outside Takic.

Takic and Cupan naturally have words otherwise unknown in UtoAztecan. Some of these words are borrowed from other languages. Below we present four likely cases from Yuman (The Yuman etymologies are from Wares, A Comparative Study of Yuman Consonantism). The Yuman forms cited here are not reconstructions, rather approximations to a reconstruction, symbolized by preposed ɬ.

(1) Cup *panaa-ɣa 'yucca whipplei': Yuman ɬmVnát 'yucca' (Wares 501)

(2) Cup *muHtaa-ɣa 'cholla cactus': Yuman ɬmVltát 'barrel cactus' (Wares 20)

(3) Cup * amuu-ɣa 'agave': Yuman ɬʔVmál 'century plant, mescal' (Wares 71)

(4) Cup *paaxV-waH-ta 'young jackrabbit': Yuman ɬpVxár 'cottontail' (Wares 338). The Yuman form is also one source of YM //paaroʔsi// 'cottontail', which is surprisingly far away.

We may as well mention here five other cases for lack of a better place to discuss them.

(5) NUA *naʔ 'father' (M-485) should be compared to Yuman nVʔáC 'woman's father' (Wares 152)

(6) NUA ɬhowi 'dove' (M-137) an obviously diffused word, is to be compared to Yuman ɬkVwíʔ 'dove' (Kiliwa huwíʔ) (Wares 121)

In neither of the above cases is the word necessarily Yuman in origin. The glottochronological time depth of NUA is 34c. That of Yuman is less. The case of 'father' may involve continent-wide similarities (maybe not). The case of 'dove' is an obvious areal word whose source cannot at the moment be determined.

(7) Hop mori 'bean', PPmuuni; Tatamuní, YM muuni; Yum ɬmVrí·k 'bean' (Wares 23); Sionan humríke 'bean' (TK). The proximate source shape of this areal word is ɬmarík. It is clearly not originally UA, and though Yum may be the source of the UA forms, Siouan, whose homeland must lie somewhere between Pittsburgh and Saint Louis (probably nearer the former) cannot have gotten it from Yuman, nor most likely vice versa.

(8) pUA *ʔaaṯah 'bow, spear-thrower' should be compared to Yuman ɬʔVtím 'bow/gun' (Wares 49).

(9) pUA *cuuru 'bird' should be compared to Yuman ɬcúrV 'hawk' (Wares 213).

Numbers 7 and 8 are especially important indicators of contact between UA and ım since they refer to technology and not just habitat.

Takic Summary and Conclusions.

What the above investigation has shown is that Tak provides evidence for pUA vowel length and preconsonontal and final features, though a distinction between preconsonantal *n and *h is seen in only one highly restricted environment, and there is no evidence for *Hk, *Hm, *Hn, *Hn, *Hw, or *Hy since these consonants are not subject to diachronic 'lenition'.

Having considered pNum and pTak phonology, we are now in a position to consider NUA. Of particular importance are the final consonants and medial consonant clusters, since these provide the solution to the traditionally controversial issues of lenition, genimation, and nasalization of UA.

We may as well mention here five other cases for lack of a better place to discuss them.

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'inal and Preconsonantal Features in NUA

The evidence from the NUA languages is that their common ancestor had :VC, *VVC, *VhC, and *VnC word medially and *V, *VV, *Vh, and *Vn word finally. :one of these types can be collapsed with any other for the ancestor, though .n the daughters some types have fallen together, as shown below in figure 9.

	Num	Tub	Tak	Hop
*VC	VC	VC̣	VC̣	VC̣
*VCC	VC	VVC̣	VVC̣	VVC̣
*VhC	VhC	VHC	VHC	Vhc
*VnC	VnC	VnC	VHC	VhC
*V	V	V	V	V
*VV	V	VV	VV	VV
*Vh	Vh	VH	VH	Vh
*Vn	Vn	Vn	VN	Vn

Figure 9

C for Tub means that *t → l; for Tak it means that *ptc[c̣] → v ɣ s x; and for Hop it means that *p → v.

Outside NUA the only trace of earlier *hC and *nC is that the reflex of pUA *p after *V or *VV is something like [β] and that after *Vh or Vn it is [p]. All other preconsonantal *n's and *h's act as if they had never been there. (Though vowel length has a distinctive reflex in all SUA languages.)

On logical grounds, however, since no hypothesis exists that would account for preconsonantal *h and *n in NUA, we must accept *hC and *nC as features of pUA. Likewise, although the evidence for *hC vs. *nC is largely limited to Num and Tub (though *nw has a distinctive reflex in both Tak and Hop), if one cannot explain how *VC, *VhC, and *VnC came to be different in Num and Tub one must accept as we do that this reflects a feature of the proto-language. The appropriate negative response (if any) to this statement is not disbelief, but proof that we are in error, by explaining these reflexes in some other way.

The feature we call *h is indeed something like [h] in several languages, e.g. Se (partly), Hop, Cm, SP (partly), Sh (partly). In others it is gemination or non-lenition of obstruents. We prefer to analyze this element as a segment and as a unique segment, and *h is feasible. If a putative pUA preconsonantal *h plausibly representing some other feature not found in NUA should be effectively argued, we would consider replacing our preconsonantal *h by *gemination, written $*C_2$ at the ends of morphemes. Let us point out, however, that the preconsonantal h of Guarijío (which does not come from pUA *h/-C) does not require any new pUA segments. It is rather the reflex of pUA *C, *nC, or *hC after a short stressed pUA *V.

Final Features in NUA

We can reconstruct monosyllabic roots of the following shapes for pNUA:

*CVV
*CVh
*CVn
*CV?

but not *CV

Disyllabic roots of the following shape may be reconstructed.

*CVCV (verbally)	*CVVCV	*CVhCV	*CVnCV
*CVCVV	*CVVCVV	*CVhCVV	*CVnCVV
*CVCVh	*CVVCVh	*CVhCVh	*CVnCVh
*CVCVn	*CVVCVn	*CVhCVn	*CVnCVn

The maintenance of morpheme-final features depends on their being manifested before consonant-initial suffixes or roots, since they (except for n in Sh and Tub) are deleted if word-final, possibly even at the pUA stage. Thus, some morphemes will lose or change their final features through lack of occurrence in morpheme strings, or through analogy. Although we can predict that there will be some discrepancies, we will not attempt to account for each such case; some cases, however, will have obvious explanations which will be pointed out.

The pUA absolutive, *-ta (or *-tə), is a most useful element, since most nouns in Tak and Tub (as well as Na) occur with it, and in Num a large number of nouns occur with some absolutive suffix or other (usually not from *-tV). Thus it serves to illustrate pUA *..VtV.., *..VVtV.., *..VhtV.., and *..VntV.. and show what a noun ends in morphophonemically. The above-mentioned transitions occur root (morpheme) medially, but except for "gemination" in verbs, do not involve any alternations.

Several cognate sets, however, show discrepant medial correspondences in words of almost (but not quite) the same meaning, suggesting that such morphophonemic devices as V → V̄ and VC → VhC or VnC were all used for derivational purposes (in preUA if not pUA itself). (See below.) For example, there is evidence that *CVCV ~ *CVnCV alternation did occur in pUA: e.g.,

*yaca 'to set' : *yanca 'to sit'

There is also evidence that *CVCV ~ CVhCV alternations also occured, at least in NUA. (See Heath 197_). But these alternations are in verbs, and can be explained as involving a specific grammatical increment. The discrepant *C vs. *hC, or *C vs. *nC also occur in non-verbs. For these no explanation leaps to mind. At this stage we are stuck with the data as it is, though some analogies may be involved.

In this section we present evidence for final features in NUA languages. We examine 140 etymologies. Among these there is agreement in ~~108~~ 116 cases, disagreement in ~~12~~ 13 cases, and uncertainty in ~~20~~ 18 cases. 'Agreement' means either across-the-board or two out of three. In the latter case, the discrepancies are made clear.

The agreement of ~~108~~ 110 out of ~~120~~ 123 instances (90%) is an overwhelming demonstration that final features in Num, Tub, and Tak are phonologically cognate and must be reconstructed.

The distribution of final features is as follows:

	one-syllable	two-syllable
final V	#	28 (+4)
final VV	11 (+4)	19 (+1)
final Vh	12	13
final Vn	4	~~12~~ 14
final V?	6	3

X = h, n, or V_1

H = h or n

E = e~i

R = has reduplication

Y = semivowel

Stems of the shape *CVV

N/S *kii 'house' : Tub = kii-l; Tak *kiN-ta; Hop kii-hə. [M-241, VH-44]. Tak reflex is discrepant; see *tan 'stone'. cf SP ətəh]ki 'rock ledge' = Tub tən͡=͡kii-l 'idem'

N/S *huu 'arrow' : Num *hu[Ca ; Tub paaq=]͡uu-l; Tak--pre Lu *huu-ʔa; Hop hoo-hə. [M-9, VH-78].

N/S *taa 'sun' : Num *ta= 'sun', *ta-ci 'star' ; Tub taa-l; Tak *taa[=miyaH-ta; Hop taa[wa. [M-425.]

N/S *tuu 'charcoal' : Num *tu[hu; Tub tuu-l; Tak *tuu-ʔa. [M-45].

N/S *paa 'water' : Num *pa[Ha; pa=; Tub paa-l; Tak *paa-ʔa; Hop paa-hə [M-457, VH-123].

N/S *ŋaa 'root' : Num *tə]na; Tak--Se ŋaa[ku?; Hop ŋa(?)- 'root', ŋaa[hə, cf YM naawa. [M-355, VH-151]. This set does not, strictly speaking, provide evidence for a NUA final feature, but there is no clear evidence for long final vowels allowing final feature, after them.

N/S *pəə 'skin' : Num *pə[hə; Tub =͡pə(ə)-l 'leaf, skin'; Hop pəə[ka. [M-212] . p SUA is *vəəwa, i.e. *pəə+ possessed noun suffix.

N/S *pii 'breast' : Num *pi-ci-?; Tub pii-l; Tak *piH-ta; Hop pii-hə. [M-58, VH-6]. Tak is discrepant.

N/S *sii 'guts' : Num *si[hi; Hop sii-hə; cf p͡Son *siiwa, which contains possessed noun suffix. [M-478, VH-66].

N *woo 'head hair' : Num--W *wo[Co(h); Tub woo[to-l. [M-210].

N/S *səə(ma) 'one' : Num *səmə,--Mo səəmano '10',--SP -ma]səη^wi 'xl0'; Hop səə[ka; PP həma(ko); NT ʔəmádo (+ *yu); Ta sine 'once'; YM seenu; Hu šewi; Na see(me?). Some languages level vowel of second syllable to agree with first vowel.

Stems of Shape *CVV ~ *CV̰?V

N/S *suu(?V) 'star' : Tub suu-l; Hop soo-hə; Tak *suu?u-ʔa; Tep points to *suu?u. [M-415, VH-71].

N/S *saa(?V) 'shit' : Tub saa-l; Tak *saa?iH-ta [M-126]. cf p͡SUA *sa?ivoori 'fly' M-187 .

N/S *k^{w}aa(?V) 'eagle' : Num--SP k^{w}a[nan; Tub waa?a-l; Tak *k^{w}aa?a-ʔa; Hop k^{w}aa-hə. [M-145, VH-49]. cf pSUA *k^{w}aa?a-wə, which contains the augmentative suffix, pUA*-wəh.

Stems of shape *CVh

--Ch no?o 'foetus'

N/S *noh 'egg' : Num *nohyo, *no=; Tak *nəh-ta 'pregnant woman'; Hop nəh-ə. [M-153, VH-96].

N/S *kuh 'fire' : Num *kuh= ; Tub kuH-t; Tak *kuh-ta; Hop koh-o (final o unexplained; ə is expected). [M-168, VH-137].

N *coh 'head' : Num *coh=; Tub co[moo-l; Hop //cəə[kVya// < *coh... 'brains'; cf pSUA *coŋi, possibly < *cohŋi, which could be segmented *coh-ŋi. [M-219, VH-38].

N/S *?oh 'bone' : Num *?oho; Tak--Lu ?e-t (< *?əh-ta). Se ?əə-c is discrepant; Hop ?əəqa < ?əhqa; of YM ?ota. [M-52, VH-61].

N/S *pih 'back' : Num *pih=; Tub =piH-t, piH=coo-l 'buttocks'; Tak--Se //təhpi// is discrepant. [M-17].

N/S *wih (<*wip) 'fat'(n) : Num *wih=; Tub wip-t; Tak *wih(-ta), Se wip-t; Hop wi-hə (segmentation before or after h unclear). [M-164, VH-102].

N/S *tah (<*tap) 'sinew' : Num *tan[mu; Tub tap-t; Tak *tah-ta; Hop ta-hə (segmentation before or after h unclear); cf pSon *tata. [M-377, VH-125].

N/S *poh (<*pok) 'road' : Num *po[Ho; Tub poq-t; Tak *pəh-ta; Hop pə-hə (segmentation before or after h unclear). [M-348-VH-4.]

N *səh (<*səp) "cold' : Num *səh=; sip-t 'ice, snow'; Hop səə[səŋʷa 'to be cold' < *səh... An extended stem, pUA *səpəH is also found in Tak, Tub, and SUA. [M-93, VH-11].

N/S *woh∼*wah 'two' : Num *wah[a(h)'2', *woCoh=[sən-wih '8', *wah[cən-wih '4'; Tub woo '2', wooyo 'both'; Tak *wəh[-V '2'--Se wah=[mahaa-ç '10' (2x5), *waHca..'4'; Hop ləə[yom '2' (<*woh-yo-mə), naa=ləyəm '4'. (< *naa-woh-yo-mə); cf SUA--YM wooyi '2', Ta náwo = Na naawi '4'. [M-511/513, VH-103]. Some of these forms show an extended stem *woh-yo, with a suffix *-yo∼*-yu also attested with the numberals 'one' and 'three'. pUA *naa-woh(-yo) '4' is also attested in the above cited examples. A competing form *wah-can '4' is also attested in Son languages, e.g. YM *wa?im- 'step', Co wa?apwa '2', Lu wasá? shows loss of *h.

base

Stems of shape CVh, continued.

N/S *mah∼*maa 'hand' : Num ma=∼mah=, --W mah[ya, --C/S mo?o (aberrant phonology); Tub maa-l; Tak *mah-ta∼*-maa; Hop ma(?)-; SUA languages support *maa and possibly *ma (i.e. *mah). [M-215/312, VH-128].

N/S *wəh 'big'; *-wəh 'augmentative suffix : (a) Num -wəh= 'long object,

dent --SP wə[ə h 'long ago'; Hop wəh-; (b) Tub -wəH-t; Tak *-wəH-ta; Hop-wə (..n + wə> ..ŋʷə); Tep, YM, Na all reflect this suffix, though apparently not productively. [M-39, VH-100].

Stems of shape *CVn.

N/S *tən 'stone' : Num *tən-pi, *tən=; Tub tən-t; Tak *təN-ta; Hop //təh[pVqa// 'canyon', //təh[peela// 'wall of cliff house'. [M-353]. cf YM teta, Na te-λ.

N/S *mu(hu)n 'owl' : Num *muhuʰ/n; Tub muhun-pis-t; Tak *muhuH-ta (Se mumt < *mu-muH-ta); Hop moŋʷə (< *mun-wəh, with augmentative suffix). [M-310]. (a)Num — Sh hin-;

N/S *hinta 'what, something'; *ka hinta 'nothing' ; Tak--Lu hiiča (< *hiNta), Se hiit-i (acc); Hop hiita < hihta. cf YM hita; (b) Tub qaainta; cf YM kayita. [TK]. The segment *-ta has been analyzed as 'absolutive' in some languages, whatever its ultimate origin and function.

N/S *?ən (<*?əŋ) 'thou, thy' : Num *?ən; Tub {iŋ} ; Tak *?ə[mi..; Hop ?əh- 'thy', ?ə(ə)ŋə (< *?əŋ-yə) 'thee'. [TK].

Stems of shape *CV?[V_1]

N/S *su? 'MoMo' : Tak *-su?; Hop so?[-o. [M-499, VH-140].

N/S *ka? 'FaMo', 'SoCh' : Tak *-qa?; Hop -ka?[a 'FaSi'. [M-498, VH-170].

N *na? 'Fa' : Num *na..; Tub ?aa]naa-; Tak *-na?; Hop -na?[a. [M-485].

N/S *k^{w}a? 'MoFa' : Tak *-q^{w}a?; Hop -k^{w}a?[a. [M-496, VH-127].

N/S *yə? 'Mo' : Tak *-yə?; Hop yə?-

N/S *mo? 'female in-law' : The evidence for this reconstruction is discussed at length in §_____.

Note: the above stems could be reconstructed as *CV, *CV?, or *CV?V_1 : the three possible types do not contrast. Note that all these items are kin-terms. Not all reconstructible kin-terms have this shape, however.

Stems of shape *CVCVV

N/S *kutaa 'neck' : Num *kuta; Tub kulaa-; Tak *qəðaH-ta. [M-300, VH-154]. Tak is discrepant with respect to final feature and first vowel.

N/S *k^{w}asii 'tail' : Num *k^{w}asi; Tub wisii-; Tak *-k^{w}asii; Hop k^{w}asi 'pintle'. [M-432, VH-51].

N/S *(paa=)kəcuu 'fish' : Num--S *pa-kəCu; Tub kuyuu-l; Tak *kiyuu-ðə; Hop paa=kiwə. [M-171]. NUA shifts *c to *y here.

N/S *mataa 'quern' : Num *mata; Tub manaa-l< *malaa-l; Tak *maðaa-ðə; Hop mata~mataa=. [M-283.]

N *kəhaa 'willow' : Tub qaa-l Hop qahaa[vi. [TK < CF] (~ŋaawi (Tub, Se)).

N *nawii 'girl' : Num *nawi(H); Tub ?aa]naawi[s-t, nawii-l 'apron, skirt'; Cup *nawii-ðə; Se naa(h)-c. SP nanwi may be borrowed (from Tub?). [M-474]. Num does not contribute to establishing the final feature (or lack of it).

N/S *tonoo 'knee' : (a) Tub tonoo-l; cf Son *tono; (b) Tak *taamə-ðə; Hop tamə; (c) Num *tanŋa(h), *tanŋa (SP) 'to kick'; Tub tan 'to kick'; (d) cf Na λaan-k^{w}aa(yi-λ) 'knee, thigh'. [M-244/246, VH-30/156]. *tonoo is pUA; forms under (b) go back to *ta(a)mo; forms under (c) go back to *tanŋa. Both are limited to NUA. Na(d) probably contains pUa *tannah 'foot' since Na k^{w}aa(yi)λ means 'top, head' and 'knee' is plausibly 'head of leg'.

Stems of shape *CVCVh.

N *pikah 'knife' : Tub pikaH-t; Tak--pre Lu *pikaH-ta; Hop //pikaa?iŋ^{w}a//. [M-248].

N *təpah 'pine nut' : Num *təpah; Tub təpaH-t, Tak *təvaH-ta; Hop təva. [M-318].

N/S *katah 'nape' : Num--SP katahk(?)a 'noddle'; Tak--Lu kalá-t < *kaðaH-ta. [M-220].

Stems of shape *CVCVn.

N/S *sutun 'nail, claw' : Num *situn; Tub sulun-t; Tak *suðaH-ta; pSUA is *sutu ~ *sutə . [M-295, VH-26]. First vowel of Num is discrepant, as is second vowel of Tak.

N *sawən 'raw' : Num *sawan; Tak *sawəH-ta. [M-340].

N/S *wokon 'pine' : Num *wokon (~ *wonko); Tub woqon-t; Tak wəxəH-ta; Hop leqe [M-317, VH-142].

N/S *taman 'tooth' : Num *taman; Tub taman-t; Tak *tamaH-ta, --Se tama-c (discrepant); Hop tama; pSUA is *tamə. [M-444, VH-29].

N *wi?an 'acorn' : Num--W *wiCaH < **wi?aH; Tub wa?an-t; Tak *wi?ah-ta. [M-1 (part), TK].

Stems of shape *CVVCV.

N/S *huuki 'bunchgrass' : Num *huk^{w}i(h); Tub ?uuki-pəə-l; Hop hooki. [M-202].

N *kaawa 'woodrat' : Num *kawa; Tub qaawa-l; Tak *qaawa-ðə; Hop qaala. [M-338].

N *puuha 'curing power' : Num *puha (< *puuha); Tak *puuhV-ðə [M-281]; cf Tub tə]poohis-t 'medicine'.

N/S *məəca 'moon' : Num *məCa(h); Tub məəya-l; Tak *məəya-ðə; Hop məəya-wə (contains augmentative suffix). [M-286, VH-158]. NUA shifts *c to *y here.

N/S *siiwi ~*siwii 'onion' : Tub siiwi-l; Hop siiwi. [M-308]. Na šiwi-λ 'plant' supports *siwii.

N *paaha 'mortar' : Num--Ms paha(a); Tub paha-l; Tak *paaha-wəH-ta 'pestle'. [M-315].

Stems of shape *CVVCV (continued).

N/S *tən=paaha 'idem' : Num--Mo tə̀h=paha[a; Tak--Lu tə̀N=paa-ǰa. [M-286/353, VH-169].

N/S *paa-ci 'eBr' : Num *paci[?; 'eSi'!; Tub paaci(i)-; Tak *-paasV; Hop ²páva [R, poss]. All UA languages but Hop reflect pUA diminutive suffix *-ci. [M-491].

N *?iisa 'coyote' : Num *?isa and *?ica; Tub ?is-t; Tak *?iisV-ǰa, *?iisV-wəH-ta 'wolf'; Hop ?iisawǰ(sg), //?ii?iisa-t// (pl) [R]; Hop sg contains augmentative suffix. Loss of second vowel in Tub is unexplained. [M-107].

N *k^{w}iiŋa ~ *k^{w}iiya 'oak' : (a) Hop //k^{w}iiŋVpi//; Tub wiŋiyaa-l 'kind of acorn'; (b) Tak *k^{w}iiyV-ǰa 'acorn'; (c) Num--SP^{-a} k^{w}iya 'scrub oak'. [M-1]. Forms under (a) support *k^{w}iiŋa; Tak supports *k^{w}iiya; SP^{-a} can come from either antecedent form, and may be a borrowing from Tak. The Tub form seems to be a cross of the two competing antecedent forms. A trisyllabic etymon is unlikely unless it contains a derivational suffix. The Ca form k^{w}iñil^{y} reflects Tak *k^{w}iiya-ǰa, as does Ca menil^{y} 'moon' reflect Tak *məəya-ǰa.

N/S *?ooŋa ~ *?oŋaa 'salt' : (a) Tak *?ooŋa-ǰa 'salt', 'lazy'; SUA *?ooŋa (PP ?on, YM ?oona, etc.); (b) Tub ?uŋaa-l; Hop ?eŋa; (c) Num *?oŋa. [M-358, VH-63]. Forms under (a) support reconstructing *?ooŋa; forms under (b) support *?oŋaa; Num can come from either reconstruction. *?ooŋa is probably pUA; whether *?oŋaa is a localized and late innovation within NUA is unclear, but likely.

N/S *suuna 'heart, middle' : Num → suh= 'mind'; Tub suuna-l, suunaa[wa-l 'middle sibling'; Tak *suunV-ǰa; Hop soona 'edible part of a seed' [M-222, VH-98]. cf SUA *suura : PP huḍ; Ta surá; YM suula.

N/S *tuuka : Num *tuka(nV); Tub tuuka-l. [M-45, VH-144].

~ N *kuuna 'bag' : Num -- SP-Ch kuna; Tak -- Lu kun-la, -- Cu/Ca kúni-ly. [M-19].

Stems of shape *CVVCVV

N/S *səəkaa 'shoulder' : Tak *-səəkaa; Hop //sə(ə)kaakVci//; cf YM seeka 'hand'; Num *sihkun; Tub siHkiH-t. [M-7/375]. The Num and Tub forms are mutually cognate but problematic in comparison to *səəkaa.

N/S *paakaa 'reed' : Num *pakən; Tub paqaa-pə̀-l, paaq[=uu-l 'war arrow'; Tak *paaxaa-ǰa; Hop //paaqaa//. [M-342-VH-8]. Num final feature is discrepant. Tub V_1 in paqaa-pə-l is short because propenult.

N/S *huunaa 'badger' : Num *hunan; Tub ?uuna-l; Tak *huunaa-ǰa, *huuna-wəH-ta 'bear'; Hop hoonawə 'bear'. pSon is *huuri, which yields YM huuri. [M-18]. Num final feature is by assimilation to the second ~~final~~ consonant.

N/S *waanaa 'net' : Num *wana(h); Tub waanaa-l; Tak *waanaa-ǰa. pSon is *waari 'basket', which yields YM waari. [M-301].

N/S *nəəmaa 'liver' : Num *nəmən; Tub nəəma-l; Tak ~~*-nəəmaa~~ *-nəəmaa; Hop nəəma. [M-265/267, VH-89]. This item is related to pUA *nəmi 'to live, walk around, wander'.

N *paasii 'chia' : Num-SP paasi; Tub paasii-l; Tak *paasii-ǰa. [TK<CF].

The preceding sets show that Tub reflects putative *CVVCVV both as CVVCV ('liver' 'badger') and CVVCVV ('net' 'chia'). The significance of this is not clear. Detractors may wonder if there is <u>really</u> good evidence for reconstructing CVVCVV stems to pUA.

Stems of shape *CVVCVh

N/S *saanah 'gum' : Num *sanah; Tub saanoH-t; Tak *saanaH-ta; Hop saana. [M-320, VH-147]. SUA *saara: PP had-, Na sa]saali-k [R] 'gummy'.

N/S *tɔɔpih 'earth' : Num *təpih; Tub tɔɔwɔH-t 'dust'; Tak *tɔɔvaa-ʔa, *tɔɔviH-ta 'white clay'; cf Hop tɔɔva 'to drop'. [M-149]. Tub medial w is not a refular reflex of *p.

N/S *?aawah 'horn' : Num *?awah; Tub ?aawaH-t; Tak *-?aawaH; Hop ?aala. [M-236, VH-104].

N/S *?aatəh 'bow' : Num *?aˆtə(h); Tub ?aaliH-t; Hop //ʔaawVhta//, metathesized from *?aata-wəH, containing augmentative. Though PP gaat < *watV$_L$, seems cognate with Hop ?aa]wta, UA *w > l in Hopi next to low vowels. The second vowel of Tub is not regular. [M-53].

N *kuuhuh 'elderberry' : Tub kuuhuH-pə-l; Tak *kuhuH-ta. [TK < CF]. cf YM kuu?u < *Ru(H) 'agave'; cf SP kuu?u 'plant species'.

N/S *taacah 'summer' : Num *taca(h); Tak *tas[pa 'spring' < *taasaH[pa. [M-425, VH-27].

N/S *paahih 'three' : Num *pahih(yu); Tub paay; Tak *paahiH(y); Hop paayom *paahi-yu-mə. [M-512, VH-1]. Hop does not require final *h, though it does not rule it out.

N/S *piipah 'tobacco' : Num *pah[mu; Tak *piivaH-ta; Hop piiva. [M-442, VH-12]. Num form is unexplainably mangled.

Stems of shape *CVVCVn

N *?aanən 'ant' : Num *?ani; Tub ?aanən-t; Tak ?aanVh-ta; Hop ?aanə. [M-3]. Num is discrepant in not supporting final feature.

N/S *taapun 'rabbit' : Num *tapun; Tub taxpun-t; Tak *taavuh-ta; Hop taavo. [M-331/332, VH-56]. Tub medial cluster is discrepant.

N/S *?oopin 'awl' : Num *(w)opi(n); Tak *?ɔɔviH-ta. [M-15].

*takan ~ *taakan 'person; body' : (a) Tub taqan-pis 'old woman'; pre-Se *taxaH-ta 'person, self'; cf YM taka 'body', Na ⟨λak-λi⟩ 'trunk of body'; (b) Tak *-taaxaH 'self', *-taaxaa-wV 'body'; Hop taaqa 'man'; cf. YM taaka 'fruit'; Na λaaka-λ 'man'. [M-274; VH-145]. Forms under (a) support *takan; forms under (b) support *taakan. Tak second long vowel reflects *..Vn. Both etymological variants occur in Tak, and both are undoubtedly pUA. Tub V_1 in taqan-pis could come from *aa, being shortened in propenult position.

Na λak-λi supports *taka rather than *takan, so we may have to reconstruct *taakan ~ *taka.

N *piʔaakən 'caterpillar': Num-Sp-Ch piʔakən; Tub piʔaakɔn-t; Hoo ‖ piʔaakə ‖. [TK < CF].

N/S *naapən 'prickly pear': Num--Ch napun-pə; Tak *naavəH-ta; Hop naavə. pSUA is *naavo. [M-69, VH-16].

tems of shape *CVHCV (*n or *h is determinable).

/S *nanka 'ear' : Num *nanka; Tub nanqa-l, nanka=; Tak *nahqa-ʤa; Hop //nahqVpə//, //nahqa// 'earring'. [M-147, VH-47].

*sahya 'mudhen' : Num ɬsaya (CF); Tub saaya-l; pre Lu *sáayV-ʤa [TK< CF].

*?ahyə 'good' : Num--SP ?ayə; Tak *?aayɔ-ʤa [M-200].

N/S *?ahyV 'turtle' : Num--SP ?aya; Tak *?áayV-ʤa . [M-447]; cf Na. aayo(o)-λ.

N *tuukunpa 'sky' : Num *tukun(-pa); Tub tukunpa-l 'sky; beads'; Tak *tuqkuhpa.. Hop tókpela < *tuukVHpawa. [M-383]. There may be some internal diffusion involved; this is one of the few reconstructable 3-syllable stems, but the 3d syllable comes off in Numic. Still, it is found in all 4 branches of NUA, and not in SUA at all. But NUA *tuuku(-pa) may be related to Taracahitian *tewka < *təwəka 'sky'; *tə - is probably < pUA *təh- (better *təə- ?) 'supernatural'. Cf Na il]wika-λ 'sky'. Thus NUA *tuukun may be contracted and assimilated from pUA *təəwəkan.

N/S *kuhŋa 'Hu' : Num *kuhma (C, S) ~ *kuma[(W); Tub kuuŋa-; Tak *-kuuŋV, *kuuŋV-ʤa 'to take a Hu'; Hop -kooŋʸa, kooŋʸV-ta 'to take a Hu'. [M-506, VH-97]. Num medial nasal has become labial due to preceding *u.

N/S *punku 'pet' : Num *punku; Tub punku-l 'dog; wretch', puHku-pis-t 'dog'; Hop //pohko// ~ //-poko//. [M-134, VH-46]. Tub has a variant allomorph with *n → *h; Hop has a variant with *n → Ø. The *n may be an infix.

N *yanpa 'mockingbird; wild carrot' : Num--SP yanpa 'A'; Tub yanpa-l 'B'; //yahpa// 'A, B'. [M-285].

N/S *tənwa 'name' : Tub tiŋʷa 'to call'; Tak *təŋʷa-ʤa, *təŋʷa-ni..; Hop təŋʷa (vb), təŋʷVn[(n). Hop and Tak support short final vowel, Tub supports long final vowel unless ŋʷ functions as a cluster, which would be non-canonical in final position. [M-297, VH-20].

N *ʔənwa 'blood' : Num--SP ?iŋʷa- 'relative'; Tak *?ə[ŋ]wa-ʤa; Hop ?əŋʷa. [M-47]. SUA and Se are from *?əra.

Stems of shape *CVHCV, cont'd.

N/S *punci 'eye' : Num *pu?si; Tub punci-l; Tak *puHći-ʤa; Hop poosi: pSUA *vuusi. [M-159, VH-5]. SUA has *vusa 'to waken' [VH-74], of which *punci may be an n-infixed derivative.

N *taCwa 'man' : Num *ta?nwa(h); Tub [taatwa-l] < ? [R] *taaHtᵃwa-t [M-275]. A comparable SUA etymon *təwi [M-275] is also found. The reconstruction remains uncertain. Tub may be reduplicated. The form may be originally trisyllabic. Cf *ʔəkan 'wind'.

N/S *konwa 'snake' : Num *to-kohwa; pre Lu *qoŋwa-ʤa; Lu qe-qéŋ-la < *qo-qóŋV-ʤa 'ring snake'. Lu piiqwa-la 'snake' is from *piH-konwa-ta (where piH-= 'back'?) cf also suŋaal 'woman ~ ṣwa- < *sunwaa. [M-386]; cf Na kowaa-λ. Hop leléqaŋʷ < *wokan is from *konwa by scrambling.

N/S *sahpə 'belly' : Num *sahpə; Tub saHpu[s-t. [M-418]. cf Ta sa?pá 'body'.

N/S *kənkə 'foot' : Num--Mo kəhkə; Tub ?ənkə-l; Hop kəkə. [M-414]. Tub has lost initial consonant; Hop has lost *n before *k, or else *n is an infix. SUA forms cannot show a distinctive reflex of pUA *n before stop.

N *məhŋa 'porcupine' : Num--Mo məhə (other Num has *yəhyən which must be related somehow); Tak--Se miiŋaa-t 'gopher'; Hop məəŋʸawə (contains augmentative suffix). [M-327]. Se form may go with *məhyən 'gopher' q.v.

Stems of shape *CVHCVV (*n or *h is determinable).

N/S *kapsii 'thigh' : Tub qapsi-l; pre Lu *qaasii-ðˇa; Hop //qaCsi//. [M-437, VH-41]; Na i]ksi-ƛ and Gu kahsí point to pSUA *kási, thus reinforcing pUA *kapsii.

N/S *kannii 'house' : Num *kahni; Tub qanii-l; Hop -qáni. [M-240, VH-141]. pSUA has *káari (cf YM (idem)), a regular reflex of pUA *kanni(i).

N/S *sunwaa 'woman' : Tak *sunʷaa-ðˇa > Lu sunaa-l, -swa-; cf Na siwaa-ƛ [M-472].

N/S *cuhpaa 'to be finished' : Num--Mo cuhpa 'disappear'; Tub cuHpa 'burn out-fire'; Hop //cohpa// 'take off clothes'. [M-169].

Na kal-li supports *kanni rather than *kannii, and the second long vowel in Tub may be the result of vowel balance after loss of first *n; i.e. Tub shows CVVCV and CVCVV stems, but does not like CVCV stems.

Stems of shape CVHCVn (*n or *h is determinable).

N/S *tannah 'foot' : Num *tah=, SP tan-pi 'heel' ('foot-back'); Tub tanaH-piH-t 'heel'; Hop tana. [M-185/224/349, VH-28]. pSUA has *táara (cf YM táaruk 'road runner', PP tad) a regular reflex of pUA *tannah; Na ƛan-kʷaa(yi-ƛ) 'knee' = 'head of leg'.

N/S *sʉ?wih 'hare' : Tub suu?iH-t; Tak *su?iH-ta; Hop sowi; cf Na si?-ƛi. [M-333]. Though the distribution shows that this is a pUA etymology, there may be some diffusion within NUA. Na ? supports ~~*cw~~ *Cω -- it does not support a simple *?, which disappears in Na across the board. See discussion in § _____ on possible reconstruction of medial *-?C- to pUA. In any event, this set illustrates stem-final pNUA *h.

Stems of shape *CVHCVn (*n or *h is determinable).

N *məhyən 'gopher' : Num *məhyə(n); Tak *məhəH-ta; Hop məəyi. [M-201].

N *kuhkan 'spider' : Num--SP uhkʷan; Tak *kúka(H)-; Hop kookaŋʷə (contains augmentative suffix). [TK].

Stems of shape *CVHCV? (*n or *h is determinable).

N/S *tonmo? [uncertain] 'winter' : Num *tonmo, *tomoh 'cloud'; Tak *tamə?a..; Hop tome?[e. [M-92/469, VH-165]. The Se and Hop forms may in fact be phonological cognates of Num *tomoh.

N *nanpV? 'foot' : Num *nanpa; Tak--Se nạvə?-ᵗ/ç; Gab-nev; Hop //nahpV?a// (v) 'to go on foot'. [M-186]. Se and Gab lack preconsonantal *n which suggests it is an infix where present. Second vowel of stem cannot be established on present evidence.

N/S *?ahya? 'rattle; gourd' : Tak--Se ?aɎ-t; Hop ?aaya; cf YM //?aaya?wi// 'squash/, //?aya-mi// 'rattles'; Na a(a)yo?-ƛi 'squash. Proto-form could be *?aaya?, but since both gourds and turtle shells can be used for noisemakers, it might be best to consider *?ahya? as derived from *?ahyV 'turtle'. It must be pointed out that YM 'rattles' does not support a long vowel or preconsonantal *h; the Se form is ambiguous. Final ? is supported by YM and by the fact that Se takes an unlenited absolutive suffix. Both YM and Na 'squash' contain the pUA augmentative suffix. [M-339].

Note: In all three of the above items final *? could be a suffix or even the remains of a suffix of form *-?V.

Final features disagree (2 groups attest one and they disagree).

N *too?i.. 'cattail' : Num ɬto?i (CF); Tub too?i-l, tooi-pəə-l; Tak *teə?iH-ta. [TK < CF]. Tub and Tak disagree on final feature.

N *paa(?a)H 'mountain sheep' : Tub paa?aH-t; Tak *paa?aH-ta; Hop paaŋʷə (contains augmentative suffix). [M-369]. Tub and Hop disagree on final feature.

N/S *kʷasⁱ/ə.. 'ripe' : Num *kʷahsə; Tub wəs (ub); Tak *kʷasⁱ/ə?-ta; Hop kʷasi. [M-151, VH-50]. Num and Tak disagree on whether final feature is present; since root is verbal, a final feature may represent a derivational suffix.

N/S *tu?V.. 'flour' : Tub tu?ii-l; Tak *tu?aH-ta. [M-206, VH-133].

N/S *kʷita.. 'shit' : Num *kʷi(h)tah; Tak *kʷiǰa-; Hop kʷita; cf Tub wiilaaH-t 'skirt feathers' (first vowel unexpectedly long, some derivational suffix is present if the word is cognate). [M-125,VH-54]. Num and Tak disagree on whether final feature is present. If we supposed that roots could end in *..VVh, then Num and Tub would agree in supporting *kʷitaah. But as in the previous 2 examples, the root is basically verbal, and the nouns and adjectives may contain non-cognate nominalizing suffixes.

aka[hta

N/S *wa(a)ka.. 'frog' : Num *waCakaCo < *wa-wa̰ka-wəh (reduplicated, augmentative); Tub waakaa[is-t; Tak *waxaH-ta. [M-190.] Num does not support final *h. Tub does not necessarily support it, either.

N/S *kawii 'mountain' : Num *kawi[pa; Tak *qawiN-ta (i.e. *qawiiH-ta). [M-287]. Cupan final feature is discrepant.

N *(paa=)?ahkə.. 'sunflower' : Num *(pa=)?ahkən; Tak *paa?aHqaa-ǰa, Hop ?aaqawə < ?ahqawə (contains augmentative suffix). [TK]. Tak and Hop both rule out final *n, and they would allow for the proto-form being *?ahkə(ə).

N/S *wincᵃ/u.. 'string' : Num *wi?su; Tak *wiN̆ču?aH-ta. [M-421.] SUA supports *wi(n), and with Lu wiiča may also support *winta, which may well contain a frozen pUA absolutive *-ta.

N/S *wəə?i.. 'pintle' : Num *wə?aʰ/n; Tak *wəə?i-ǰa. [M-313]. YM hu?i agrees with Tak for second vowel.

Final features disagree, continued.

N/S *pohoX ~ *powaə 'body hair' : Num *poHa 'skin, bark'; Tub poon-t; Tak *pehV-ǰa; Hop pəhe; cf also PP hə]həvho [R] 'eyebrow' < *sə?-voho. Tub and Tak disagree over whether a final feature is present. If Num is a direct cognate, then Num + Tak override Tub, yielding pNUA *pohoo. Some SUA languages support *vo-wa (Ta, Gu, YM) with incorporated possessed noun suffix. [M-212, VH-7]. Num *poHa could derive from antecedent *powaa thus agreeing with SUA, or from *pohaa, thus agreeing with NUA but requiring *pohaa to be reconstructed, with vowel leveling o..a → a..o in the other NUA languages

- ch muusahpi 'clitoris'

N/S *musaH 'whiskers, mustache' → 'cat' : Num *mosoCi 'mustache', --SP mošoa 'pubic hair'; Tub ?u]musaH-t 'arrow feathers'; Hop moosa 'cat', mósiŋa 'clitoris'; cf Ta músa 'cat', Cor *musá < *mosa 'cotton', Na mis-λi 'cat'. [M-214/449]. Num shows leveling of vowels, Cor partly so. Only Tub provides evidence for any final feature. A related etymon is *muusi 'face hair', supported by Ly -mú·ṣi, Co məəsí 'catfish'. Hop evidence suggests a long first vowel, but this is not supported by Tub or Na, even though it would make the variant *muusi more directly comparable. Num *monco (~ *mocon) seems related, but the phonology cannot be accounted for in a straightforward manner. We must assume *musan (→ *moson → *monso) → *monco ~ *mocon. This means that Tub and Num, if mutually cognate, disagree on final feature. Na mis-λi support pUA *musa, with no final feature.

N/S *ʔatəH ~ *ʔatə-mə 'louse': Num — Ka-ch ʔaciʟpi < *ʔa̰ti; Hop ‖ʔatəh‖; cognates also in Tep, Ta, Cor; ≠ Tak — Se ʔaçəm-ç; cognates also in YM, Na. [M-271, VH-247]. The second form has incorporated pUA plural suffix. Num and Hop disagree on final feature. pUA probably ended in -V̆.

final feature uncertain (only one group attests one)

N/S *piisaH 'pintle': Tak *piisaH-ta; Hop pís=[qeyte < ‖piisV=qeyVte‖ 'glans penis' [VH-73]

N/S *naapəH 'prickly pear': Num *mapu (CV); Tak *naavəH-ta; Hop naavə; pSUA is *naavo. [M-69, VH-16]

N/S *sakaX 'willow': Tak *saxaH-ta; cf Na saka-λ 'grass'. [Sapir]

N/S *ku(H)ta.. 'firewood': Tak *kuðaa-wəH-ta; (< *kuðaH-wəH-ta?) Hop kótqa <?‖kootVqa‖ or //kohtVqa//. VM kuta would support either *kutaa or *kuHta..; the existence of *kuh 'fire' tends to support *kuhta, which may imply feature jumping in Tak. cf also Cup *kuHta[HpiH-ta 'bow'

N/S *wəpaa.. "to whip': Num *wəh=; Tub wupa(a?), ?uwup-is-ʧ(n); Hop //wəpaah// (vb), //wəpahpi// (n). Tub final ?is not attested in all authorities, but a long pre-Tub *aa is supported in any event. The Hop vb may support final *aa or *ah. The Hop noun is possibly to be segmented wəpa-hpi. [M-458, VH 17].

N/S *masaa 'wing': Tak--Se mahaa-ç < *masaa-ða; Hop masa; cf Tub masi-ɬ 'grass, weeds', which, if cognate, supports vowel final, but does not help decide if it was long or short. [M-468]. Since no noun stems of shape *CVCV are with certainty reconstructable, protoform is probably *masaa.

[final feature uncertain, cont'd]

N/S *taawah 'day, summer': Tak *taw[pa < **taawaH[pa; Hop taala. It is not certain that the Tak form requires reconstructing a final consonant feature, though it does not rule it out.

N/S *ciipuH 'bitter': Tak *ciivuH-ta; Hop ciivo. [M-43, VH-13]. Final feature in Tak may be a derivational suffix, since root is verbal.

N *ʔaatah 'crow': Num--SP -Ch ʔahtah; Tak *ʔaaðaH-wəH-ta; cf Hop ʔatóko 'heron' (not a direct cognate). [M-110] Tak neither supports nor rules out final *h. SP shows feature jumping, if proto-form had final *h. Hop does not apparently support first vowel as being long.

N/S *nanin 'tongue'; Tub lalan-t; Tak (-naŋV; Hop leŋi; pSUA is *nəŋi. [M-443, VH-94]. Since there is absolutely no other evidence for pUA initial *l, Hopi and Tub must have changed initial *n to l by dissimilation from the medial nasal. There are 2 possible ways of deriving the Tub form: (a) *nanin-t > lanin-t > lalin-t (another assimilation) > lalan-t (vowel harmonization) -- this supports *nanin; (b) *naŋi-t > *laŋi-t > la-laŋi-t (reduplication) lalan-t (drop final vowel of stem). Although word-final short vowels drop in Tub, they do not ordinarily drop from stems that normally occur with suffixes. Further *naŋi would be the only n stem of shape *CVCV. Thus the evidence supports pNUA *nanin.

N *kʷiina..'north': Num *kʷiᵐ/nVha; Tub wiinaŋʔ; Ser kʷii[mq, ʔa]m 'north wind'; Hop kʷiníwiqʔa //kʷiiní-wiqV-ʔa‖ 'to go north'. [M-304]. No final feature is with certainty attested many of these forms. Hopi does not support *a as the second vowel, nor *ii unambiguously as the first one. This is a pan-NUA word, but there may have been some internal diffusion. The proto-form may have begun *kʷiya..

-Ch kʷiyaamahtə 'north wind'

ʔa]kʷinaᵐ[

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N *tuhkuh 'wildcat'; *tuhku-wəh 'moutain lion': (a) Num *tuhku(h); Hop tóhow 'mountain lion'; Tak *tuukuH-ta; *tuuku-wsH-ta; (b) Tub tuukuukwəH-t 'mountain lion'; Hop tokóci (contains diminutive suffix). [M-462]. Forms under (a) support *tuhkuh; though h is not a regular reflex of *hk in Hopi, the cases of *hk are too few to exclude Hop h as a possible reflex of it as ultimately being seen as regular. Forms under set (b) as well as the Tak forms, allow the reconstruction of *tuuku(h) < *tuukuk. Tub has lengthened the second vowel, but Hopi does not support any final consonant. This is an undoubted tymology with some phonological problems (including the additional one that Hop supports both *tuhku.. and *tuku..).

N/S *təh 'supernatural'; Abstracted from *təh=ya?^{i}/a 'to die, be sick' and *təh=muukV 'to dream'. [M-130/131/136, also M-426]. The protoform may really be *təə, but *təh is more likely. Cf also Taracahitian *təwəka 'sky', Na il]wika-λ 'idem'.

N/S *?atəH ~ *?atə-mə 'louse'; Hop //?atəh//; cognates also in Tep, Ta, Cor; Tak--Se ?acam-c; cognates also in YM, Na. [M-271, VH-24]. The second form has incorporated pUA plural suffix.

N/S *məkaH 'large': Tak *məkaH-ta; pSon *məka 'far'. [M-163].

N/S *k^{w}iicin 'smoke' : Num *k^{w}ihi or *k^{w}iCih; Hop k^{w}iicin^{w}ə (contains augmentative suffix). If Numic has final *h, it disagrees with Hop; if it has final V, only Hop attests a final feature. [M-393, VH-35].

N *pi?aakən 'caterpillar' : Num-SP pi?aku-; Tub pi?aakən-t; Hop //pi?aakə//. [TK CF]. SP does not support reconstruction of final n, but since it is not attested with suffixes, it doesn't rule in out, either.

N/S *mu(k) 'point, nose'; *mu(k)=pi(h) 'idem'; (a) Num *muh= 'nose'; Tak--Ca -mu? 'nose, mouth'; Hop mo[?a 'mouth'; cf PP mu?ukug = NT mukága 'sharp point'; Hu mácə́idem'; (b) Num *mu-pih; Tub muH-piH-t; Tak *muu-vii-ʃa, Se muk-pi? 'point'; cf PP muuvi-ʃ 'angular' < *mu-vi-yə. In this set the final features seem clear, but they are wiped out irregularly in several of the languages. *=pih is 'back'.

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N/S *nasii 'ashes': Num--Ch nasi[pə 'hot ashes'; Co nasí; Na neš-λi. [M-10, 61]. Na does not support final long vowel, but first vowel is definitely short, and pUA *CVCV is non-canonical. We may alternatively entertain pUA *naasi, but this is not convincing.

N *tuukih 'night': Tub tuukiH-t; Hop tooki. [M-45, VH-144].

Medial Consonant Clusters

76 UA etymologies attest to medial *-HC- clusters. 31 of these were already cited among the sets used to establish NUA final features. The remaining 45 sets are cited forthwith, preceded by a table (figure 10) shaving the distribution of the reconstructed clusters. First, evidence will be cited for *hC- and *nC-; then evidence for *-?C- will be discussed separately.

H \ C	p	t	c	k	k^w	m	n	ŋ	w	y	s	Totals
h	6	2	6	4 (+2)	1	(1)		6		9		35 (+2)
n	4	2	4	4		4	2		4	(1)		25
?	(1)		(2)	2					1	1	1	8
---												
p											1	1
t												
k	2											2
H	4								1			5
*h or *n												76

Figure 10a

*h, *?, *-r do not occur medially preceded by other consonants.

( ) means at morpheme boundaries only

Non-lenited Medial Consonants

	geminated or preaspirated	prenasalized	single after short V
Numic			
WNumic	geminated	geminated	lenited
C/S Numic	geminated	prenasalized	lenited
Tubatulabal	both	prenasalized	lenited
Takic			
Serrano	both	both	lenited
Cupan	*preaspirated	*preaspirated	lenited
Hopi	preaspirated	preaspirated	lenited if *p only after *p lenited,
Tepiman	*preaspirated	*preaspirated	*preaspirated
Guarijio	preaspirated	preaspirated	(*p not lenited) *preaspirated
Cahita	geminated	geminated	geminated,
Coran	?	?	? after *p lenited
Aztecan	no trace?	no trace??	*p lenited

Figure 10b.

*preaspirated = non-lenited preceded by long V

Examples follow.

For sets not already given

For etyma not already justified in the previous section, cognate sets are cited

Old	New
*-hp-	
*sahpə 'belly'	*tahpi 'to tie' [M-440]
*cuhpaa 'to be finished'	*?ahpə 'GrFa' [TK]
	*səhpə.. ~ səpəH 'cold/wind' [M-93/465, VH-11]
	*kuhpa 'head hair' [M-209, VH-9]
	cf *kopa [M-188] 'forehead'
*-np-	*-?p- [to be discussed separately]
*nanpV? 'foot'	*sə?-pəh ~ *sə?-pohp 'eyebrow'
*tuukunpa 'sky'	
*yanpa 'mockingbird, carrot'	
*tən=paaha 'mortar'	
*-Hp-	
	*saHpV 'frost' [M-93, VH-11]
	*taHpa 'to split' [VH-10]
	(*huHpa 'skunk' SUA) ~ *hu(u)pa 'smell'
(prob. *h)	*kuHp^{a}/i 'to close eyes, sleep' [M-386, VH-153]
	(NUA *cupa ~ YM *cuHpa 'to harvest')
*mu(k)-pi(h) 'point, nose'	
	*təkpu > təHpu(-ci) 'flea' SUA

*-Cp-

N/S *tahpi 'to tie' : Num--SP tahpica; Cor--Hu tápi. [M-440].

N/S *?ahpə 'GrFa' : Num *?ahpə; Ta ?apá 'MoFa'; YM ?apa 'PaPa, ChCh'. [TK].

N/S *taHpa 'to split' : Hop //tahpa-kina// 'to tap, knock, make snap'; SUA *tapaa-ŋa : PP taapan; Ta ǰapána; Na λapaana; also Na λa-λapa-ca 'to break'. [VH-10]

N/S *kuhpa.. 'head hair' : Tub kuHpa 'head'; Hop //kohpa// 'top of head'; PP kuup; Ta kupá; Hui kəəpaa. [M-209, VH-9]. cf pUA *kopa 'forehead' : Num *kopa; YM kova; Co k^{w}aa[ci; Na iiš-k^{w}aa[yi-λ [M-188].

N/S *kuHp^{a}/i 'to sleep' : Num--Co -kupa- 'to kill'; Tak *kuHpV; PP kuup; Ta kupí; Hu kəpi-. [M-386, VH-153].

S *təkpu > *təHpu(-ci) 'flea' : PP čəəpṣ; Ta ǰipučí; YM //tepuči//; Hu tepə́; Na tekpin. [M-173, VH-146].

N/S *saHpV 'frost' : Tak--Lu pu-saapi 'it's freezing'; YM //sapa(mi)// 'snow, frost'. [M-93, VH-11].

*-Cp- ~ -p-

S *huHpa 'skunk' : PP ?uupio; YM hupa; Hu ?əəpáa; Na epa-λ. cf pUA *hu(u)pa 'to smell' : Hop hováŋta, =hovaqti; Ta hubá; YM huuva. Unclear whether Hop supports long vowel. [M-391].

*cupa ~ *cuHpa 'to gather' : Num--Mo copa; Hop cová-; pre Lu *čuHpa; YM čupa. [M-192]. Mo vowel is discrepant (a-umlaut?)

For another alternation *-np- ~ -p- see *nanpV?.
Also *kuhpa and *kopa may be in such a relationship.

N/S *səhpə.. 'cold' : Num--SP səhpə-; PP həəp [M-93, VH-11].

~ N/S *səpəH 'cold; wind' : Tub səəp 'to be cold'; Tak *səvəH; Tep *həvəra 'to blow', *həvəri 'wind' [M-93/465, VH-11].

cf also *səh (< *səp) 'cold', cited earlier under 'final features'.

*-ht-

*?əhta 'to close' [M-90]

*pətə?~*pəhtə? 'heavy'

*-nt-

*hinta 'what, something'

*kahinta 'nothing'

*tən-ta 'stone'

*-Ct-

*?əhta 'to close' : Hop ?əəta (< ?əhta); Ta ?éra 'to close; door' YM ?eta. [M-90]. This set shows r (not ř) as the Ta reflex. This is relevant to the question of whether SUA *r can be treated as a 'lenited' version of pUA *t. We prefer to suppose that pUA *-ht- > SUA *-r- in suffixes (and in Ta also in roots).

We acknowledge that a single example in Ta reflexting r < *ht does not establish a regular correspondence and we do not wish to be seen as seriously proposing hypotheses as weak as the ones we attack.

-Ct-

*pəta?~*pəhtə? : (a) Tub pələ?; Tak *pəðə?; Hop pətə; (b) Num *pəhtəh; Gab potoo; (c) PP s-vəəd; YM veete; Na etiʃik. (a) points to *pətə?, (b) points to *pəhtə?, (c) can be from either. [M-223, VH-3].

*-hc-

*pahci 'seed' [M-366, TK]

N *pahca 'to burst' [M-63]

N *wihci? 'bird' [M-40]

*?əhcə/i 'to steal'

*wihcV 'thorn → needle, awl [M-14]

*puhca 'to blow' [M-49]

N *wahcən 'four'

*-nc-

*winc^{a}/u 'string' *yanca 'to sit down' (cf *yaca)

*punci 'eye' (cf *pusa) *?anci 'possession' (RL)

*-?c- [to be discussed separately]

*yə?-ci 'aunt'

*mo?-ci 'DaCh'

N/S *pahci.. 'seed' : Tub paHci[s-t 'purple seed'; Gu pahčí 'corn'; YM vačí 'corn'; Hu hací 'squash seeds.' [M-366].

N *pahca [intermediate reconstruction] 'to burst' : Num--Mo pahca 'to kill one'; Tak *paHca > Se paça[q-k. [M-63]. This contains the same root *pa?i found in *pa?V-kV 'to hit' §. Consequently, we must reconstruct *pa?V-ca here, with a well known pUA causative suffix.

N *wihci? 'bird' : Num-SP, Ch wici?; Tak-Se w^{i}ɦaci-t. [M-40]. Probably contains diminutive suffix; otherwise *hc → *hy in NUA.

N/S *?əhc^{ə}/i 'to steal' : Num--SP ?əyənka; Tub ?əəy; Tak *?əyə́-; Hop //?əəyi// (NUA *?əhyə); PP //?əəsida//; YM ?etb^{w}a //?ecVb^{w}a//. [M-416, VH-120].

N/S *wihc^{a}/u.. 'thorn → needle, awl' : Num *wihí 'knife', *wíhyi 'awl'; Tak--Se wihaa-ç; Ta wičá 'needle', wičurí 'cactus'; YM wiča; Na wic-λi. [M-14]. Num *wihi and Se may reflect p(N)UA *wih, and this would make *wihc^{a}/u segmentable after the h. This is speculative however, since the forms in question can derive by regular sound change from *wihc^{a}/u; *wih 'thorn' would also be homophonous with *wih (< *wip) 'fat'. Final feature (i.e. ð) is probably definitive on this form.

(through the intermediate state *wihyV

N *wahcən 'four' : Num *wahcən[=wih; Tak--Se wacah,--Cu wiću, --Lu wasa? [M-513]. Lu s is unexplained.

N/S *puhca 'to blow' : Num--Mo puuhi (< *puhya?) Tub pušk < *puyVkV; Tak--Se *puihkin; Hop póyakna, pooyanta, Ta púča; Na //piicaa//. [M-49]. Tub, Tak, and Hop point to NUA *puHya-ki(-na).

N/S *?anci 'possession" : Tak *?aači-ða < *?aHci 'pet'; Na aaška < *aasi < *anci. [RL].

*yanca 'to sit' : Tub yanc; Hop yeese; PP daha, Ta asá; YM yeesa; Hu yeesǎ-; Cf p(S)UA *yaca 'to set': PP daaṣ; Ta ačá; YM yeča; Hu -yeca. *yanca seems clearly to be formed from *yaca by infixing *n.

Another possible case of alternation is pUA *punci 'eye', p(S)UA *pusa 'to wake'. It is conceivable that Num *puni 'to see', is also (or instead) related to *punci, but no other brach of UA attests to *puni.

The above three items, *?anci 'possession', *yanca 'to sit', and *punci 'eye', along with *winc^{a}/u 'string' are the items so far identified that contain pUA *nc. We suppose that *nc could not contrast with *ns. One case of *nc is morphophonemically related to *c, another perhaps to *s, one has a morpheme boundary between *n and *c (*winc^{a}/u), and the other has not shown that it can be analyzed. We prefer to reconstruct *nc rather than *ns, since *s basically does not occur with consonants before it (two exceptions: *kapsii 'thigh' and *nə?sa 'mother's sister'). The reflexes of *nc = *ns are V_1s in most languages, but nc in Tub, and *Hč in Tak. Medial UA *c > s Takic unless 'strengthened'; what strengthens is *n or *h. Tub shows *n, so we reconstruct *n. The other languages show *[n^{t}s] > [ns] > V_1s. For these 4 sets we cannot reconstruct *hc because even when Tub data is missing *hc has a different reflex from the indicated *nc.

*-hk-

*(paa=)‿?ahkə(ə) 'sunflower'

*kuhkan 'spider' *təhka 'to eat meat'

*tuhka 'under' (discussed under Postpositions §)

*nahku(yə) 'self' (discussed under Pronouns and Demonstratives §)

*-nk-

*kənkə 'foot' n ~ ŋ *wonkV 'foot(print)' [M-259]

*nanka 'ear'

*punku 'pet'

*naHku 'side' (discussed under Postpositions §)

*-?k- [to be discussed separately]

*wi?kah 'dibble'

*to?ka 'spider'

*-Hk-

*tuhkuh or *tuuku(k) 'wildcat'

*-Ck-

N *təhka 'to eat meat' : Num *təhka; Tub təHk; cf Ym tekwa < tekVwa 'meat, flesh', which may rather go with *tuku(wa) 'meat'. *təhka [M-350, VH 163]; *tuku(wa) [M-279, VH-22].

N/S *wonkV 'foot(print)' :Tub wonko-l 'shoe'; PP gooki 'tracks'; YM //woki-mi// 'foot, leg'. [M-257].

*-Ck- ~ -k-

*kənkə 'foot' is such a case.

Another set suggesting *-hk- is included here for lack of a better heading under which to sort it out:

*həka 'to be cool' ; *həəka(n) 'wind; to blow'; (a) Num--Co həka(h); Hop həka; YM heka 'shade'; (b) Hop //həəka// (v), həəkaŋ^{w}ə (n) (contains augmentative suffix); YM heeka (v, n); Co ?eeka; Na e?eka-λ [R]; (c) Num--Mo həhk^{w}a(v), həhk^{w}ah (n); Tub ?əxkawa-l (n), ?əxkowa? (v). Items under (a) are from *həka; items under (b) are from *həəka(n); items under (c) are from *həəka(n) with initial reduplication and augmentative suffix thus: *hə́-həəka-wə → həhkawa (Tub ?əxk^{a}/owa) → həhk^{w}a(Mo). The Mo and Tub evidence do not support *-hk-, though if Hop həəka.. should prove to have -hh- in another dialect, a reordering of this etymology would be required. YM heeka however can only reflect a pUA long vowel.

*-hk^{w}-

*tahk^{w}a.. 'hard, stiff' [M-216]

*-ps-

kapsii 'thigh'

*-?s- [to be discussed separately]

*nə?sa 'MoSi'

-Ck^{w}-

N/S *tahk^{w}a.. 'hard, stiff' : Num--SP tahk^{w}a[ia (caus); Na tak^{w}aa[wak. [M-216].

*-nm-

*tonmo? 'winter'

*kanmaa 'to taste'/'cheek, mouth'

*kinma 'to come' [M-94, VH-159]

*kunmi 'to eat corn' [VH-88]

-hm-

*təh-muukV 'to dream' [M-130/131/136]

lower

*-Cm-

N/S *kanmaa 'to taste; mouth' : Num *kanma 'to taste'; PP kaam 'cheek'; Na kama-λ 'mouth', kamaa[wak 'half-ripe'; cf Se qama?-q 'drunk', [VH-87]. Cf also Na kamo?-λi 'sweet potato'; if cognate, it probably contains *-wəh 'augmentative'. ~~However, it may be related to the notorious Peru-Pacific kumara.~~

N/S *kinma 'to come' : Num *kinma; Tub kim; Tak *kima; Hop kima 'to bring'; YM kiimu 'to enter-pl'. [M-60/94, VH-159]. YM is deviant both in sound and meaning and may rather go with pUA *kii 'house'. This root, however, is without doubt of pUA age, since it yields the incorporated movement element *=ki$_A$, 'come and vb' found in SUA as well.

N/S *kunmi 'to eat corn' : Num--kumi(yah) < *kuHmi; PP kuum; YM kuume, Hu kəəmi-. [VH-88].

N/S *təh=muukV 'to dream' : Tub tumuuka; Hop //təə-mooki//; YM te(e)nku < //tee=muuku//; Na tee=miki [M-139]. If *təh-ya?^{i}/a (q.v.) is really *təə=ya?^{i}/a, then this set is *təə-muukV; first syllable of Tub would be short as in *tuukunpa 'sky'.

*-nn-

*kanni(i) 'house'

*tannah 'foot'

-Cn-

Both cases of *-nn- have been presented under 'final features'. It is of interest to note that the YM reflext of *-nm- is -V$_1$m-, of *-nn- it is -Cr-, and of *hŋ- it is -V$_1$n-.

*-hŋ-

*məhŋa 'porcupine'

*kuhŋa 'Hu'

(*cohŋi>) *cooŋi 'head hair' (-Num)

*?ahŋa 'wing, feather'

*cahŋa.. 'lizard sp.'

*cuhŋ^{i}/u 'to suck, pipe, bone'

*-Cŋ-

S *cohŋi 'head hair' : PP son- 'axehead'; YM čooni; Na con-λi. [M-219, VH-38].

N/S *?ahŋa.. 'wing, feather' : Num *?ahŋa; Hop ?aaŋa 'long hair'; Ta ?aná; Co ?aná; cf Tub ?anan-pəə-l 'feather in a band' (if cognate, first vowel short, and first nasal n are both unexpected). [M-467, VH-58].

N *cahŋaH 'lizard sp.' : Num--SP caŋaa-; Tak-Se caaŋ-t. [M-269].

N/S *cuhŋ^{i}/u 'to suck; pipe' : Num--W *cuhŋi 'bone',--SP cuŋuh 'pipe'; -Ch cumuh 'idem' (< *cuHŋu(h)); Tak--Se cuuŋa; Lu čuŋla-š 'nipple' (< *cuuŋV-ča..) Hop cooŋo 'pipe'; Ta čunú 'to suck'; YM čuune 'idem'. [M-319/422].

*-nw-

*tənwa 'name'

*?ənwa 'blood'

*sunwaa 'woman'

*konwa 'snake'

*-Cw-

*taCwa 'man'

*-?w-

*su?wih 'hare'

open up

*-Cw-

All cases of *-Cw- are found in the section 'final features'.

*-hy-

*woh-yo 'two'

*?ahya 'turtle'

*?ahya? 'gourd, rattle'

*?ahyə̃ 'good'

*mə?hyən 'gopher'

*paahih-yu 'three'

*sahya 'mudhen'

*?əhya 'a sore' [M-404]

*təh=ya?i/a 'to die' [M-130/131/136/426]

*-ny-

*?ən-yə 'thee' (Hop)

*-?y- [to be discussed separately]

open up

*ko?ya 'to kill'

*-Cy-

N *?əhya 'a sore' : Num--Mo ?əya-yee 'to have ____' (< *?əhya); Se hə̤ə̤yə-ç̣; Hop [?ə́ya] = ?əəyaʃ?. [M-404]. Hop is discrepant, unless a misprint. Mo y can only come from pNum *hy. Se initial h is unexpected, unless it has been extended from before y.

N *təh=ya?i/a 'to die, be sick' : Num *təh=ya?/i 'die'; Hop //təəya// 'be sick' [M-130/131]. The first element could be *təə=, if presence of morpheme boundary inhabits dropping of medial y in Numic. See *təh-muukV.

Where Numic evidence for *-HC- is not borne out by other branches of UA.

N/S *tuku(wa) 'meat, flesh' : Num *tuhku(Ca); Tub tukuwa-; Tak--Se tuku-ç̣; Hop tokoʃ; PP čuukug; cf YM tekwa < *ték͡Vwa. [M-279, VH-22]. Cf SP tukuu 'to cache food'. *-wa is probably the possessed noun suffix. Tub, Se, and Hop disconfirm *-hk-, and also do not support stem final *h which might have jumped to before *k in Num.

N/S *tu-ka.. 'under/below' [postposition] : Num *tuhk^{w}ah --SP tuhk^{w}a- 'deep'; Tub tuka? 'deep'; Tak--Se nə̤-htq 'under me', pə̤-wtq 'under it'; Hop ?á-tka 'under it'; YM vé-tuku 'under it'; Hu -tə̤a. [M-34/35/121].

N *ŋa-ku.. 'direction/side' [postposition] : Num *nank^{w}ah; Hop -naqə, -ŋə̆k^{w}. [M-376].

Note: if we could show that in Tak and Hop preconsonantal *h and *n are deleted from unstressed words and the vowels develop as though originally short, then we could save the Num facts by reconstructing *tuhka.. and *naŋku.. (or *ŋahku). Such a choice would be highly speculative, though might well be shown to be right. See more detailed discussion under 'postpositions'.

In any case, to summarize, the evidence for preconsonantal and final features offered by Num is hardly ever controverted by evidence from other branches of UA.

Other cases where Numic shows *-hC- unsupported or ambiguously so in other branches are

*tuuku(k) 'wildcat'
*?atah 'crow'
*həəkan 'wind'

Let us now review the ways in which Numic is not phonologically conservative with respect to pUA:

(1) vowel length is lost
(2) *(h)c → (h)y after high vowel, as in all NUA
(3) medial *y is dropped
(4) initial *ŋ → n
(5) s → h / $\acute{V}_1$ ___ V_1
(6) medial *ə → ɔ / i
(7) there is some vowel harmonization or leveling
(8) there is some feature jumping from morpheme-final position to before second consonant.
(9) pUA accent become second-mora.

Alternation in Protoforms

In about 25 cases sets of two or more phonologically related (but non-identical) etyma can be reconstructed which are at the same time semantically related (at times to the point of identity). We take these sets of non-identical but related reconstructions to be the product of morphophonemic processes in pUA and pre UA. There are two frequent kinds of alternation (a) ± length of V_1, (b) ± presence of *h or *n before C_2.

A thir type, iscrepancy in final vowel, common in verbs, is i ustrated here only for nouns.

V ~ VV	7 cases
V ~ VnC or h	16 cases
different final syllable (with noun)	2 cases.

In some (or most) cases the phonologically longer or more complex form is probably derived from the simpler one; but in a few cases the opposite may be true.

We do not feel prepared at this time to attempt any probing analysis of explanation of these phonemena; we await the uncovering of further comparable reconstructed variation.

V ~ VV

	N/S	*taakan	'person, body
	N/S	*takan	
	N/S	*həəkan	'wind
basic	N/S	*hɔka	'shade, be cool'
	N/S	*nəəma	'liver
	N	*nɔmə	'person'
basic	N/S	*nɔmi	'to live, walk around
	N	*maatV	'to know'
	S	*mati	
	N	*juuki	'to rain'
	S	*yuki	
basic	N	*nawii	'girl'
	N	*naawi	
basic	N/S	*?oŋa	'salt'
	N	*?oŋaa	
basic	N	*yaca	'to set'
	N/S	*yanca	'to sit'
	Hop	*kɔkɔ	'foot'
basic?	N/S	*kɔnkə	
	Se	*napə?	'foot
basic?	N	*nanpV?	

basic S *pusa 'to wake'
N/S *punci 'eye'

basic	N/S	*pəta?	'heavy'
	N	*pəhtə?	
basic	N	*wahcən	'four'
	Lu	*wacə	
basic	N/S	*hu(u)pa	'to smell'
	S	*huHpa	'skunk'
	N/S	*kuHpa	'head hair'
	N/S	*kopa	'forehead'
basic	N	*cupa	'to gather'
	S	*cuHpa	
	N/S	*səp (>*səh)	'cold, snow'
	N/S	*səpəH	'wind, cold'
	N/S	*səhpə..	'cold'
	N/S	*saHpV	'ice'
	N/S	*punku	'pet'
	Tub ~ puhku		
	Hop ~ puku		
	N/S	*musaH	'face hair'
	N/S	*muusi	
	N/S	*pohoo	'body hair'
	N/S	*powaa	

*CV?CV and *CV?VCV in pUA

There is a goodly number of sets that on the face of it suggest that pUA may have had stems of the shape *CV?CV.. Careful examination shows that several such cases have a morpheme boundary before C_2. Further study suggests that both *CV?CV and *CV?V_1CV stems may have occurred. We will examine all these sets, since there are not overly many, and because the suggestion that *CV?CV stems were found in pUA is novel. Part of the evidence for pUA *CV?CV and *CV?V_1CV comes from the occurrence of ..?C.. sequences in certain of the UA languages. Consequently, we will first discuss the occurrence synchronically of preconsonantal ? in the various UA branches.

Numic: in SP and Ch ? co-occurs with both obstruents and resonants, even though they may already be preaspirated or prenasalized. Though this ? seems in some cases to represent a grammatical morpheme, it is clearly suprasegmental. Such a ? is found in other Numic languages, but there is little agreement among these languages, and no regular phonological correspondence outside Numic.

Tubatulabal: there seem to be no cases of preconsonantal ?

Takic: in Se some stems end in ?, and ? thus occurs before consonant-initial suffixes, notably the absolutive t(~c). In Cupan languages preconsonantal ? occurs only when an underlying unstressed short vowel has been deleted. This may also be the case in Se.

Hopi: preconsonantal ? occurs only when an underlying unstressed short vowel has been deleted.

Tepiman: all apparent cases of preconsonantal ? involve a deleted intermediate vowel.

Tarahumara and Guarijio: many stems have preconsonantal ?; while some of these occur at morpheme boundaries (i.e. C_2 belongs to a suffix); there are many cases where ? is part of a root, or possibly an infix.

Yaqui-Mayo: many stems have preconsonantal ?. Whenever a morpheme boundary can be established through comparative evidence, the ? is from *?. Many apparent roots contain ? before C_2.

Coran: Co has preconsonantal ? liberally scattered throughout the lexicon in a bewildering way; in cognate items Hu generally lacks this ?. The whole suprasegmental phonology of Coran remains to be worked out--including vowel length, syllable-final ? and h, and tone. We will not use data from these languages to attempt to demonstrate anything.

Aztecan: Na has preconsonantal ? both at morpheme boundaries and within apparent single morphemes. ? occurs only preconsonantally and word-finally. It is missing word-initially and intervocalically. ? does not come from UA *?, which disappears without a trace; the apparent source of Na? is w preceded by some other consonant -- which may be pUA *? (perhaps also y preceded by some other consonant).

The implication of the above outline is that if pUA had stems of the shape CV?CV, they will be reflected directly only in Ta-Gu and YM; the other languages will have other reflexes.

If *CV?CV occurred in pUA we expect *(CV)CV? and vice versa.

Evidence for stem-final *? is not extensive; it is not necessarily even convincing. The six CV? stems could be reconstructed CV?V_1 (though this would be otiose). Evidence to be discussed presently will show that *CV? is preferable.

The three CVCV? stems are very doubtful.

tonmo?	winter'	(~ tomoh)
nanpV?	'foot'	
?ahya?	'rattle; gourd'	-? could be a suffix
		cf *?ahya 'turtle'

The cognates that are founded in both NUA and SUA seem to represent two basic correspondence types, as shown below. For each individual set, the distribution is spotty, so the number of sets in which each reflex is found is given for each UA branch.

	pUA *CV?CV		pUA *CV?VCV
Num	CVTV (1)	≠	CVhTV (2), CVRV (1)
Tub	CV́HCV (1); CVVCV́ (2)	≠	CV?VC (2)
Tak	CV́VCV (3); CVCV́ (1)	=	CVVCV (2)
Hop	CV́VCV (2); CVCV́ (2)	≠	CV?CV (1)
PP	*CVCV > CVVCV (5)	≠	CV?VCV (1)
Ta	CV?CV (4)	=	CV?CV (1)
YM_{Hu}	CV?CV (4)	=	CV?CV (2)
Co	CV?CV (2); CVCV (2)	=	CV?(V)CV (3)
Na	CVCV (4)	=	CVCV (2)

Note: accent marks on Tub, Tak, and Hop refer to where (automatic) stress would have occurred in pUA form.

	*wi?káh	'dibble'
	*su?wíh	'hare'
	*nə́?sa	'MoSi'
	*yə́?-ci	'aunt'
	*ko?-ya	'to kill'
	*sə́?-pəə *sə́?-poho	'eyebrow'
	*mo?-ci	'DaCh'
S	*tó?ka	'spider
	*mə?a-ka	'to kill'
	*pa?V-kV	'to hit, beat'
	*pɋ?V-ca	'burst
	*mo?oŋa	'male in-law'
S	*ko?o-ko	'painful
indent →	*ko?o-ko-ri	'spicy; chile'

Some of the forms of shape *CV?CV contain a morpheme boundary before C_2; others are not known to. All of the reconstructed forms of shape *CV?VCV contain a suffix. Since in at least some of the languages the reflex of this CV?VCV pattern is not what it would be synchronically if CV?V+CV were joined, the formations in question must be of some antiquity, and we have no qualms about assigning them to the proto-language. In sum, there does exist some evidence for reconstructing a root-shape *CV?CV to pUA, and as well a derived stem-shape *CV?V-CV, which is just a special instance of *CVCV-CV.

We now present the sets supporting the reconstruction offered.

*CV?CV

*su?wih 'hare' : this set has already been cited under evidence for stem-final *h.

*wi?kah 'dibble' : Hop wika 'hoe'; PP giiki; Ta wiká; YM wi?ka; Co vi?ká 'stake'; Hu wíka; Na ⟨wik-λi⟩. [M-324]. Final h, which draws the account, is posited to account for short i in Hop.

*nə?sa.. 'MoSi' : Tak *-nəəsV; Gu nehsá; YM ne?sa 'aunt'. [M-503]. On the basis of the sound correspondences this could as well have been reconstructed *nə?Vsa.., but since there is no evidence for a suffix, *nə?sa.. is preferred. Data from Tub, Hop or PP would disambiguate the matter.

*yə?ci 'aunt' : Tak *-yəəsV 'aunt, MoSi'; PP ǰisk < *dʒsi-kV 'MoSi'; Gu yə́?čí 'FaSi'; YM yé?či. [M-488]. This is pUA *yə? 'Mo' plus diminutive suffix *-ci. This supports reconstructing pUA *CV? noun stems without a second harmonic vowel.

*ko?ya 'to kill' : Hop qəəya; PP kood < **koyV$_1$; Ta ko?yá; Hu -kuya; Na koko(o)ya 'be sick', kokoš-ki 'sick' [M-128, VH-45]. This is derived from pUA *ko?^{i}/o 'to kill, die', but *ko?ya does not have a vowel between ? and y.

*sə?=pəə ~ *sə?=poho 'eyebrow' : (a) Num--SP səəpu-pV; Tak *səəve-ǰa; PP ~~hehu(h)o~~ hahav(h)o [R] < **səvVho; (b) Tub suHpə-l; Hop səəvə ; Ta si?wéraʔma 'eyelash'; YM puh=]sa?ve-m < //puusi se?ve-mi//. [M-160, VH-14]. This is a compound: the second member is either pUA *pəə 'skin' or pUA *pohoo/*powaa 'body hair'. Forms cited under (a) support *sə?=poho; forms cited under (b) support *sə?-pəə. Note that unlike *n or *h, preconsonantal *? does not inhibit lenition of obstruents. This makes *? more like a suprasegmental feature in these contexts. The first part of the compound, *sə?=, has not been identified elsewhere.

S *to?ka 'spider' : PP tokiitud (★'web'); Ta ro?ká '-web'; Co tu?ká; Hu tuuká; Na toka-λ. [TK].

Further examples of reflex of *CV?CV in Num and Hopi are seen in Num *hipi 'to drink' < *hi?+pi, and Hop hïïko < *hi?+ku. The unsuffixed stem for 'to drink' is *hi?i (N/S), which we should perhaps consider, along with all other verb stems of shape *CV?V_1, as having rather the shape *CV?. Additional support comes from Hop kəəki 'to bite' < *kə?+ki, versus general UA *kə?^{ə}/i, which should perhaps be reconstructed *kə?.

*CV?VCV

N *mə?V-ka 'to kill' : Num--SP ca-ŋ^{w}əhk^{i}/aa 'to die off'; Tub mə?ək; Tak *məəka-nV; all other languages have reflexes of pUS *mə?a 'idem'; *mə?V-ka is nothing more than an extension of pUA *mə?a. [M-127, VH-85].

N/S *pa?i-kV 'to hit, beat' : Num pahk^{a}/i; Tub pa?akin; Tak--Lu paaqi 'to twist'; Co -hé?ika 'to kill'. [M-245]. Though it seems likely that this item consists of a root *pa?i 'to hit' (found in Num) plus suffix *-kV, Mo pahca 'kill' = Sa paca⌈q-k 'burst' reflects *pa?V-ca.

N/S *mo?oŋa 'male in-law' : Num--S mona; Hop mə́?ənaŋ^{w}ə (contains augmentative suffix); Ta mo?né; YM mo?ne; Co -mú?n; Na mon-λi. [M-500/507]. In NUA *ŋ > n in suffixes, but just where the morpheme boundary is in this form is unclear. Num and Na support the reconstruction given, but Hop has final //n// (extended from medial C ?).

*mo? 'female in-law' : Hop mə?wi, -méyi 'ChCh'; PP moos < *mo(?)ci 'DaCh'; Ta mo?⌈rí; YM mo⌈kari; Na mo= [M-500/507] Hop mə?wi and Ta mo?rí suggest pUA *mo?. Na mo= is not in conflict with this; but Ta could as well have its ? because of the morpheme boundary within the stem. YM definitely does not presuppose any glottal stop in the proto-form. If the proto-form were taken to be *mo, we would have to fly in the face of the fact that there is no sure evidence for reconstructing any stems of shape *CV; only *CVV, *CV?, and *CVV are repeatedly attested. Hop =méyi and PP moos might go back to a pUA *mo?-ci (containing a diminutive suffix), but *c > y in this context is not known to be regular in NUA. If acceptable, the Hop vowel is short because the form is possessed. *mo? is further supported by the form *mo?oŋaŋ 'male in-law' which is unlikely to contain a suffix beginning with ? . Our best bet may be to reconstruct *mo? ~ *moo. *moo is harmonious with Hop -méyi, Ta mo?rí, YM mokari, and Na mo= . *mo? is harmonious with Hop mə?wi, PP moos, Ta mo?rí, and Na mo=, and especially with *mo?oŋaŋ.

S *ko?o-ko 'to hurt, be sick' : PP ko?ok; YM ko?ko; Na kokoo;

→ *ko?o-ko-ri 'spicy; chile' : PP ko?okol; YM ko?kori; Co ku?kúri. [M-128]. This set is formed from the pUA verb *ko?^{i}/o 'to kill, die' plus a suffix *-ko.

Other sets from SUA shaving preconsonantal ? within roots are not well enough distributed to allow reasonable reconstructions for a fairly remote time period.

Two sets showing preconsonantal ? in some southern languages can be shown to be morphemically complex.

N/S 'to smell' : Num *?ək^{w}i; Tak--Se h^{w}uk^{w}um(a-); YM húhu?b^{w}a; Co -?é?č^{w}e; Hu ?ə́k^{w}i; Na (i)?nek^{w}i. [M-390]. Se and the Son languages contain a preposed radical element of the proximate shape *hu. This is found in such items as *hu(u)pa 'to smell', *huHpa 'skunk', and *hu.. 'fart' [M-391]. Thus we reconstruct pUA *?ək^{w}i 'to smell' and derive the forms in Se, YM, Co, and Hu from *hu?ək^{w}i. YM shows, in addition, reduplication of first syllable.

S 'snot' : Ta čo?má; YM //čoomi-mi//; Co ču?mé. [M-219/398]. This set contains the pUA root *coh 'head' plus an unidentified root or suffix *-mV. (probably *-mə). *coh-mə yields Ym coomi.. in a regular way, and Ta čo?má attests to a morpheme boundary between o and m. The source of the ? in Co is anybody's guess.

Having considered NUA in some detail, we now turn to SUA. We begin by discussing certain phonological aspects of various languages.

Some Phonological Developments in Tarahumara

Ta words of shape CV?CV

Ta has instances of preconsonantal ? in morphemes and stems whose pUA shape did not, apparently, contain a *?. While we cannot explain every case, generally we can say that if the pUA antecedent of the Ta forms contained a morpheme boundary, or if there was a *-?C- cluster in the pUA antecedent, Ta will show -?C-. The known cases of Ta -?C- stem which have UA etymologies are given below.

(a) there is a (diachronic) morpheme boundary

ko?čí	'eSi'	pUA	*ko(-ci)
ba?čí	'eBr'	pUA	*paa-ci
o?čí	'bone'	pUA	*?oh
ba?wí	'water'	pUA	*paa
bo?[w]á	'wool'	pUA	*poho~*powa
řema?ri	'young man'	Son	*[illegible] ma > PP [illegible]m
čo?má	'snot'	Son	*coh-mə, YM //coomi-mi//, cf Co ɟu?me

(b) there was a *? in the pUA form

*mo?orí	'daughter-in-law'	pUA	*mo?[o] cf YM mókari
mo?né	'son-in-law'	Son	~~*mo?[o]~~ YM mó?ne, Co -mú?n
řo?ka	'spiderweb'		cf Co tu?ká, Hu tuuká, Na tǒkǎ-λ

(c) there was either a ? or a morpheme boundary, or both

wa?wé	'eagle'	pUA	*k^{w}aa(?a)-wəH ; Na k^{w}aaw-λi , PP ba?ag
so?porí	'star'	pUA	*suu(?V)

(d) an initial C has been lost

u?kú	'to rain'	Son	*yuku
o?rí	'white man'	Son	*yooli
o?yó	'to puke'	pUA	*(yo)yo?V [R]

(e) other lgs show a preconsonantal laryngeal

UA:

sa?pá	'meat'	pUA	*sahpə 'belly'

Son ~~SON~~:

ka?wí	'to fetch firewood'	cf YM ké?we
čo?kó	'bitter'	cf YM čó?ko

(f) there is no immediate explanation

UA:

kə?[w]á	'forehead'	pUA *kopa
ma?sá	'feather'	pUA *masaa

Son ~~SON~~:

be?ná	'to pick up'	cf NA pehpena
ka?wá	'egg'	cf YM káva

Ta Words of UA Origin Lacking Initial Lenition

Some Ta stems have second-syllable stress, but do not lenite the initial consonant. This suggests that either at an earlier stage (and in the phonologically underlying form) they had initial stress, or else they are loans.

We do not attempt an explanation of the forms that are not obviously loans, there being to little data to generalize from.

UA:

tani	'to ask for'	pUA	*tani
tam^{i}/u	'we'	pUA	*ta-mə
pači	'ripe corn'	pUA	*pahci
pani	'up'	? pUA	*pa?ani (usually with prefixes)

Son:

puča	'to blow'	Son	*puća
kiri	'greens'	Son	*kili (diffused?)
tori	'chicken'	Son	*toli (diffused?)
hawi	'stand up'		cf YM ha?b^{w}ek

Diffused:

peřa	'mat'	Na	peλa-λ < MZ pata
hikurí	'peyote'		cf Co

Ta w and ɸ from pUA *[v]

A few Ta words show w or lenited away ɸ (rather than expected p~b) from pUA postvocalic *p. This suggests that Ta underwent lenition of *p to [β] after vowel, but that when grammatical analogy was possible [β] > [p]; this p was subject to the late Ta-Gu lenition which is peculiar to this group of languages.

Ta w, ɸ < pUA *p/[v]

se?orí	'fly'	Ym sé?vori	Na saayool-in < Son *sa?ivoori
ka?wá	'egg'	= YM káva	
mawiyá	'cougar'	Son *maviya	
ko?wá	'forehead'	pUA *kopa	
kuwá	'tip, point'	cf Co k^{w}áaci	Na k^{w}aa both 'forehead'
wipa	'tobacco'	pUA *pipah > Son *viiva	
usáni	'six'	cf YM vusani	

A pUA cluster *ht is not yet found in many etymologies. Ta seems to show r (not ř) as its reflex. Little can be made of this at the moment.

Ta ?era 'to (en)close' < pUA *?əhta

Glottal Stop in Yaqui-Mayo

Intervocalic ? in YM continues pUA intervocalic *? as the following examples show.

YM	če?e ~ či?i	'to suck'	pUA	*ci?i
YM	he?e ~ hi?i	'to drink'	pUA	*hi?i
YM	ke?e	'to bite'	pUA	*kə?ə
YM	vo?o	'to be down'	pUA	*po?^{i}/o
YM	ne?e	'to fly'	pUA	*nə?i
YM	si?i	'to piss'	pUA	*si?i
YM	b^{w}a?e	'to eat'	pUA	*k^{w}a?V
YM	me?a	'to kill'	pUA	*mə?a

Both *CV?CV and *CV?VCV are reflected as CV?[V_1]CV in Ym
These are explained above in ~~paragraph~~ section.

close up

*CV?VCV

YM	ko?ko(ri)	'hot--of chile'	pUA *ko?V	
YM	ko?kore	'sick'		
YM	mo?ne	'Sola'	pUA	*mo?oŋan
YM	wo?či	'grasshopper'	pUA	*wo?oH-ci

etc.

*CV?CV

YM	ye?či	'aunt'	pUA	*yaʔ-ci ?

etc.

Nouns of shape *CVV, *CVh, *CVn, unless they have acquired on the way some affix, are reflected in YM in the shape [CVV_1?V_1] /CVV/

YM	čuu?u	'dog'	SUA	*cu../
YM	hoo?o	'back'	pUA	*ho(o)
UM	vaa?a	'water'	pUA	*paa
YM	taa?a	'sun'	pUA	*taa
YM	voo?o	'road'	pUA	*poh
YM	wii?i	'string'	pUA	*win
YM	muu?u	'owl'	pUA	*mun
YM	see?e	'sand'	pUA	*siʷ/ya → see

with a suffix are:

YM	hu?iwa	'arrow'	pUA	*huu
YM	to?na	'belly'	pUA	*too?V

disyllabic is:

YM	hu?i	'pintle'	pUA	*waa?i../

with a prefix is:

YM	?áwi	'fat'	pUA	*?a- 'its' + *wih 'fat'

prefixed *CV? are:

YM	?áye	'mother'	pUA	* a- 'his/her' + *ya ? 'mother' ~~'mother'~~
YM	?ásu	'GrMo'	pUA	*?a- 'his/her' + *su? 'GrMo'

close up

pUA *n, *ŋ, *[l], and *r

These four pUA apical resonants are traditionally reconstructed on the basis of the following correspondences (note that *l and *r occur only medially).

	initial	initial	medial	medial	medial	medial	in suffixes
traditional	*n-	*ŋ-	*-ŋ-	*-n-	*-l-	*-r-	*-n-
Num	n	n	ŋ	(n)	n	?	n
Tub	n	n	ŋ	?	n	l	n
Tak	n	ŋ	ŋ	?	n	ɣ	n
Hop	n	ŋ	ŋ	(n)	n	r	n
PP	n	n	n	(n)	d/l	d/l	n
Ta	n	n	n	?	r	r	n
YM	n	n	n	(n)	r	r	n
Co	n	n	n	(n)	r	r	n
Na	n	n	n	?	l	l	n
instances	(15)	(8)	(20)	(3>1!!)	(11)	(7)	
revised by TK	*n	*ŋ	*ŋ	invalid	*n	*r	*ŋ

The correspondence for traditional *-n- is sporadic and represented by only a handful of putative sets.

A number of scholars have expressed doubt as to the existence in pUA of a putative phoneme *ŋ without presenting any convincing evidence of where its reflexes might have come from. We would like to point out quite strongly that without the assumption of regular sound change we cannot produce any kind of reconstruction that is not garbage, and we will be properly disowned by our intellectual {successors / heirs} when they find us out. Regular and recurrent sound correspondence supports pUA *ŋ both initially and medially and does not support (on the face of it) traditional medial *n.
(In the mid-sixties it was pointed out to T[illegible] K[illegible] by Ken Hale that there is little good evidence for reconstructing medial pUA *n in the traditional sense. Since traditional UA *l occurs only medially, and has reflex n in NUA, it should be grouped with UA initial *n as its medial reflex.) Note that traditional UA *l is NUA *n/: SUA *r. The relevant evidence for UA apical resonants (apart from in affixes) is presented in the following sections.

We anticipate and summarize our conclusions on this matter with the following remarks:

(1) traditional pUA medial *n almost always involves stems with (diachronically) more than one morpheme. There is no attestation of putative medial *n in Tub or Tak, and in any event these are but 3 sets that are worthy of serious consideration. We do not necessarily deny that the suggested items are ~~five~~ true cognate sets. We only question that they support reconstructing pUA *n.

(2) traditional pUA *ŋ is reasonably well-attested initially, though only Hop and Tak have a reflex of it that is distinct from pUA *n. Medially, traditional pUA *ŋ is respectably frequent.

(3) there is no evidence for pUA initial *l. (The item N *naŋin/: S *naŋi 'tongue' has initial *n.) We group traditional medial *l

(N *n/: S *r) with initial *n and re-name it 'medial *n'. This is hardly a 'limited' preUA *t.

(4) traditional *r remains medial only. Its attestation is not overly impressive, but it must be accepted as a pUA phoneme in the absence of a hypothesis which can account for the attested correspondence deriving it from some other established pUA element.

(5) medial n in SUA lgs by definition derives from pUA *ŋ.

(6) a correspondence NUA n/: SUA n in suffixes also represents pUA medial *ŋ. This point will be justified in where pUA suffixes are discussed.

NOTE: We would like to mention that Wick Miller (p.c.) in the light of the above facts, (not our interpretations) prefers to

(a) discount the evidence for initial *ŋ, calling it *n.

(b) consider medial NUA *ŋ/: SUA *n as pUA *n.

(c) consider medial NUA *n/: SUA *r as pUA *l.

(d) WHAT ABOUT *r? (in UACS Miller gets it from *t)

In the light of the foregoing discussion, our objections to this interpretation should be obvious.

pUA initial *n

The evidence for pUA initial *n will not be cited here; it is extensive and not controversial. We will simply give the reconstruced UA forms containing initial *n (15 cases).

close up

N	↘	*na?	'father' [M-485]
N/S	↘	*nanka (open up)	'ear' [M-147, VH-47]
N	↘	*naŋin ~ S *naŋi	'tongue' [M-443, VH-94]
N/S		*naapa	'shirt' [M-370]
N	↘	*nanpV? ~ *napV?	'foot' [M-186]
N	↘	*naapəH ~ S *naavo	'prickly pear' [M-69, VH-16]
N	↘	*nawii (open up)	'girl' [M-474]
N/S		*na?a/i ~ *naya (raise)	'to burn, kindle' [M-61, VH-95]
N		*nə..	'to make baskets' [M-23]
N/S	↘	*nəəma	'liver' [M-265/267, VH-89]
N/S	↘ (indent)	*nəmi	'to live, walk around'
N		*nəmə	'person'
N/S	↘	*ni?ooki/a	'to speak, talk' [M-434]
N/S	↘	*nə?sa (raise)	'MoSi' [M-503]
N	↘	*napa	'snow' [M-399, VH-160]
N/S	↘	*noh	'egg' [M-153, VH-96]
N/S	↘	*naa-	'twice, double; reciprocal' [M-516]

checks here

Items checked ↘ have been treated elsewhere in the body of this paper.

pUA initial *ŋ-

The evidence for this sound must involve Tak and/or Hop. We cite eight sets, four of them new. Five of the 8 sets are not found (yet) in SUA.

	N	*ŋa-ku..	'direction, side' [postposition] (M-376)
	N/S	*ŋaa	'root' [M-355, VH-151]
	N/S	*ŋa..	'to cry' [M-112]
	N	*ŋaya	'to wave, twirl' [T////, K////]
	N	*ŋa..	'to(un)fasten' [T////, K////]
	N	*ŋaarV	'to gnaw/woodpecker' [T////, K////]
	N/S	*ŋo..	'to bend back' [M-36, VH-152]
	N	*ŋoyV	'to go away/home, pursue' [T////, K////]

~~Items checked have been treated elsewhere in the body of this paper.~~ The remaining six sets are cited below.

N/S *ŋa.. 'to cry': Num--Co nah[wooi(h); Tub naŋ; Tak *ŋaa]ŋaa [R] ~~yaa (R)~~

-- Lu ŋaa ~ ŋaŋ~ŋa?, -- Cu ‖ ŋaŋa ‖ (stressless root); Ta narə́. [M-112].

N *ŋaya 'to wave, twirl': Tak -- Lu ŋaya/i (vi/vt) 'to winnow', -- Cu ŋáylya (vi) 'to twirl'; ~~Hop////~~ 'to sway, weave'. [T////, K////].

N *ŋa.. 'to(un)fasten': Tak--Lu ŋarə́a/i (vi/vt) 'to fasten', ŋalipa 'to become entangled'; Hop ŋaa(ha) 'to untie'. [~~Terry~~ K~~aufman~~].

N *ŋaarV 'to gnaw': Tak--Lu ŋooli 'to gnaw'; Hop ~~y-r-yyaw~~ ŋarə́ŋyaw 'woodpecker'. [~~Terry~~ K~~aufman~~].

N/S *ŋo.. 'to bend back': Num--SP noh[koHmi; Tub noo?; Tak *no[mV; Hop ŋo[la 'to bend', ŋo[mV 'to coil up'; PP ‖ noda ‖ < *noora, nóonəgi < *ŋowa; Ta norə́ra; Hu ‖ nuwa ‖. [M-36, VH-152]. Tak and Hop support an extended stem *yomV; (Tak initial C is discrepant) Son supports an extended stem *yoora; Hop, PP and Hu support an extended stem *yowa.

N *ŋoyV. 'to go away/home': Tak *ŋoyV; Hop ŋoyV 'to pursue, chase after'. [~~Terry~~ K~~aufman~~]. These forms may be only further instances of the previous etymon.

In sum, we have seven or eight sets here, which in the current state of our knowledge cannot be explained away and should be taken rather as creating an expectation of further verification.

The traditional pUA medial *n

ledial *n would be established on a correspondence NUA *n/:SUA *n (Nor-
ially NUA medial *n/: SUA medial *r, and SUA medial *n/: NUA medial *ŋ,
s will be shown later). There are only three plausible sets (cited below),
nd two of them can be demonstrated to contain morpheme boundaries, such that
he last half of each word consists of a suffix. The third plausible set
emains an orphan.

he first set is 'male in-law' discussed above in ~~paragraph~~ section. [M-507]. The
ough reconstruction mo?ona must be compared to pUA *mo? 'female in-law',
hich shows that ..(o)na is a suffix (unless it is an incorporated form of
he root *na? 'father'). In any event this item does not support root-medial
A *n. As we will show later, in suffixes the correspondence NUA *n/: SUA
n does occur, as does NUA *n: SUA *r and NUA *r: SUA *r; but the correspondence
A *ŋ: SUA *n does not occur in suffixes. We therefore take NUA *n/: SUA *n in
uffixes to represent pUA *ŋ. And thus, we arrive at the reconstruction *mo?-oŋan
or *mo?o-ŋan) for this set.

he second set is 'to drum': Num--SP po?noa; YM poona. [M-141]. As the
following forms show, the root is *po.., and what follow is suffixal material:
Mo tah-po 'to pound', Mo pota 'to pound acorns', SP tah-potu? 'to pound with
a stone', Se peeŋ 'to pound'. The similarity between SP and YM may be purely
adventitious. YM poona compared to Se peeŋ could support a pUA *pooŋa (or
*pohŋa).

The third set is SP tonohki~tunuhki 'hill': PP toonk 'dike, bank, dam'.
[M-230, VH-167]. The logical protoform for this item would be *tonohki,a
3 syllable form (which are otherwise rare and can always be show to contain

at least two morphemes).

Even though we cannot straightforwardly demolish this proposed etymology, it lacks confirmation. One possible case does not establish a correspondence.

We challenge etymologists to find further support for pUA traditional medial *n. Let us say in anticipation that we reject such cases as the following:

(1) Num *k^{w}ana 'smelly': Tep *k^{w}aana 'coyote; liar' Co k^{w}ánam^{w}a 'to deceive' [M-108, VH-135]. Semantics are implausible.

(2) SP nana-: Co ti?-nahana 'to grow' [M-207].
Mo naa shows that the root is *na.. (or *ŋa..).

(3) Hop naani: Co na?ná; Hu-na 'to laugh' [M-255].
Co may be reduplicated, or -nV may be a suffix.

pUA medial *ŋ

Medial *ŋ is established on the correspondence NUA *ŋ/: SUA *n.

Since NUA medial *ŋ has no other correspondence, its testimony alone is sufficient to establish medial pUA *ŋ, and the same is true of SUA medial *n; its testimony alone is likewise sufficient to establish pUA medial *ŋ. We have 11 cases of medial *ŋ attested from both branches, 4 cases attested from NUA alone, and 5 cases attested from SUA alone, 20 cases altogether.

(a) attested in both branches (11)

N	*ŋin ~ S	*nŋi	'tongue'	[M-443, VH-94]
	*ʔoŋa ~ some N	*ʔŋaa	'salt'	[M-358, VH-63]
	*soŋo		'lungs'	[M-272, VH-166]
	*taŋi		'to ask for'	[M-13, VH-92]
	*taaŋi..		'mouth'	[M-291, VH-19]
	*tooŋa/i		'to be hot/shine-sun'	[M-239, VH-155]
	*yuuŋa		'prickly pear'	[M-70]
	*toŋoo		'knee'	[M-244/246, VH-30/156]
	*kuŋa		'Hu'	[M-506, VH-97]
	* aŋa..		'wing, feather'	[M-467, VH-58]
	*cuŋi/u		'to suck;pipe, bone'	[M-319/422]

We presen: below the five cases not already treated earlier in this paper.

*soŋo 'lungs': Num *soŋo; PP hon 'body'; Ta sonoŋrá. [M-272, VH-166].

*taŋ 'to ask for': Tak--Ca né]taŋ; PP taañ; Na λaʔ-λaniya [R]. [M-13, VH-92].

*taaŋ.. 'mouth': Num *taŋ[pa ; Tak--Fernandino taaŋi-; PP čañ; Ta řiní; YM teeni; Cor *téni; Na teen-λi. [M-291, VH-19].

*tooŋa 'to be hot, shine-sun': Hop ‖ taaŋV[pa‖: Tak *tooŋa; PP toñ, ~~ton~~, tonad 'sun'; Na toonal-li 'sun'. [M-239, VH-155].

*yuuŋa 'prickly pear': Hop yoŋa (yooŋa is expected); PP ǰuñ; Hu yáná. [M-70].

GET

José Grimes E. y otros:

El Huichol, Apuntes sobre el Léxico

1981

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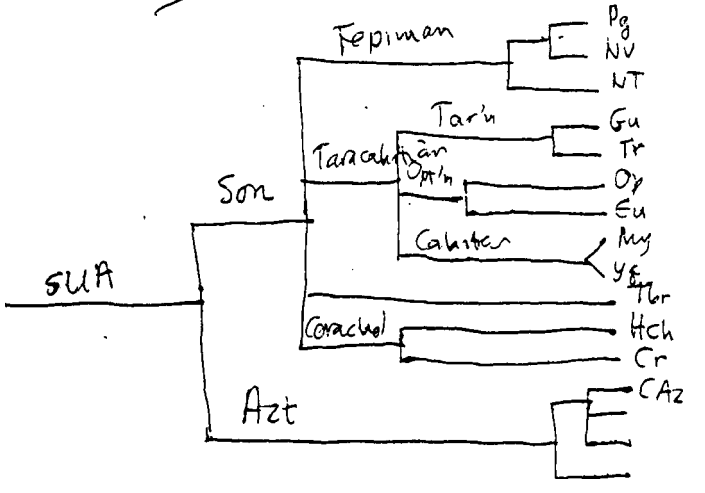
Hueichol seems to have the same inversion of *ṽ and *ṷ

that Tepiman has *ṽ

*ṷ

	naaká	ear	waki dry
?aayée	neené	tongue	nema liver
turtle	taamée	teeth	háka reed
	maatáa	grey wolf	haší eye
?eekáa air	táame	but	háa water
		kíi	house
		sívi=	sour

Miller's Classification (lexical)



(b) attested in NUA only (4)

*k^{w}iiya ~ *k^{w}iiya	'oak, acorn'	[M-1]
*[illegible]	'porcupine'	[M-327]
*cahnaH	'lizard sp.'	[M-269]
*tanya	'to kick'	[M-244/246, VH-30/156]

All of the above have been treated elsewhere in this study.

(c) attested in SUA only (5)

*cohni	'head hair'	[M-219, VH-38]
*cani/a	'to hit'	[M-232]
*naana	'mother'	[M-489]
*sunu	'corn'	[M-100, VH-93]
*pini	'to suck'	[VH-91]

We present below the four sets not already treated.

*cani/a 'to hit (with hand)': PP soon; Ta ʔoʔná; YM ʔona;
Na ʔo]ʔona 'to play music'. [M-232]

*naana 'mother': ST-nán; Co nàána; Na naan-λi. [M-489].

*sunu 'corn': PP huun; Ta sunú; YM sunu; Na sEn-λi. [M-100, VH-93].

*pini 'to suck': PP viin; Hu hiini-; Na pi]piina [R]. [VH-91].

pUA traditional medial *l, called by us *n.

The evidence for this pUA sound, which by previous argumentation we have shown to be in complementary distribution with initial *n, is the correspondence NUA *n/: SUA *r. There is no point in arguing the relative plausibility of *n>r and *r (if you will, *l)>n; both are plausible. We reconstruct *n because there is no other candidate for pUA medial *n and because one division of the family shows n as the reflex. That we have added one more piece of evidence to show the relative conservatism of NUA neither pleases nor dismays us. A set showing NUA medial *n without SUA corroboration still supports pUA *n since NUA medial *n always has SUA *r in cognate items. There are ten items from both NUA and SUA to support medial pUA *n; there is one more item found only in NUA; eleven sets in all.

N *huunan ~ S *huuri	'badger'	[M-18]
*kannii	'house'	[M-240, VH-141]
*maana..	'female child'	[M-85, VH-84]
*m[illegible]na/i	'to flow'	[M-175]
*ʔona/o..	'ball'	[M-20]
*saanah	'gum'	[M-320,VH-147]
*suuna	'heart'	[M-222, VH-98]
*tannah	'foot' (N *tanah, S *taana)	[M-185/224/349, VH-28]
*puuni/a	'to tie'	[M-439, VH-97]
*w[illegible]na	'to stand'	[M-413, VH-161]
N only *ʔ[illegible]aan[illegible]n	'ant'	[M-3]

The five sets not already treated are given below.

*maana.. 'female child': Hop maana; PP mad; Ta mará;
YM maala. [M-85, VH-84].

*maani/a 'to flow': Hop ‖ maanVpa ‖ 'flowing', maana 'river';
Lu-mono (suffix) 'while going';
PP ‖ mali ‖; cf Tub -min (suffix) 'away' (probably from *miya
'to go'). [M-175].

*?oona/o 'ball': Mo ?ohnoowi; PP ?ola; NT ?orosi (contains diminutive suffix)
Co ?u?raara ~ ?u?rara?; Na olol-oo 'to make into a ball'. [M-20].

*puuni/a 'to tie': Tub puun; PP ‖ vuda/i ‖; Ta buré;
Hu hai-~-haa. [M-439, VH-97].

*wana 'to stand': Num *wara; Tub ?aa]wan; Tak *wanV;
Hop wana; Ta wiri; YM werV.
[M-413, VH-161].

pUA *r (medial only)

There are only seven sets that support the reconstruction of pUA medial *r, and there is no candidate for pUA initial *r. This rare and defective phoneme, however, must be reconstructed given the evidence that we have for it. Medial pUA *r is reconstructed on the correspondence SUA *r/: Hop r/: Tak *ð/: Tub l/: Num ?. The SUA reflex, *r, is the same as the reflex of pUA medial *n (as reconstructed by us). The Tak and Tub reflexes are the same as those of lenited pUA *t. We think this does not support the notion that l's and r's in UA are ancient lenitions of preUA *t, but rather

(a) in SUA medial *n fell together with preexisting *r.

(b) in Tak and Tub lenited *t fell together with preexisting *r.

The etyma containing *r are identified below; five stems:

N *ŋaarV 'to gnaw' [TK]

N/S *pura 'just, only, alone [M-510]

N/S *tukuri 'owl' [M-311, VH-105]

N/S *?ara 'blood' [M-47]

N/S *cuuru.. 'bird sp' [M-41]

two suffixes (supporting data cited in later sections):

N/S *-ra verb action noun [RL]

N/S *=ra 'to go verb-ing' [Crapo]

Sets not treated earlier are given below.

*cuuru.. 'bird sp': Tub culu[s-t 'woodpecker'; Hop cooro 'bluebird', cf ciroh 'bird'; Ta čurugí 'bird'. [M-41].

*pura 'just, only, alone': Tak *-puð-; Ym ‖ pula ‖. [M-510].

*tukuri 'owl': Tuk tukluluh 'screech ____'; Hop tokori 'screech____'; PP čukud < *tukurV_L; Na tekoloo-λ (contains augmentative suffix). [M-311, VH-105].

*ʔəra 'blood': Tak--Se[ʔ]ɔc(a)ç ; NT ʔárai; Ta lá; Gu heera. [M-47].

This may be contracted from *ʔənwa-ra, which would make *-ra a suffix.

In Hop *t does not [illegible], so *t and *r are always distinct.

In Numic no clear reflex of *r has been found, but see *nhang.

uniquely SUA medial *r

Medial SUA *r can come both from pUA *n and pUA *r; whenever a NUA cognate to a such a set is missing, it is impossible to determine what the pUA model probably was. These are five such sets that are reasonably well attested in SUA.

S *kiri 'herb': Ta kiri(bá): Na kili-ʎ. [TK].

S *marV 'buzzard': NT kušímari; Co mʷá?ra?ika;
Hu maraika. [M-68].

S *tori 'chicken': PP cucul < ||tuturi|| [R]; Ta torí;
YM t[ʔ]tori [R]; Na t[ʔ]tolin [R]. [M-84].

S *yoora/i 'to live': Ym yoore 'to heal', yooli 'brave', yoori 'white man';
Na yool-li 'seed, heart'. [M-266].

The following set has a Num cognate, but it does not establish whether the SUA *r is from pUA *n or from pUA *r.

N/S *wiiru 'buzzard': Ta wirú; YM wiiru; Hu wiraka;
Num *wihku(n). [M-66]. Num is a contracted form of *wiiruku, which is also the antecedent form of the Hu form. If pUA had *n in this form, we might expect *n and not *h in the Num form. However since we find that when CVCV roots are contracted to form intrumental prefixes in Numic even *CVnV→CVh, we must not be confident that Num *wihku(n) supports pUA *wiiru rather than pUA *wiinu.

NUA *kaŋ 'cheek' ? Numic *r ?

A NUA word for 'whiskers' seems to partly diffused:

Num (Mo, SP) *kanah; Tub kaŋaa-l; preSe *qaŋaa-ɣa.

SP should have a reflex of *ŋ, namely q. Tub should should have initial h< [q]. Without these discrepancies we would reconstruct NUA *kaŋaa. There may be a common root in *kanmaa 'to taste/cheek'. Another attestation of the same root may be in Tub ?alhan-t 'jaw', if this is from *?ato-kan-ta (*?ato 'below, under', *kan 'cheek', *-ta 'absolutive').

(< *kaŋ)

Though this origin of Tub ?alhan-t seems most likely, Num (I-3 *?a(h)ta) has an apparent cognate to it whose ancestral form would be something like *[?ahɣa-βə], based on Mo/NP ?ata-pə [?aɣa-βə], Co ?ahra-və, Sh ?ahtah-pə [?attappə], SP ?ahtakəpə [?attayə-βə]. This protoNumic form cannot straightforwardly be reconstructed as either *?atah-pə or *?ahta-pə. We suggest *?ahra-pə. If so, this is the only known instance of Num *r. Since we find the idea of diffusion from Tub to Num unlikely (though possible), we may have to recognize a NUA *?ahra(n) 'jaw', yielding Num *?ahra and Tub ?alhan-t. We have already shown that pUA *r yields Tub l.

If we look for reflexes of *r in Num, we can find the following possibilities, none of which is impressive:

(1) We observe above (§ _ _) that UA stems of shape *CV?VCV became *CVhCV in Num. If *wiiru(ku) 'buzzard' is a correct reconstruction, then UA *wiiruku (→wi?uku)→ Num *wihku(n) is a reasonable sequence of events.

(2) CNum has *hu-wih-cuCu 'bird' (compare SP wici?/: Seɣwə/iči-t, both < *wih-ci-?): *-cuCu can be compared to Hop cooro/: Tub culu[s-t all from *cuuru and thus q may be a reflex of pUA *r in Numic, as it is of *y.

(3) As discussed above (§ _ _) a NUA stem *?ahra(n) 'jaw' may have existed, yielding pNum *?ah[ɣ] a-pə.

The three possible reflexes referred to above can not all be collectively true. (1) and (2) may be harmonizable; (2) may allow an intermediate stage with **?. The question is open.

pUA medial *c in NUA and Numic

Where pUA has medial *c and *hc NUA has *y and *hy after *ə, and for *hc apparently after high vowels generally (thus, after *i and *u as well). We list below the reconstructed instances of these sounds.

(a) pUA *c which stays in NUA (if the etymon survives)

S *?aacə 'to laugh' [M-253, VH-39]

N/S *kʷiicin 'smoke' [M-393, VH-35]

N/S *maaci 'to be visible/light' [M-251/263, VH-36]

N/S *taacah 'sun, summer' [M-425, VH-27]

S *yaca 'to set down' [M-380, VH-40]

N/S *huci.. 'tree' [M-476]

(b) pUA *c which shifts to *y in NUA

	pUA		NUA
N/S	*kəcuu	'fish' [M-171]	*kəyuu
N/S	*məəca	'moon' [M-286, VH-158]	*məəya
N/S	*?əəca	'to plant' [M-321/2, VH-119]	*?əəya
N/S	*wəcə/i	'to fall' [M-161/402, VH-101]	*wəyə/i

Note: NUA *?əə.. 'cold' does not show this shift. Since the item is not found in SUA, we suppose this item was innovated in NUA after the shift *c>y had run its course.

(c) pUA *hc which stays in NUA (if the etymon survives)

N *wahcən 'four' [M-513]

*pahci 'seed' [M-366, TK]

N *pahca 'to burst' [M-63]; best treated as *pa?i-ca, as noted in §

*wihci? 'bird' [Sapir]; probably contains a morpheme boundary (with diminutive suffix), since *c does not shift to y here.

(d) pUA *hc which shifts to *hy in NUA

	pUA		NUA
↘	*?əhcə/i	'to steal' [M-41, VH-120]	*?əhyə/i
↘	*wihca/u	'thorn→needle,owl' [M-14]	*wihyV
↘	*puhca	'to blow' [M-49]	*puhya

In Numic, a medial *y not preceded by *h is dropped, whether its ultimate source is pUA *y, or NUA *y shifted from pUA *c. We identify below the pUA sets with medial *y.

↘ N *yoyV 'to go away/home' [TK] (-Num)

*?aayV 'now; new' [Sapir]

S *maaviya 'mountain lion' [M-289]

*miya 'to go' [M-196]

N *yaya 'to wave, twirl' [TK] (-Num)

The sets not earlier cited that support the reconstructions given above will now be presented.

N/S *maaci '(to be) visible/light': Num *mahi or *maCih; Hop maaci[wa 'to be known'; PP maasi; Ta maǰi; YM maaci. [M-251/263, VH-36].

N/S *huci 'tree': Num *huhi or *huCih; PP ?uus; Co ?əcári 'pole. [M-476]. Tub ?uu?uH-t 'pole' and YM huya 'tree' suggest that *-ci is an incorporated diminutive suffix. But its identity was lost before pNum times. (~~-Num *kʷihi *kʷiCih~~)

The above two sets, plus *kʷiicin 'smoke' ▷ Num *kʷihi~*kʷiCih) cited earlier, show an additional preNumic rule: NUA *c>*h (or preNumic *y (>ø) before *i.

*?əə.. 'cold': Num *?əə; Tak--Se ?əǰəə/h . [TK].

As noted earlier, this set is unique to NUA.

S *?aacə 'to laugh at': PP ‖ ?aṣ^{ə}/a ‖; Ta ?ačí; Ym ?aače; Co ra-]?á?ce. [M-253, VH-39].

The next four sets, along with earlier-cited *məəca 'moon' and *kəcuu 'fish', illustrate *y>Ø in Numic.

*?əəca 'to plant': Num--SP ?əa; Hop ?əəyi; NT ?əṣ; Ta ičá; YM ?eeča. [M-321/322, VH-119].

*wəc^{ə}/i 'to fall': Num *wə?i/ə; Tak--Cu wəyi/ə (also Tak *wiHci 'to drop' < *wəhci); PP gəəš; Ta wičí; YM weče; Na weci. [M-161/402, VH-101].

Num reflex *? rather than zero in this item is unexplained.

*?aayə 'now': Num *?ə-ka 'new',--SP ?ə-pi 'now'; Na aaš(k)an 'now', ayVmo 'not yet'. [Sapir].

*miya 'to go': Num *miHa; Tub miy; Tak -- Se ‖ miia ‖; Hu-mie. [M-196].

pUA medial *s

The main interest of pUA medial *s consists in two points:

(a) medial *s, unlike other obstruents, does not occur in clusters, with two exceptions *nə?sa.. 'MoSi', and *kapsii 'thigh' (both may be morphemically complex, but this is merely a suggestion).

(b) some cases of medial *s become *h in Numic, while generally *s remains (though phonetically usually long). It turns out that the conditions of shift *s>*h in Numic are occurrence between identical vowels.

The following etyma contain pUA medial *s

	N/S	*k^{w}asV	'skirt' [Whorf]
↘	N/S	*k^{w}asi/əH	'cooked, ripe' [M-151, VH-50]
↘	N/S	*K^{w}asii	'tail' [M-432, VH-51]
	N/S	*təsa	'white' [M-460, VH-31]
	N/S	*pasoh	'grass' [M-204]
↘	S	*pusa	'to wake up' [VH-74]
↘	N	*?isa	'coyote' [M-107]
	N	*?aasi	'to bathe' [M-25, VH-139] (-Num)
	N/S	*maasa/oh	'deer' [M-124]
	N/S	*siisi	'piss' (n/v) [M-449, VH-67] (-Num)
	N/S	*təəso..	'cave' [M-80, VH-118] (-Num)
↘	N/S	*kapsii	'thigh' [M-437, VH-41] (-Num)
↘	N/S	*nə?sa..	'MoSi' [M-503] (-Num)

The next two etyma, which show *s > h in Numic, are cited with supporting forms.

N/S *kʷəsə (~*kʷisə) 'to take, carry': Num *kʷəsə; Tub wiis (long vowel unexplained); Tak *kusV; Hop kʷəsə; kʷiisi ' to get trapped'; PP bəhə; YM bʷise. This may be an extended form of a root *kʷə- ~ *kʷi- which seems to be attested by Tub, Ta, Co, Hu, and Na. [M-75, VH-52].

N/S *waasa 'field': Num *pan=waha 'meadow'; Ta wasá; YM waasa. [M-323].

The next two etyma, which have *s between identical vowels, are not represented in Numic.

N/S *masaa 'wing, feather' [M-468]

N *?aasa(-wəh) 'eagle' [M-146]

The next item has *s between identical vowels and a Num reflex that does not shift the *s to *h. At this stage an attempted explanation would seem premature.

*tuusu 'to ground'; *tuusi 'flour': Num *tuhsu (vb); Tub tuus; Hop toosi (n); PP ||ču̍hi|| ; Ta ru̍sú; Ym tuuse; Hu - taašə ; Na tɛ̆s-λi. [M-206, VH-75].

Other pUA reconstructions

We present here a list of (approximately 100) well-supported phonologically reconstructible UA stems not otherwise discussed in the body of this paper. The list is divided into two in the body of this paper. The list is divided into two halves: stems with short vowel and stems with long vowel. Items restricted to NUA are marked N; those limited to SUA are marked S; those common to both divisions are marked N/S. Taken with previously discussed etymologies, these reconstructions by no means exhaust the set of trustworthy etymologies; but many of the remaining etymologies have phonological or dictributional problems that cannot be glossed over and require commentary not appropriate in this context.

Final features: There is apparently (but see §§___ on Na) direct evidence for final features in SUA languages. pUA verbs could apparently end only in *V or *VV. Consequently, except for nouns and adjectives attested in NUA languages, the final features *n and *h are not reconstructed. In case an etymon is attested in NUA languages, but the final feature (if any) remains uncertain, the reconstruction is followed by 2 dots.

The following reconstructions are cited without supporting data, but reference is made to entries in VH or M where most of the relevant supporting data can be found.

stems with short vowel

N/S	*hi?(i)	'to drink'	[M-140, VH-77]
N	*cəka	'duck'	[M-144] (Hop + SP: diffused?)
S	*coma	'to sew'	[VH-37]
N	*?ətə..	'hot'	[M-230]
N	*hotV	'to open a hole'	[M-325]
N	*howi..	'dove'	[M-137]

N/S	*huka	'leg'	[M-259, VH]
S	*kaka	'sweet'	[M-429]
N/S	*kaku?	'FaMo'	[M-498, VH-170]
N	*katah ~ S *kato	'noddle'	[M-220]
N/S	*katə	'to sit down'	[M-381, VH-42]
N/S	*kə?ə/i	'to bite'	[M-42/83, VH-43]
N/S	*ko(ci)	'eSi'	[M-494]
N/S	*koci/o	'to kill, die'	[M-128, VH-45]
N/S	*ko?i/o		~~[M-128, VH-45]~~
N/S	~~*ko?V~~	'to eat'	[M-151, VH-48]
N/S	*ko?a/i		[M-83/151, VH-131]
N	*kʷətə	'to arise'	[M-345]
S	*maca	'thigh'	[M-438]
N/S	*makaa	'to give/hit'	[M-194/233, VH-83]
N	*maatV ~ S *mati	'to know'	[M-251, VH-25]
N/S	*mə?a	'to kill'	[M-127, VH-85]
N/S	*mumuH	'bee'	[M-30/178]
N	*na-paahi	'six'	[M-516]
N/S	*sakʷa	'blue'/'yellow'	[M-50]
S	*sawa	'leaf'	[M-257, VH-64]
N/S	*sawi	'to melt'	[M-282]
N	*sihwa.. ~ S siya	'sand'	[M-359/360/361]
N/S	*si?a/i	'to piss'	[M-449, VH-67]
N	*soho~(piH)	'cottonwood'	[M-102]
N/S	*sokV	'mind'	[M-294]
N/S	*suwa	'to die, kill, eat up'	[M-129/152, VH-72]
S	*taha	'to burn' ~~(n < v)~~	[M-425, VH-150]
S	*tahi	'fire' (n < v)	~~[M-425, VH-150]~~

S	*tata	'to be hot'	[M-424]
S	*tasi/ə	'to cough'	[M-104]
N/S	*tawi	'chest'	[M-59]
N/S	*tək^ə/a	'to cut'	[M-116, VH-113]
N/S	*təwa	'to find, see'	[M-364, VH-21]
N/S	*tuku(wa)	'meat'	[M-279, VH-22]
N/S	*paa-ci	'eBr'	[M-491]
N	*paha	'aunt'	[M-504]
N/S	*paki	'to enter'	[M-158, VH-2]
N/S	*pakV	'shirt'	[M-371]
N	*pisV	'to go out'	[M-198]
N/S	*pitə	'to arrive'	[M-8, VH-143]
S	*po?i/o	'to lie down'	[M-262, VH-130]
S	*win ~ S *wincV	'string'	[M-421]
N/S	*wo?oH-ci	'grasshopper'	[M-204]
N/S	*yahi	'to come'	[M-95/95/357, VH-82]
N/S	*yakaa..	'nose, tip'	[M-305, VH-110]
N/S	*ya?a	'to desire'	[VH-129]
S	*yaha	'to smoke'	[M-395]
N/S	*yəkə	'to taste'	[VH-107]
N/S	*yə?ə	'to swallow'	[M-427, VH-168]
S	*yuki ~ N *yuuki	'to rain'	[M-335, VH-109]

stems with long vowel

N/S	*?aamu	'to hunt'	[M-243]
N/S	*?aato..	'bottom'	[VH-60]
N/S	*?aawV	'to tell'	[VH-124]
S	*cuu	'dog'	[M-136]
N/S	*hoo..	'the back'	[M-16]
N/S	*huupi..	'woman'	[M-473, VH-79]
S	*haaki	'gully'	[M-346, VH-57]
S	*k^{w}iika	'to sing'	[M-379]
S	*k^{w}iiya	'earth'	[M-150, VH-112]
N/S	*muuki	'to die'	[M-127, VH-86]
N/S	*naa-wha(-yV)	'four'	[M-516]
S	*?ooka	'old woman'	[M-475]
N/S	*?oopin	'owl'	[M-15]
S	*saayV	'enemy'	[M-157]
N/S	*saa(-ma)(-yu)	'one'	[M-509, VH-65]
N	*saa?a ~ *saawa	'to bloom'	[M-176]
N/S	*saata..	'red, ochre'	[M-341, VH-32]
N/S	*siiku	'navel'	[M-298, VH-68]
S	*siimi	'to go'	[M-197, VH-69]
N/S	*siipa	'to scrape, shave'	[M-363, VH-70]
N/S	*taapi/a	'sun, day; to dawn'	[M-425]
N/S	*taaka	'to put, lay down'	[VH-18]
S	*taavə	'long, tall'	[M-270]
N	*taapi	'to ask'	[M-12]
N/S	*too?V	'belly'	[M-419]

[insert 3 items from next page]

N/S	*tuuki/a	'to go/put out - fire'	[M-170, VH-121]
N/S	*tuuki/a	'(last) night'	[M-45, VH-144]
N/S	*tooka	'to call, cry'	[whorf]
N/S	*tuuku..	'black'	[VH-23]
N/S	*tuu..	'child, boy, son'	[M-54]
N/S	*tuupV..	'cloud'	[M-92]
N/S	*pəə	'new'	[M-302]
N/S	*waaki	'(to be) dry'	[M-142, VH-99]
N/S	*wil(ki..)	'bird'	[M-40]
N/S	*yaawah	'space, opening, doorway'	[M-90, VH-108]
N	*paawəh	'blood/red'	[M-457]
N/S	*waa?i	'to roast'	[M-280/351, VH-162]
N	*yaawa	'to carry'	[M-78]
N/S	*saaki	'to parch'	[M-326/352, VH-157]

Grammatical Morphemes

Both Langacker and Heath have identified a number of grammatical morphemes and proposed reconstructions for them. In RL's case these are pronouns, postpositions, and suffixes. In JH's case they are suffixes. Sapir established or suggested several of these etymologies but did not offer reconstructions.

Our phonological reconstructions in any case often differ with those of RL or JH, though we consider most of the etymologies valid.

Postpositions

Langacker (The syntax of postpositions in Uto-Aztecan) has outlined the synchronic and diachronic syntax of postpositions in UA languages, showing that many of the modern forms have incorporated pronoun agreement markers and/or case markers. The majority of postpositional elements cited for the various UA languages by Langacker, can be analyzed in terms of thirteen elements (in pUA garb). Some additional items have been gathered from primary references by TK, and most of Langacker's forms have been checked in the original sources. All these elements are monosyllabic, but they do show correspondences in volving length, spiration, and final glottal stop. They also contain the correspondence NUA *gl : SUA n < pUA *g, not found in suffixes. In many cases, as suggested by RL, and on the basis of general lore about such relational elements, many of these items may be worn-down nouns referring to body parts and parts of objects found in nature. We would like to point out that only one of the 13 elements identified here involves consonantal alternation of the type called 'lenition' by RL, although 4 or 5 of the others contain consonants which are subject to lenition in RL's terms. The element in question is *mi~*wi 'to, etc', attested in all but Tep and Ta. Most of the postpositions consist of one or two (in tandem, or compounded) postpositional elements often preceded by one of one pronominal prefixes *pə-, *?a-, *naa-, or

*wa-: 'their' in the proto-language the postpositional elements and aggregations agreed for person with the noun governed, but in various of the languages an invariant form has been developed for a postposition which includes a frozen no-longer-analyzable prefix (one of the 4 listed above). Other elements (which are suffixes) that find their way into postpositional aggregations and get trapped there include:

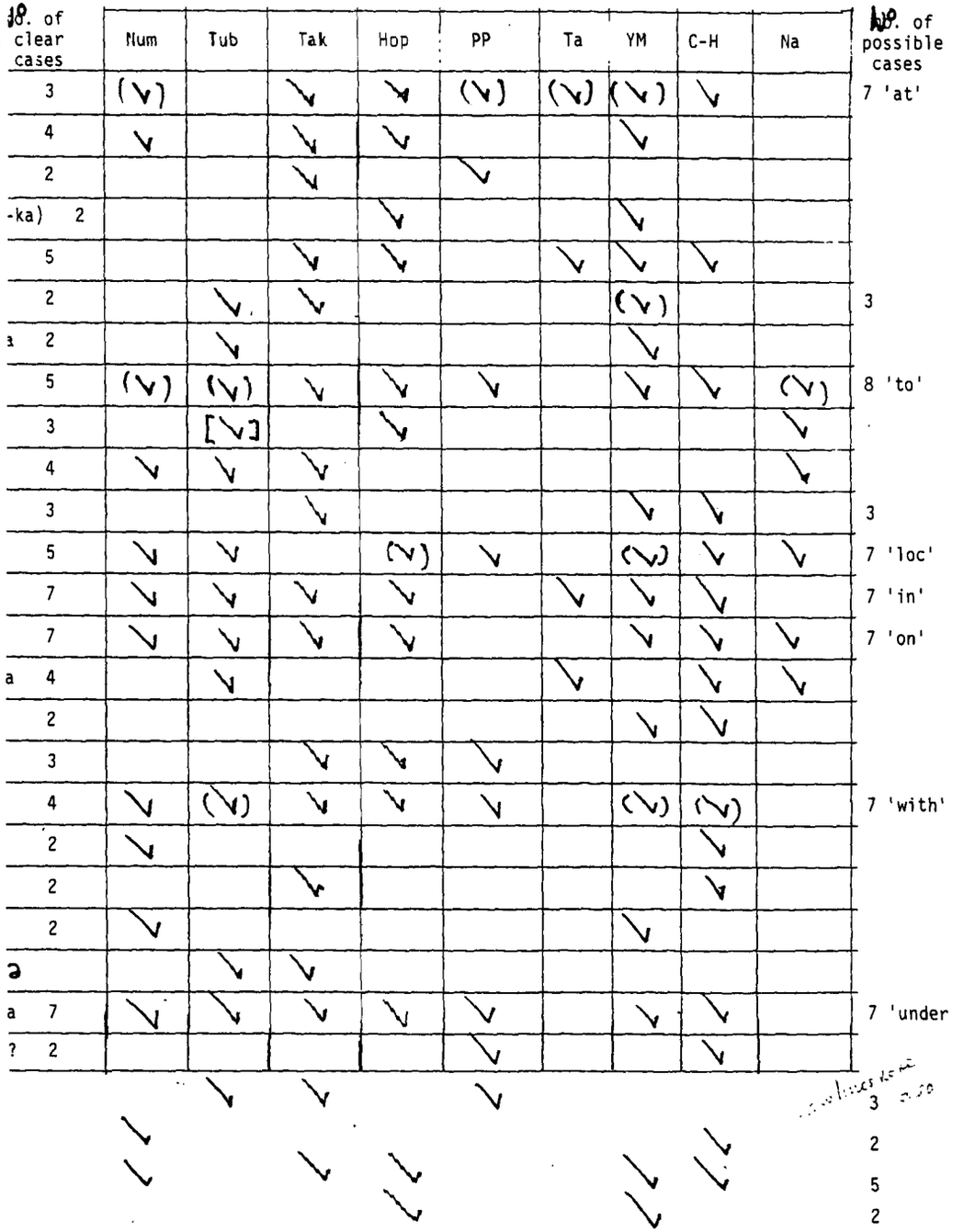
*yə 'accusative' (NUA) < 'possessive 3s' (pUA)

*a 'accusative' (acc to RL)

*tV 'absolutive'

*mə 'plural'

The following chart shows the distribution by subfamily of UA postpositional elements, singly and in combination, but without frozen prefixes, clothed in pUA phonological garb. Some of the few phonological irregularities in fact involved in these items will be discussed, but we will not attempt to be exhaustive or definitive. We hope we may stimulate someone to make that attempt. We will try to rationalize the semantics for postpositions, but only those that are attested across the board seem amenable to semantic reconstruction at the present time.



We make a preliminary attempt here to specify the distributional capabilities of the postpositional elements. There are 3 basic types.

as attested widely

(a) alone, initial in strings, and final in strings--ie they can be combined with each other

(b) alone or initial in strings

(c) never alone

(a)	(b)	(c)	(d)
(1) *ya	(7) *hpa?	(11) *su	(13) *nii
(2) *hci?	(8) *k^{w}a?	(12) *ku	(14) *yə
(3) *mi~wi	(9) *ma?		(15) *a
(4) *hta	(10) *tu(-[k]a)		
(5) *ka			
(6) *pa			

Note: In this section only elements and combinations attested in at least 2 subfamilies are cited. Reconstructions offered by RL are given in square brackets at the end of each etymology RL has dealt with.

There are six elements which may occur alone and in various combinations which have a very general locative meaning.

N/S
(1) *ŋa 'at', etc: Tak -- Lu -ŋa 'at, in, on'; -- Ca/Cu-ŋa(?) 'in'; Hop -ŋa 'by, at' ("locative tensor"); Cor--Hu -na 'at'.
[RL drives this from his *-ma 'in, on, at'; we reject this].

N/S *ŋa-hku '-ward': Num *nank^{w}ah 'side, direction' (*ŋa+ku+a); Lu-ŋax 'at'; Hop -ŋaqo~-ŋak^{w} 'from, in'; YM ve]nukuči (*ŋa-ku-ci) 'until', nuku[sia 'downward'.
[RL UAG 94 *na-nk^{w}a 'toward, direction].

N/S *ŋa-yə ⊃ : Tak-Lu -ŋay 'from' (, --Se -nə? 'from'?); PP wə]nadk 'with (instr.)' (< *ŋa-yə-ka).

N/S *ŋa-su(-ka) 'inside, in middle': Hop -ŋso 'to', -ŋsoqa 'into'; YM nasuku 'between, in the middle'.

N *ŋa-wi ⊃ : Tak-Lu -ŋawič 'of, belonging to, from' (< *ŋa-wi-ta); Hop -ŋami 'for' ("ethical").

An additional cases of *ŋa is: ma?-ŋa (9); cf also *paa (7).

N/S
(2) *ci? (or *hci??): Tub wa]Hci?a[s 'by means of' (< *ci?+?a); Tak-Cu -či 'with'; Ta-či 'at, in'; YM-či 'on, for'; Cor--Co he]ce 'in, on, for'.

N/S *ci?-pa: Tub ?aH]kaciip 'across' (< *ka-ci?-pa); YM ve]či?vo 'for'.

N/S
(3) *mi~wi(=ŋ) 'to', Num -- SP *(H)-mi 'direction; in, on': Tak--Cu ?a]w 'in, on, at'; Hop -]mi~-wi 'to'; PP wu]i 'to' (< *pə-]wii, if not from *punci 'eye, face'); Ta a]mina (< *wi-ŋa) 'to, toward, against'; YM -wi 'to, in, at'; Cor--Co he]mi 'with, about, in'.
[RL NCG 376, UAG 94 *-mi (~ *-wi) 'to, with, at']

N/S *wi-ka 'toward': Tub mi[niika~miik 'toward' ("allative"); (< *wi-nii-ka); Tak-Se k^{w}ii]mq 'north]ward'; Hop miqa 'into'; Na-wik 'toward, against'.

N/S *naa-wi 'with': Num -- Np - noo 'with, and'; Tub naawita[m 'between' (< *naa-]wii-ta-); Tak--Cu -naw 'with', -- Ca -new 'with'; Na naawak 'near, with' (< *naa-]wi-ka).

An additional case of *wi is: *ya-wi (1).

N/S
(4) *ta (or *hta?): Num *tami 'to, toward' (< *ta-wi) Tak--Ca-ta(?) 'on'; --Lu-tal/-čal 'with (instr.)' (< *ta-ta [R] or + absolutive suffix); YM ve]ta 'from', ve]tana 'from, by' (< *pə-ta-ŋa); Cor--Co -ta- 'in'.

N/S
(5) *ka ['with' (SUA)]: Num-Sh ka 'at, to', kapa 'among, between'; Tub ?aH]kaciip 'across' (< *ka-ci?-pa); PP -kaj 'with' (*ka-yə); Cor--Hu -kə 'with' (< *ka-wi); Na-ka 'with'.
Additional cases of *ka are: *ŋa-su(-ka) (1), *wi-ka (3), *ma?-ka (9).

N/S
(6) *pa 'in': Num--Sh pe 'inside'; Tub pa 'to, in' ("inessive"); Tak--Se -pə~-v "locative"; Hop -pe 'at, in'; Ta -bo 'at'; YM -vo 'inside ; Cor--Hu -pa 'in'.
An additional case of *pa is: *ci?-pa (2)

The following four elements (unless they are further analyzable) may occur alone, or initial in strings, but not elsewhere. Their meanings are sometimes narrower.

N/S
(7) *hpaa or hpa? (<*pa + a?) 'on, over, above': Num *pa?an 'high, long, tall', -- Sh pa(a) = Mo paah 'on top of, by means of'; Tub -pa 'on'; Tak -- Se -hpa? 'on', -- Lu pa?aq 'on top'; Hop -paa 'on'; YM ve]pa 'above, over'; Cor-- Co ha]p^{w}a 'over, on'. [RL UAG 117 *-pa 'on'].

*hpaa-ŋa (or *hpa?-ŋa) 'up: Tub paaŋa 'up; Ta pani 'uphill'; Cor-- Hu hee]pa-na 'toward'; Na -pan 'on, above', ⟨pani⟩ (Sapir) 'up, high'. [RL UAG 94 *-pa-na 'on'].

*hpa?-ku 'outside': Ym pa?ku; Cor-Co p^{w}a?kəeh (<*pa?-ku-pa).

N/S
(8) *k^{w}aa or *k^{w}a? (<*ku + a?): Tak--Lu -k^{w}aan 'for' ("dative"), --Cu -k^{w}aani 'for' (<*k^{w}aa-nii); Hop -k^{w}a 'into'; PP ba[?ič 'beyond, in front of', baa[so 'along, in front of'. [RL UAG 94, NCG 378/9 *-hk^{w}a 'to, at, against' -- not strictly speaking based on the same data].

N/S
(9) *ma? 'with': Num -- Sh ma-SP ŋ^{w}a-Mo-hmaha 'on, by means of'; Tak--Lu -man 'along with, by' (<*ma?-nii); Hop mə]ma 'along with' ("sociative"); PP vəə]m (<*pə]ma) 'along with'. [RL UAG 94, NCG 377 *-ma 'on'].

N/S *ma?-a 'with': Num--Sh ma?e(n) 'along with'; Cor--Co he]me?e 'by means of'.

N/S *ma?-ŋa 'with': Tak--Lu -maaŋay "agentive" (<*ma?-ŋa-yə); Cor--Co ha]m^{w}a(a)n 'along with'. [RL UAG 94/160 *-man '(along) with'].

N/S *ma?-ka 'with': Num--Sh maka 'to, towards'; Ym makE 'along with'.

N *ma?-yə 'with': Tub ?aa]maayu (*ma?-yə-wi) 'with'; Tak--Se ~~-ia?~~ -mia? 'with'.

N/S
(10) *tu-ka tu-a 'under, below': (a) Num *tuhkah; Tub tuka?; Tak--Se -htq-wtq; Hop ?a]tka; YM ve]tuku; (b) PP vəə]co (<*pə-]tu-a); Cor--Co he]te; --Hu təa. [RL UAG 94 *tu-hk^{w}a 'under, below'].

The five elements *yə, *su, *ku, *a, and *ni recur in various combinations, but do not usually occur alone.

(11) *su does not occur alone
cf *ŋa-su(-ka) above (1)

(12) *ku does not occur alone
cf *ŋa-ku, *pa?-ku above (1) (7)

(13) *ni: Hop -ni 'like' ("simulative"); Num--Ch Naka-ni 'how' (='like what')
also ↳ ni-ta-a: Cor--Co wa]rita?a 'behind'
↳ wi-ni-ka: Tub miniika 'toward'
↳ paa-ni-ka-yə: Hop -(h]penihqaY 'more than'
↳ ma?-ni: Tak--Lu -man 'along with, by'

Also YM ~~hune(?0-ci)~~ 'that way': Lu ?axani-nuk 'thus'

hune(?)(i)

*yə does not occur alone: this may be an incorporated form of the pUA 3 sg possessive > accusative ending. ɬ yə -ku 'to': Tak--Lu -yuk, --Sɕ-yəka?; Cu/Ca -yik. ʃS *yə-ma?: 'above, over, on top of': PP daam (<*ya-ma<*yə-ma); Cor--Hu -he]imaa.

cf also *ɲa-yə, *ma?-yə, PP-kaj ka-yə above

(1) (9) (5)

5) *a does not occur alone: this may be an incorporated form of the pUA accusative suffix.

cf [ci?-a], [ŋa-ku-a], paa (or pa?), kʷaa (or kʷa?), ma?-a,

(2) (1) (7) (8) (9)

tu-a above

(10)

differences w/ Langacker

Hop -yami 'benefactive' does not contain *ma.

Lu -maayi 'benefactive' is really maayay 'agentive'

Pronouns and Demonstratives

Langacker, in NDA and in UAG, has undicated his opinions about the structure of the pronominal marking system in pUA, and offered some tentative phonological reconstructions of the morphemes involved. In RL's view, pUA had

(a) clitics marking subject and object; word order was SOV;

(b) preposed elements (probably prefixes) marking person reference on post-positions;

(c) preposed (with one exception) elements (not unambiguously affixes) marking possession on nouns;

(d) preposed elements (probably prefixes) marking subject and reflexive object on transitive verbs;

(e) independent personal pronouns.

as to point (d): Langacker refers to the fact that Heath doubts the pUA pedigree of these elements since they are found only in SUA. We also tend to doubt.

as to point (e): it seems impossible to separate the independent pronouns from the clitics (a) through phonological or morphological reconstruction, and we abandon the distinction.

as to point (c): we feel that the balance of the evidence is that possessive elements were affixes, not clitics. Inasmuch as postpositions are a special subclass of nouns, it makes sense (though it is not necessary) that nouns and postpositions be marked for person agreement in essentially the same way; the facts are otherwise: there are special allomorphs of person markers that are possessive prefixes, but the markers used with postpositions typically are phonologically the same as the clitics and independent pronoun bases.

We have examined the primary data, as well as RL's supporting data. We suggest the following phonological reconstructions for the pronoun markers. They do not differ much from those suggested by RL, except that they are more specific; i.e.,

we reconstruct ~~vowel~~ length and final features where indicated. The sets containing these phenonema will be listed below, the rest will not be justified, since there is basically no disagreement with RL.

Note that we do not offer a reconstruction for reciprocal subject-object ~~pro~~clitics.

We also do not feel ready to try to determine the difference between *?a and *pə.

We do not reconstruct *-yə 'his', though we acknowledge that a suffix *-yə existed in pUA. We prefer to hedge on its function; it clearly marked accusative in NUA.

The element *?i found with the first person pronoun markers is probably the pUA demonstrative *?i 'this'; *mə is the pUA pluralizer.

A independent, enclitic, ~~w~~ with person markers postposition vs possessive

N/S	*(?i-)ŋə	≠	*?i-	I/my
N/S	*?əŋ (-mi) ~ *pə	≠	*?əŋ-	thou/thy
N/S	*?əŋ-mə → indent	=	*?əŋ-mə-	ye/your
N/S	*(?i-)ta?(-mə)	≠	*(?i-)ta?-	we/our
N/S	*?a	=	*?a-	he/his
N/S	*?a-mə → indent	=	*?a-mə-	they/their
N/S	*pə	=	*pə-	he/his
N/S	*pə-mə → indent	=	pə-mə-*	they/their

B non-distinct argument markers

N/S	*naa- [illegible] (with PP and V)	each other [RL]
		NDA 61, UAG 47
N/S	*ta- [illegible] (with V)	unspecified subject [RL]
		NDA 139, UAG 46

N/S	*taa- [illegible] (with V)	unspecified object [RL]
		NDA 139, UAG 46
N/S	*nə- [illegible] (with V)	unspecified human coreferential subject plus unspecified object [RL]
		NDA 139, UAG 46

Comments on the following etymologies:

*?əŋ-mi contains an element (*mi) peculiar to the independent form of 'thou'. We forbear to speculate at the moment as to its origin.

*pə 'thou' is an element that coexists with pUA *?əŋ in Tub, Tak, Tep and Cor. It is homophonous with one of the third person pronoun bases. We can make nothing of this weirdness at the moment.

Tub

*ʔəŋ 'thou, thy': Num *ʔənj{iŋ}; Hop ʔəh-, but ʔəh+yə (accusative) > ʔə(ə)ŋə 'thee', which points to underlying nasal and specifically ŋ, since n + y > ŋ is less likely than ŋ + y > y. Cf also ʔəŋəʔə 'thy mother' < ʔəŋ + yəʔ.

*ʔəŋ-mi 'thou': Hum *ʔənmi (acc); Tak--Se ʔəmiʔ, --Lu ʔom, --Cu ʔəm; Hop ʔəmi (nom); YM *ʔemV in ʔempo, ʔenči.

*taʔ 'we, our': Num *(ʔi)taH-; Tub {ilaʔaŋ}; Tak--Lu čaʔam; Hop ʔitah-.

*pə 'thou': Tub {pi ~ puu}; Tak *pə; Tep *pə, Cor *pe. [TK].

*haa-(a) 'reciprocal': Num *na-; Hop naa-; also frozen on postpositions in Tub (naa-), Cu/Ca (n-), Na (naa-). (b) 'double, twice': Num *na-; Tub naa- ~ na-; Hop naa- ~ na-; Ta na-; YM na-; Hu na-; Na naa-.

*təə- 'unspecified object': Num *tə-; Hop təə-; PP ču-; Na tee-.

The following posposition or pronoun base incorporates the prefix *na(a)- 'reciprocal, double'. It also contains the two postpositional elements *ku (really *hku?) and *yə:

*na-hku(yə) 'self' [postposition]: Num --Ch nahunpə 'oneself' (<*nahku), --NP nahoy (<*nah(k)oyV); Tak--Lu -xay (<..*akVyV or ..*kayV), --Se -nuk (<*-nV(H)k^{W}V or *-nV(H)kV$_{R}$), --Ca/Cu -qi (<..*HkV$_{L}$yV or *-aHkVyV); Hop na(a)hoy (<*na(a)H(k)uyə); Ta ʔanagu (<*ʔa-]na(H)kV$_{R}$), binoy (<*pə-]na(H)kV$_{R}$yV).

[RL NDA 71-100 reconstructs *-na-ko-yə < *-na-k^{W}a-yə; items cited by RL other than those given above are not acceptable cognates phonologically].

Hop na(a)hoy < *na(a)hkuyə, and Hop tohow < *tuhku-wəh 'mountain lion' both illustrate a sound change *hk > h, but two other Hop words kookaŋ^{W}ə 'spider' < *kuhkan, ʔaaqawə 'sunflower' < *ʔahkəə, do not show this reflex.

*nii-waa 'possession, thing owned' ("inanimate classifier noun"): Tak--Se-nu (Kitanemuk -niw); PP ʔəniga; Ta niwa-ra (cf niwa 'to have, own'). [RL UAG 91 *ni-wa].

Demonstratives and Interrogatives

N/S *?i 'this': found throughout the family in numerous combinations. [RL UAG 98 *i]

N/S *hu 'that': Num *?u; Ta hu; YM {hu}; Co {?a}. [RL UAG 98 *u].

N/S *?a 'he, etc' also means 'that' in many languages, e.g. Tak, Hop, Tep, Cor. (cf RL UAG 104)

N/S *wa ~ ma 'yon' (a) *wa: found in Num, Tub, Tak, Hop, Tep, YM; (b) *ma: found in Num, Tak, YM, Cor. [The forms given by RL in Hop -- pam, pl. pama-- do not obviously contain this element, and are probably to be analyzed without it]. This element coexists in various branches of UA and the alternation is to be assigned to the proto-language, unless a semantic separation, which so far escapes us, can be made between *wa and *ma. [RL UAG 99, NCG 375-6 *ma].

N/S *ha 'question marker; interrogative element': found through the family in various combinations. [RL *ha].

N/S *haki ~ *haka 'who': found in all branches of the family, except possibly Tep. [RL UAG 51/120, *haka VH-138 *haki/a].

N/S *hinta 'what': widespread; attestation given earlier under 'final features'. [RL UAG 51/120 *hita].

N/S *ka hinta 'nothing': widespread; attestation given earlier under *hinta. [RL *ka-yə(=ta)].

N/S *ka 'negative': found throughout the family. [RL *ka(-yə)].

The demonstrative elements mentioned above occur with a variety of postpositions to form locative adverbs. Some of the more commonly occurring combinations are given below.

N/S *?i-pa 'here': Tak--Lu ~ ?iva?, --Se ?iip; Hop yeve ~ yepe; Co?iiye. [TK].

S *?i-mi 'here': PP ?iima ~ ?im; Ym ?imi. [TK].

N(/S) *?i-k^{w}a? 'here': (RL NCG p378, UAG p 104)

(N/)S *?i-pa 'here' (RL Overview p 104)

N *?a-pa 'there': Num --SP apaa; Tak--Se ?aap. [TK] ?

S ?a-mi 'there': PP ?am(ai); Ta (h)ámi. [TK] ?

S *wa-mi 'yonder': PP gam(ai); Ta wamí; YM wa?mi. [TK] ?

Quantifiers

Numerals

There are root morphemes for 'one', 'two', and 'three'. All other numerical expressions are complex. pUA numerals can be reconstructed from 'one' to 'five' --after that the systems part ways, but 6-10 are expressed with 1-5 plus additional material. It seems likely the pUA count ended at five. The numerical expressions can be augmented by three different suffixes, *-yu ~ -yo, *-ki, and *-ka (or *-hka). The first two are pUA, the third is limited to Tep, Cor, and T-G. *-ka seems simply to be the pUA accusative marker used with demonstratives now serving as the mark of independent numerals 'two, three, and four'. Neither *-yu/-yo nor *-ki is a requisite part of any numerical expression, yet it is found frozen in some instances. We list the numerical expressions below by gloss.

N/S ONE *saa(ma)(yu): forms are given above under 'final features'. [RL UAG 109 *samayV]. [M-509, VH-65].

N/S TWO *woh(yo) ~ *wah: [M-511, VH-103]. from *woh(-V) are Tub woo; Tak *wohV; Na oo[me; Num *woCoh=san '8'; Ym //wo?[limi// 'twins'. from *woh-yo are Tub wooyo 'both'; Hop looyo[m; YM wooyi. from *woh-ka are PP gook; Ta ?oká; Gu wohká. from *wah-V are Num *waha; Co wá?apʷa; Ym wa?im= 'step='; Num + Tak *wahcan '4'; Tak *wah=mahaa-ʔ '10' (2x5). [RL UAG 109 *woha NUA: *woka SUA].

N/S THREE *paahih(yu): most forms are given above under 'final features'. [M-512, VH-*pahay(V); we say that the second vowel a found in some languages has been assimilated to the first vowel]. ~~[M-511/516]~~ [M-511/516].

N/S FOUR *naa-wh(o)(yo)(ki) ("twice ~~four~~ two"): Tub naa]naaw [R]; Hop naleyom (<*naa-woh-yo-ma); Ta nawó; Hu náuka (<*naa-woh-ka); Na naawi (<*naa-woh-yo); PP gi?ik (<?*naa-woh-yo-ki, with loss of naa-?); YM nayiki (<*naa-woh-yo-ki). [RL UAG 109 *na-wo].

Tak + Num have innovated *wahcan '4' ("2x?"): forms are given under 'final features'. The form may be partly diffused. [M-513].

N/S FIVE *mani(ki): Num *maniki; Ta marí(ki); Gu marihki; YM mamni < [R] *má-mari). [M-515].

There are two new forms of limited distribution:

N *maahaa..: Tub maahay[ciya; Tak *mahaa-ʔ.

S *maakova: NT ma(a)kov(a); Na maakʷil-li; Co [mʷaakʷa '4'!.

Note that all three forms for 'five' contain pUA *ma(a) 'hand'. The second part of each of these formations remains obsure. At this point the system of counting diverges.

SIX NUA has *na-paahi(yu) ("double three"): Num *naa(h)-pahi; Tub naHpaay; Hop //nápaay//. Tak modifies this to *paa-paahi [R].

The prefix *naa- ~ na- found on *naa-woh '4' and *na-paahi '6' is the 'reciprocal' prefix found also on verbs and postpositions. Note that the vowel (of *naa-) is long before a short root vowel and short before a long root vowel.

The expression is "5 + 1" in Co, Na.

SEVEN is "2 x 6" in YM; "4 + 3" in Se; "5 + 2" in Co, Na

EIGHT is "2 x 4" in Num, Se, Hop, PP, Ta, YM; "5 + 3" in Co, Na.

"2 x 4" is probably original, but the actual forms are not phonologically cognate.

NINE is "5 + 4" in Co, Na

TEN is "2 x 5" in Tub, Se, YM; *maCtaC in Co, Na.

"2 & 5" is probably original, though the actual forms are not phonologically cognate. The source of "10" in Co and Na is probably pMZ *maktas '10'. 6, 7, 8, 9 = "5 + 1", "5 + 2" "5 + 3", "5 + 4" may also be borrowed from pMZ.

Other Quantifiers

At least two other quantifiers can be reconstructed.

N WHOLE *suu: Num--SP su[u 'one', Tak--Se huu[kp 'one', --Cup *su-pu 'one'; Hop soosok~soosoyam 'all'. [TK].

N/S MUCH, MANY *mu?i: Tak--Lu muy[uk; PP mu?i; Co mu?i; Hu maire; Na miy[aak. [RL UAG 106 reconstructs *mə(?)i; he says "There is an evident relation to UA forms for big" (our *wəh). It is fudging to reconstruct *mə(?)i rather than *mu?i. Se wə?ə(a), Hop wəəyak are simply reflexes of pUA *wəh. There is no 'lenition' here; there are two separate etyma.]

Incorporated Movement Markers

Languages in all branches of the family have elements that may be incorporated by suffixation to a verb stem to indicate directional motion involved in the action of the verb. In such formations the incorporated motion element is construed as the higher verb of which the initial verb is the complement. The suffixed elements, whenever etymologizable, are lexical verbs of motion, sometimes slightly pared down. Not all are etymologizable, however.

The better attested incorporated movement markers are given below. They are discussed in detail by Crapo (though we do not always agree with him), and summarily by Langacker (UAG p 147).

N/S (1) *=kinma 'come to vb': Num *-(h)ki; Tub -(a)Hkim, -(a)ki(i)m; Na-ki(~w). NUA *kinma 'to come' is hereby also attested in SUA. In light of the Tub form we are not entitled to assume that pUA already had a worn-down form such as *=ki. [RL *-ki; RC *-ki]

N/S (2) *=miya 'go to vb': Num *-HmiCa; Tub -(a)mi[n; Tak--Lu-im; Hu-mie [RL *-məya; RC *-miya 'round about/while going']. This is a basically unmodified form of the pUA verb *miya 'to go'.

N/S (3) *=nəmi 'go around vb-ing': Num *-nəmi Tub -(i)ni[nəm; Hop-nəmi; Hu-ne; Na-nemi [RL *-nəmi; RC *-nəmi 'here and there']. This is an unmodified form of the pUA verb *nəmi 'to live, walk around'.

N/S (4) *=tu.. 'go to vb': Num--Mo -Hutna 'elsewhere'; Tub (not in Voegelin) -lun; Hop -to; Na -ti-w [RC *-tuh]. Crapo suggests deriving this from a pUA verb *tu?(u) 'carry [pl. obj.' attested in Num, Tak, PP, Ta, Co. [M-77]. ~~(RC *-tuh)~~

N[S] (5) *=ra 'go vb-ing': Tub -(a)la; Tak--Lu-la; PP-la (says Crapo; (*=ta..) this is phonologically impossible; is it = Ta?). [RC *-ta]. This element is not from a known lexical verb.

N/S (6) *=mɔna 'vb while going': Tak --Lu -mona; PP -mɔd [RC *-mɔlɔ].
This is basically an unmodified form of the pUA verb *mɔnɔ/a 'to flow'.

In general, the forms of the incorporated movement elements, when viewed across the board, do not entitle us to suppose that at the pUA stage they had specially shortened forms.

T batɬabal

distributive	-(i)niin m	here and there
	-(a)la	going
movement	-(a)min	to vb here and go away
	-(a)Hkin	to vb these and come here
	-(a)gi(i)m	coming along/come and

Some UA suffixes

Both Heath and Langacker have proposed reconstructing a number of suffixes to pUA or one of the 2 major branches. We examine several of these not from the semantic or syntactic point of view but from the phonemic and morphophonemic point of view.

There are two issues raised by one or another of these scholars which we feel are controversial and on which we differ with them. One is the question of ablauting suffixes (UAM 2.1, et passim), the other is the question of lenition. Beyond these points, we feel we can refine the phonological reconstruction of many of the et molo icall valid affixes ro osed b these scholars.

Let us remember that most or all UA morphemes end in vowels or in a final feature that tends to drop in word-final position. "Ablauting suffixes" are basically suffixes that change a preceding morpheme final vowel to short i. (Heath also suggests that in particular languages there may be suffixes that cause morpheme-final vowels to undergo other ablauts. (2.12) Though we may be accused of being unsubtle, it seems clear that a straightforward phonological analysis would simply assume that such 'ablauting' suffixes begin with a vowel (usually i) and that whenever 2 vowels come together through morphological processes, one of the vowels is dropped.

Since pUA has no V_1V_2 clusters, there seems to reason why 'ablauting' suffixes cannot be treated simply as cases of suffixes beginning with a vowel. Phonological rules will then say how the resultant morphophonemic sequences V_1V_2 will be adjusted. For example with a suffix-initial *i we would have:

$$\left\{\begin{matrix} a \\ ɔ \\ i \end{matrix}\right\} + i \rightarrow i$$

o + i → o

u + i → u

Heath points out that in NUA whether a suffix has i-ablaut power can be read off from its phonological shape (i.e. if it has shape *Ca or *Cə it causes i-ablaut; if the vowel is not *a or *ə or the consonant is preaspirated, it doesn't (UAM 2.9);[FN] in SUA this is not possible. Logically, then, we reconstruct the ablauting property as in SUA, as a morpheme-initial vowel. In NUA the system has been leveled out so that the features are predictable and the suffixes now have basic shape CV. This is a straightforward kind of diachronic morphophonemic change, through leveling. The synchronic NUA ablaut then is simply a kind of phonological change that refers to the morpheme boundary that precedes a suffix. The pUA change *t *c before (in our terms) suffixes beginning with *i is well enough supported by Heath (UAM 2.3, though his interpretation differs) and again needs only to refer to "here begins a suffix". We do not deem such a phonological statement to be over-abstract. Furthermore, these are no sure cases of pUA *ti..,: so that possible *ti *ci does not even need to refer to a morpheme boundary.

FN quote: "I see no way to predict i-ablaut in PSUA on phonological or grammatical grounds. In PNUA, on the other hand, i-ablaut seems to be regular with suffixes beginning in *-Ca or *-Cə with unhardened consonant, while other (including *-ʾCa and *-ʾCə) avoid ablaut." He goes on to say, in what seems a totally inconsequential way, "Because of serious discrepancies between PSUA and PNUA in this regard, PUA reconstruction is very difficult." The choice seems clearly to be with what SUA has. This is one of the few cases where SUA seems more archaic than NUA, and may have been the source of Heath's puzzlement, since he seems to share the common prejudice that

NUA languages are basically conservative and SUA languages are basically innovative. This also may partly explain Heath's reluctance (which we share on other grounds) to accept RL's reconstruction of reflexive pronoun prefixes to pUA on the basis of SUA data alone.

We pointed out earlier that the correspondences involving nasals in suffixes do not include NUA *ŋ: SUA *n. What we find are the following correspondences.

NUA	:	SUA
n		r
n		n
r		r

Since N*n/: S*r is pUA *n (traditional *l), and N*r/: S*r is pUA *r, then N*n: S*n, which occurs only in suffixes, may be taken as reflecting pUA *ŋ. We need only refer to the fact that this *ŋ occurs in a suffix, perhaps as the first phoneme. Keeping in mind the two analyses we have made (traditional) (namely, 'ablauting' is suffix-initial vowel and apparent *n suffixes is really *ŋ) we offer the following phonological reconstruction for UA suffixes.

We would like to point again out that vowel clusters are non-canonical for UA languages, or at least pUA, so that such forms as offered by Heath must be modified so as to eliminate these clusters.

Derivational Suffixes

suffixes with initial *i *i wa

N/S *-iwa 'passive' [JH; RL NDA 142-155, 167-9 *-t(ə)-wa)*-tiwa, *-liwa].
Tub -iwa, Hop -iwa, -ilti (<*iwa+ti); Ta -wa; Ym -iwa; Co -iwa; Hu -wa; Na -wa, -o(a). With apical consonant before *-iwa we have: Num-- SP -ht(ə)r; Ta -riwa; Co -riwa; Hu -r wa; Na -l(o). Langacker thinks SUA *-r-iwa comes from pUA *-t(ə)iwa by 'lenition'. Since *ht>r in Ta (one case known),

and since SP has -htɔɔ (< -*ht-iwa) we suppose that *ht may become *r in SUA in suffixes. Alternatively the SP suffix may not be cognate. Hopi, however, with -ilti (*-iwa-ti) seems to support a morpheme containing *t, though in a different order. If we reconstruct *-ht-iwa we have to allow preconsonantal h to drop in suffixes in Hopi, so that -iwa-hti > -iwati > -ilati > -ilti. This is not a bad idea, since it would also make directly comparable such forms as Num *tuhkah = Hop -tka 'below', and Num *ŋankʷah = Hop -ŋaqe ~ -ŋakʷ 'direction/side'. In any event the SUA passives in *-r-iwa are not unambiguous evidence for lenition. The material cited by Langacker does not let us know if the suffix *-riwa has ablauting force.

N/S *-iŋi 'future' [JH *-ni SUA, *-ni NUA; RL UAG 154 *-naki] Tak -- Lu -an; Hop -ni; PP -ini-; YM -ine-.

N/S *-ipaXa 'desiderative-future' [JH *-ipai-, RL UAG 148 *-pa]: Num -- SP -paa (future); Tub -ipa?a-; Tak--Se -iv; Hop -iva (inceptive); YM -ivae.

S *-iya 'causative/indirective' [JH *-iya]: PP //-ida-// ; Hu -iya; Na -iya.

N/S *-ini 'causative-applicative' [JH *-ni NUA, *-li(-ya) SUA; RL UAG 146 *-ni NUA caus., *-li-ya SUA applic.]: Num--SP -ni-; Tak-- Ca -an(i)-; PP -ču-lid; ST -id; Ta -iri-; YM -iria-; Hu -iri-; Na -ili-ya. Tub -ana- 'benefactive' is probably not cognate; the vowels are wrong (contra Heath)

N/S *-ituya 'causative' [JH *-tu(w)a- or *-tu-ya-; RL UAG 145 *-tu-a]: Num *-tu,--SP -?htui; Tak--Se -ču-na (prob -ču-na) Hop -itoy(-na); PP //-ituda// ; YM -itua; Hu -tɔa; Na -itiya. SP ht is unexplained but since this ending is probalby *-tu 'become' (given later) + a transitivizing suffix, and *-tu definitely lenites in Takic, the SP preaspiration is probably secondary.

N/S *-i verb > result of action [JH *-i, RL UAG 63/181 *-i]. This suffix is widespread throughout the family, e.g. Tub, Tak, Hop, PP, YM.

suffixes with other initial vowels

N/S *-uhka 'past' [JH *-hka]: Tub -iwHkaŋ; Tak--Lu -u-k; YM -uk(a).

suffixes with initial consonant

N/S *-hwa verb > action noun [RL UAG 63 *-iwa]: Num --Sh -wa-hpi (agent); Tak --Se -ihʷa-t (instrument); Hop -iw; PP-ig; Ta -wa; Ym -wa.

N *-kə 'intransitive thematic'[JH *-kə-]: Num *ki ~ *hki, Tak--Se -qə-, --Lu -ax-; Hop -kə-.

N/S *-na 'punctual causative' [JH *-ina NUA, *-na SUA: RL UAG 145 *-na]. Num--SP -ina-; Tub -ina; Tak *-ina-; Hop -ina-; PP -n-; Ta -na; Na -na.

N/S *-ca 'distributive causative' [JH *-ica NUA, *-ca SUA: RL UAG 145 *-ca] Num--SP -ica; PP -s-; Ta -ca-; Na -ca-

N *-ta 'intransitive distributive' [JH *-tai- NUA]. Num -- SP -icai-; Hop -ita.

N *-pəə 'mediopassive distributive participle' [JH *-pə-]; RL (UAG 62/181) *-pə]: Tub -ipəə-; Tak *-ivə-; Hop -ivə.

unclear whether vowel initial

The following suffixes may have 'ablauting' properties, but this is uncertain since they are reported only by RL who does not always make the matter clear.

N/S -tu 'become' [RL UAG 45 *-tu]: Num *-tu?a, --SP -tu?i-; Tub -uu?u, Tak--Se -ču?a- ~ -tu?(a); --Ca/Cu -lu; Ta -tu; Ym -tu; Hu -tɔ; Na -ti. The correct reconstruction is probably *-itu, since YM -tu occasionally has an i- property and the corresponding causative is *-itu-ya.

N/S *-wəh 'augmentative (on nouns)': this suffix is attested from all branches of UA but is productive only in some, e.g. Tak *-wəH; Hop -wə (after *n> -ŋʷə). It is common in unanalyzable noun stems in both YM (-wi) and Na (-oo).

Inflexional suffixes occuring on nouns and words in the noun phrase. All the items to be presented below have been discussed by Langacker; while his views on most of them we find reasonable, we are not convinced by all of his morpho-syntactic assignments.

*-ci 'archaic accusative ending used in pronominal system' [RL UAG 82]. This seems restricted to SUA, esp. YM and Na, and may have originated in this branch.

*-hka 'archaic accusative ending with demonstratives/noun modifiers [RL UAG 82/99 *-kV]. Num *-hka; Ym -ka; Hu -k ; Na -ke?. This is also found on independent numerals in Tep, T-G, and C-H as pointed out earlier.

*-aa 'accusative' [RL UAG 77 *-a]. This is based on Num and Tub only, and one must be suspicious of its pUA pedigree.

*-yə 'third singular possessive' (SUA and pUA acc. to RL UAG 83): 'accusative' (NUA). Since we have two other available markers of third singular possessive, namely *?a- and *pə-, and since *-yə in this function is restricted to Tep and C-H, which share other peculiarities such as *-hka on numerals and 'truncation' of verbs, we are doubtful that *-yə anciently marked possessive, and prefer to consider it as the pUA accusative. But we could be wrong. The matter is not resolved.

Supporting forms: Num--Sh -i, --SP -ya; Tub -(y)i; Tak--Se-yə, --Lu -(y)i, Ca-i; Hop -y

*-ta 'absolutive': RL (UAG 61) reconstructs *tə, which we consider reasonable,

V/S -ra verb>action noun: [RL UAG 63 *-ta]: Tak--Lu -la; Tep --ST -ra; Co -ra; Na -lis.

V/S *-ta 'make' [RL UAG 45 *-ta]: widespread in family, e.g. Tak--Lu -la; Hop -ta; YM -ta. The correct reconstruction is probably *-ta, since YM -ta seems to have no i-property.

V/S -wiya 'applicative' [RL UAG 146 *-wi(-ya)]: Num --Mo-wi; PP-gid; Na-wiya.

V/S -ŋaa 'verb> place' [RL UAG 63 *-na]: RL cites Num *-nna; Na -yaa]n, -kaa]n.

V/S -ŋii 'verb> agent' [RL UAG 62 *-ni]: RL cites Sh and Na -ni.

N/S *-ci 'diminutive (on nouns)': this suffix is attested from all branches of UA, but productively only in certain branches, among them Num -ci; Hop -ci; Na -ciin.

pUA items containing *-ci include

*paa(-ci) 'eBr'

*ko(-ci) 'eSi'

*yə?(-ci) 'aunt'< 'Mo'

*wo?aH(-ci) 'grasshopper'

*taapun(-ci) 'rabbit'

Num *ta-ci 'star' (<*taa-ci 'little sun')

Tak *nəH-ci-ʔa 'old woman' (<*noh-ci 'little egg')

Because of these often pUA-level reconstructions, we find that Langacker's hypothesis of a pUA diminative suffix *-ci-ma (UAG 58) highly unlikely. -ma (RL UAG 81) by us maa) as a diminutive suffix occurs in Tak only. Na-ciin must be from *-cuuNV (<*-ci + something), since *c > s / _ i in Nahua.

an line underline not hyphen

though probably wrong, and likns it to his own creation, pUA *tə 'be', which we consider grotesque. This is an example of the extreme reductionism, Boppesque in feeling, which Langacker is prone to, and which the UA field does not need now and will probably not need in the future. Apart from RL's syntactic arguments that languages showing -ta directly really show *tə 'absolutive' + *a 'accusative', we wish to point out that a pUA *-ta 'absolutive' can phonologically yield most of the known UA absolutives, especially those which RL does not consider to contain an old accusative morpheme.

In Tub final short vowels are dropped, long vowels are shortened. Thus Tub -t~-l< *-ta is acceptable. (This one mora loss by the way, is why Tub -a 'accusative' must be from *-aa).

In Tak final short vowels are dropped in env. VC_#, which is why Se -č and Cupan t~čwə can acceptably derive from *-ta; of course Cupan has ta~cawa in env. V_#

Hop -t, YM -ta, and Na -λi can all derive straightforwardly from pUA *-ta.

Num --Ch has a nominative suffix -tə on demonstratives, which can less easily be gotten from *-ta.

It must also be conceded that Tub -l/-t, and Hop -t, and Se -t/-č/-c could equally well have come from *-tə. But if pUA *hinta 'what/something' contains the pUA absolutive suffix, then Hop, with hihta, supports *-ta for pUA.

In conclusion, we do not wish to deny that the absolutive may have had a vanant *tə; we only wish to cast doubt on the identification of a segment *a marking 'accusative'.

*-mə 'plural': this ubiquitous element needs no discussion, except to point out that it is still unclear whether this morpheme contains a long vowel or a final feature. [RL (UAG 80) *mə].

*-waa 'possessed noun': [RL UAG 88, NDA 113-4 *wa]: e.g. Num--Ch-wa (body parts, plant parts); Tep--NT -ga; Ym-wa; Na //-wa//. Vowel was probably long.

More on Heath (NA, UAM)

We would like to point out that our phonological reconstruction, if correct, renders unacceptable certain equations of a morphophonemic nature suggested by Heath.

(1) For example, in Lu, kʷoot-ax- (NA 213) must come from *kʷəHtə, and kʷot-ax- must represent analogical elimination of vowel length. NUA *kʷətə would be kʷolo* in Lu, and there are no two ways about it. Diachronically, there is no such thing in Lu as lengthening of short stressed vowels in open syllables (contra UAM 3.2).

(2) Another unlikelihood is that Hop ?əwə (NA 213) could be from *CVhCV, since UA preconsonantal *n or *h is reflected in Hopi as preaspiration of stops and /c/ and vowel length with continuants (including /s/).

(3) We have shown (contra Heath NA 213) that resonants as well as obstruents may be preceded by *n and/or *h.

Heath also makes some incorrect diachronic claims about Tub.

(4a) In UAM 2.13 Heath says: "...Tub changed all final *i's in verb stems and verbal suffixes to another vowel, usually *a." This is false.

(4b) In UAM 1.2 he says: "Tub /-CVCV-/ verbs normally become CV:CV-...". This also is false.

The truth about Tub verbs is as follows:

(a) $CV_1?V_1$ CVV?

*hi?i 'to drink' → ?ii?

*kə?ə 'to bite' → kəə?

*ya?a 'to yearn for' → yaa?

(b) final short vowel otherwise drops

(i): Pre Tub *CVCV

*sa?i 'to shit' → sa?

*si?a 'to piss' → si?

*wənə 'to stand' → wən 'be

*ŋaŋa 'to cry' → ~~haŋ~~ haŋ

*k^{w}asə 'to ripen' → wəs

*taŋa 'to kick' → taŋ

*katə 'to sit' → hal? 'live'

*miya 'to go' → miy

*kinma 'to come' → kim

*pita 'to arrive' → pəl

*təwa 'to see' → təw 'find'

(ii): pre Tub *C̄VCV̆

*wiiwV 'to ladle mush' → wiiw

*waa?V 'to broil' → waa?

*waaki 'to dry' → waak

NUA *puhya 'to be full' → puuy

NUA *?əhya 'to steal' → ?əəy

*siipa 'to whittle' → siip

*saaki 'to roast' → saak

*?aasi 'to bathe' → ?aas

*puuna 'to tie' → puun

~~*uyuki~~ 'to fall' → yunk

*yuuki

< *tuus1/u 'to grind' → tuus

(iii): pre Tub *CVCCV̆

*təhka 'to eat' → təHk

*yanca 'to sit' → yanc

~~*me[a]-ka~~ 'to kill' → ~~m-?[a]k~~

*mə?[a]-ka mə́ʔ[ə]k

(iv): other

*pa?[i]-ki-ŋa 'to hit' → pa?[a]kin

*puhya-ki 'to blow' → pusk

(c) final long vowel loses one mora

*cuhpaa 'to go out' → cuHpa

*tənwaa 'to name-call' → tiŋwa

*makaa 'to give' → maha

*wəpaa 'to whip' → wupa(a?)

(d) ? final? inhibits any loss

(denominal)

*nəpa-? 'to snow' → nəpa?

(deadjectival)

*pəŋ-? 'to be heavy' → pəŋə?

Heath in UAM 2.4 says "Syncope of unablauted vowels is uncommon [in YM and Hop]". This is certainly not so in noun stems, where dropping of short unaccented vowel occurs in Hopi wherever possible, and in YM under at least three typical circumstances (compounding, adding postpositions, and finally (only i in 3 + syllable words).

Two cruxes in Diachronic Nahua Phonology

There are two { ? cruxes / conceal / difficult questions } in the historical phonology of Nahua.

(1) under what conditions does the original final vowel drop from ~~one~~ the underlying form of nouns and adjectives? (All but a handful of Na verbs contain a final underlying vowel).

(2) what is the original of Na saltillo?

Once we know ~~this~~ the answers to these questions we can use Na for reconstruction of ~~one~~ the relevant environments and elements.

Half an answer can immediately be given to the question of vowel-drop in nouns and adjectives. in the absolutive form

We can divide Na nouns into those whose first vowel is etymologically short and those whose first vowel is etymologically long. Of those whose first vowel is long, we find that the second vowel drops if in pUA it is short, but that the second vowel does **not** drop (rather it shows up as a short vowel) if in pUA it is long, or followed by a final feature.

The data cited in the appendix (§____) illustrates this rule. The implication of this rule is that pSUA also had minimally both long and short vowels in stem-final position of nouns and adjectives.

Some stems known only from SUA can consequently be reconstructed with final *-VX if Na evidence supports it. If Na has a reflex of stem-final complex vowels, other SUA languages may also have it.

kʷiika-λ 'song' would be *kʷiika-H, a verb stem with a nominalizing suffix

eewa-λ SUA 'skin' (pUA *pəə) would be *pəə-waX. This contains the possessed noun suffix pUA *-waa.

oomi-λ SUA 'bone' (pUA *?oh) would be *?oh-məX and would support vowel length for the pUA plural morpheme, now *-məə.

When it comes to Na noun and adjective stems whose first vowel is etymologically short, however, the situation is different, and puzzling. Here, final vowels drop, or not, seemingly independently of whether the pNUA form ended in a simple or complex vowel. It seems that pUA medial clusters or complex final vowels are not proof against final vowel drop, and their absence, conversely, does not ensure vowel drop, either. Nevertheless, the simplest hypothesis would seem to be that pre-Na had noun/adjective stems that ended in either long or short vowel, and that from these final vowels ~~are~~ one mora was lost. This is the way preNa stems of shape *CV̄CV can be accounted for. This would create the following agreements and discrepancies between pUA as we reconstruct it up to now and pre-Na.

agreements for *CVCV stems only

NA	pre-Na		pUA
ač-λi	aʧ̆i	'seed'	* pahci
wic-λi	wiʧ̆V	'thorn'	* wihcu/a
too-ka-λ	tVwV̆-kā	'name'	* tənwa (reuse)
meλa-λ	metā	'quern'	* mataa
saka-λ	sakā	'grass'	* sakaH (Tak)
oko-λ	okō	'pine'	* wokon
yaka-λ	yakā	'nose'	* yakan
e?eka-λ	ekā	'wind'	* hə(ə)kan
nene-piil-li	nenē	'tongue'	~~na/eyin~~ *nᵃ/əŋin
atemi-λ	?atē-mē	'louse'	* ?atəH (Hop)

discrepancies for *CVCV stems

Na	pre-Na		pUA up to now	revised pUA
λak-λi	takă	'body'	*takan	revised *taka
kal-li	kalĭ	'house'	*kannii	revised *kanni
λan-λi	tamĕ	'tooth'	*taman	no revision possible
mis-λi	măsă	'cat'	*musan (Num)	revised *musa
keč-λi	kaʧĭ	'neck'	*kutaa	revised *kutaa~*kuc-i?
šiwi-λ	siwī	'plant'	*siiwi 'onion'	revised *siiwi~*siwii
soki-λ	sokī	'mud'	*soko (Num)	revised *sokii~*sokoo
kama-λ	kamā	'mouth'	*kamma (Num)	revised *kaŋmaa
kʷiλa-λ	kʷitā	'shit'	*kʷita..	revised *kʷita-H
naŋaka-λ	nakā	'ear'	*nanka	revised *nanka-H

(additional discrepancies for *CVCV stems)

λi	~~šuk-i~~	sīkă	'navel'	*siikun (Num)	revised *siiku?
	mon-λi	monĕ	'SoLa'	*mo?oŋa (Hop)	revised *mo?oŋa

We will discuss the discrepancies by type:

soki-λ 'mud' and kama-λ 'mouth' may come from pUA forms with final long vowel, since the only other evidence for final vowel in these forms is from Num, which has lost the *V̄:V̆ contrast.

kʷiλa-λ 'shit' may come from *kʷita-H since the pUA root *kʷita is a verb root.

-H would be a nominalizing suffix. ~~-H would be a nominalizing suffix.~~

naŋaka-λ 'mushroom' may come from *nanka-H 'ear, being a nominalization of a root which is verbal 'to hear' in some UA languages, though originally it seems to have been a noun root.

šiwi-λ 'plant' may come from *siwii, a putative variant of *siiwi, just as there is variation in *?oŋa~?oŋaa 'salt' and *naawi~*nawii 'girl'.

šiik-λi 'navel': the Num form points to final *-n, but this may be a Num innovation.

mon-λi 'SoLa': the Hop form points to final *-n, but this may be a Hop innovation, copied from the medial nasal.

kal-li 'house': only Tub (hanii-l) supports final long V, and this may be by syllable balance after Tub loss of first *n.

λan-λi 'tooth': NUA is solidly *taman, so an intermediate pre-Na must have innovated tamĕ (which may be on the analogy of the plural, pUA *maə. A problem here is that Na oomi-λ 'bone' and atemi-λ 'louse' seem to support pUA *-maa 'plural'. Maybe the pUA plural was *-maə with long vowel stems and *-ma with short vowel stems. But this is unlikely, since syllable balance seems rather to operate in remote UA stages, e.g.

*naa-~*na- 'doubled' (*na-paahih '6', *naa-woh '4').

*nawii~*naawi

*siwii~*siiwi

?oŋaa~?ooŋa

keč-λi 'neck' may come from pUA *kutaa plus a nominalizing suffix *-i, yielding preNa *kuc-i, but why this should have happened is unclear.

λak-λi 'body': the evidence for final *n on *taakan is clear, but for *taka(n), the other variant, it is unclear, and reconstructing *takan may be nothing more than the use of analogy by the linguist. We can live with pUA *taka.

mis-λi 'cat': the evidence for final *n is from Num only, and pUA may have been simply *musa.

The above discussion should have made it clear that in most cases where Na presupposes a simple or complex (→ *long) final vowel, the evidence from other UA languages is compatible with it (though not obviously, else we would not have undertaken this discussion) assuming that pUA had something from which the preNa form was directly derivable. It also suggests that final *n may be a suffix in some cases.

In any event, if the above interpretation is true, pre-Na preserved a contrast between stem final $\breve{V}$ and $\overline{V}$, the latter reflecting pUA *VV, *Vh, and *Vn.

The rule given in Campbell and Langacker that without consideration for original length final high vowels drop and low vowels don't, does not work for the data cited here; though all their data is cited here, there is more data that is relevant and it is also cited here.

Relatively few noun stems in Na end in underlying long vowel. Our explanation is as follows.

(a) preNa final short stem vowel is dropped

(b) preNa final long stem vowel is shortened

(c) pUA *a or *aa becomes Na aa after w in a second syllable

(d) other final long vowels represent contractions of another syllable beginning with a Semi vowel.

In many cases, where the vowel is oo, it is assumed to be from pUA *-wəh 'augmentative' contracted with the preceding stem final vowel.

A. CVCV]V_2 drops — stem-final vowels in Nahua (nouns and adjectives) — up

pUA	cSon	Nah (<TK field notes or ⟨colonial⟩)	
	(<*kutaa+iHpi)		
*kutaa	*kucV^{H}(pi)-ta	kečλi	neck
*takaʔ	*taka-ta	⟨λak-λi⟩	body
*kanni	*kaCri-ta	kal-li	house
*taman	*tame-ta	λan-λi	tooth
	*maca-ta	meθ-λi	foot
	*nasi-ta	neš-λi	ashes
	*sugu-ta	sEn-λi	corn
*pahci	*vaci-ta	ač-λi; ⟨ači=⟩	seed
*wihcu/a	*wicu/a-ta	wiθ-λi	thorn
	*tahi-ta	λE(E)-λ	fire
	*mahi-ta	me-λ	agave
*tənwa	*tewa-KA	tooka(yi-λ)	name
*musaʔ ('beard')	*musa-ta	mis-λi	cat

PU: cSon means common Sonoran reconstructed without reference to final features reflected in Na.

B. CVCV]V_2 stays

*toona/i (raise)	toona-ra-ta (SUA dimin *-ri)	toona-l-li (space)	day
*səpə..	*seve-ta	see-λ; ✓see	cold (n)
	*[se-]seve-ka[R]	sese(e)-k	cold (a)
(<*kanmaX?)	*peta-ta (<MZ)	peλa-λ	mat
	*huHpa-ta	epa-λ	skunk
kanma (Num)	kama-ta	kama-λ	mouth
(Ta, Hu)	kiri-ta	kili-λ	herb
Tep	*kuʔawi-ta	k^{w}awi-λ	tree
*k^{w}ita.. (*k^{w}itaX?)	k^{w}ita-ta	k^{w}iλa-λ	shit
*mataa	*mata-ta	meλa-λ	quern
*sakaH ('willow' Tak)	*saka-ta	saka-λ	grass
*wokon	*woko-ta	oko-λ	pine
*yakaa	*yaka-ta	yaka-λ	nose
*haʔ(ə)kan	*he(e)ka-ta	e?]eka-λ[R]	wind
*soko (Num)	*sokV-ta (<*sokVV?)	soki-λ	mud
nanka 'ear'	*naka-ta	naka-s-λi	ear
(*nankaX?)		naʔnaka-λ [R]	mushroom
		cf. naka-λ	meat/flesh
NUA nayin n yi Tub	nəŋi=	nene-piil-li	tongue
?atəH	?ate-me-ta (*pl.)	aatemi-	louse

NUA nayin Tub ~ SUA nəŋi

*pə(h)taH	*vete-ka	eti(i)-k	heavy
	*tekpu-NV..	tekpi-n	flea

C. $\breve{V}_1$ drops under prefixation

*kuHpa.. 'head hair'	*vé-kupa-ta	ikpa-λ	thread
	*vé-kupa-ko	ikpa-k	on
	*vé-sawa-ta	iswa-λ	leaf
*sutVn	*vé-sute-ta	iste-λ	nail
*kʷasiə..	*vé-kʷase-TV	ikʷsi-tok; ikʷsi vb	cooked/ripe get___
*tosa 'white'	*vé-tosa-ta	{ ista-λ	salt
		{ istaak	white
*kapsii 'thigh'	*vé-kăsi-ta	ikši-λ	foot/leg

D. $\bar{C}\breve{V}CV$ V_2 drops

*?anci	*?aasi-ka	aaš-ka	possession
*maaca	*meeca-ta	meeč-λi	moon
	*naana-ta	naan-λi	Mo
*siiku	*siiku-ta	siik-λi	navel
taani..	*teeni-ta	teen-λi	mouth
*tuusi	*tuusi-ta	tEEš-λi	flour
*paa-ci	*vaaci-ta	aač-λi	eBr
*punci	*vuusi-ta	iiš-λi	eye/face
*taapun(-ci)	*taavuci-ta		
	→tooci-ta	tooc-λi	rabbit
	SUA		
*naapəH	naavo *naavo-ci-ta	nooc-λi	prickly pear
	*naavo-PA..	no?-pal-li	cactus

*piXya	*piiya-we-ta	⟨pi?-λi⟩	eSi
*kʷaa(?a)	*kʷaa(?a)-we-ta	kʷaaw-λi	eagle
	(Tepi, Tar)		
*poh	*vo(o)-we-ta	o?-λi	road
*su?wih	*su?wi-ta	⟨si?-λi⟩	jackrabbit
*su?	*su?-we-ta	si?-λi	GrMo
*siHYa..	*siYa-ra-ta	šaa-l-li	sand

D′ $\bar{C}\breve{V}CV$ ⌈V_2 drops, V_1 shortens

*cohni	*coni-ta	con-λi	hair
*mo?oma	*mo?one-ta	mon-λi	SiL
*mo?	*mo(?)=	mo=	DiL, etc

E. $\bar{C}\breve{V}CV$ ⌈V_2 stays

*kʷikaX	*kʷiika-ta	kʷiika-λ	song
*taakan	*taaka-ta	λaaka-λ	man
*paakaa	*vaaka-ta	aaka-λ	reed
*pəə	*veewa-ta	eewa-λ	skin
*piipah	*viiva-ta	i(i)ya-λ	tobacco
*saanah	*saara-ka	sasaali-k; (saal-iwi vers;	sticky saal-owa caus)
*?oh	*?oo-me-ta	oomi-λ	bone
*?aatVh (or *?aawVtVh)	*?aata-ta	⟨aλa-λ⟩	spearthrower
*siiwi 'onion'	*siiwi-ta	šiwi-λ	plant
		šo=naka-λ	onion

~siiwii ?

? *kuhŋa 'Hu'	*vé-kuuna-w -ta	iknoo-λ	bereft
*ciipuH	*ciciivu-ka [R]	čičii-k	bitter

F. C$\breve{V}$CV$\begin{bmatrix}\\ V_2\end{bmatrix}$ is long

*konwa	*kowa-ta	kowaa-λ	snake
*sunwaa	*suwa-tá	siwaa-λ; -s(o)waa=	woman
*maasa/oH	*maaso-ta	masaa-λ	deer
*kopa	*kova	k^{w}aa(yi)	forehead
*?ahya	*?aaya-we-ta	aaya-kač-λi	rattle
		aayo(o)-λ	turtle
tuk$^{u}_{o}$ri	*tuk$^{u}_{o}$ri-we-ta	tekoloo-	owl
*?ahya?	?aaya?we-ta	ayo?-λi	squash
taapih ~ taapa	teHpV-YU-ta cf TePi *tavə-la	tepee-λ	mountain/land
taaso..	*teeso(-we)-ta	ostoo-λ	cave

G. monosyllabic roots

*paa	*vaa-ta	aa-λ	water
*maa (~mah)	*maa	maa(yi)	hand
*suu(?V)	*suu(?V)≈	sii-λal-in	star
~~tah/Ho~~	*taa-ta	λaa-λi	uncle

*tah Hop

*tən	*te-ta	*te-	stone
?also	*te-we-ta	*teoo-λ	god
*tap	*ta-tA	λa-lwa-λ	sinew

antecedent form unclear

Na	es-λi	blood	(UA *?ənwa, *?əra)
Na	šooči-λ	flower	(UA *səə?a ~ *səəwa)

Saltillo in Nahua

Saltillo is the conventional name given to a Na phoneme that occurs only syllable-finally (including word-finally). In classical Na and some modern dialects it is pronounced [?]. In most modern dialects it is pronounced [h]. This dual pronunciation may be very old; CN does not necessarily represent the earliest pronunciation. Saltillo bears no direct relation to pUA *ʔ or *h, both of which are lost in Na initially, between vowels, and finally. When the etymology of a word containing Na Saltillo is clear, it seems that it is a reflex of *w (or *y) preceded by some other consonant (which may have been *ʔ in its role as just another consonant)

We examine the evidence below.

Na	si?-λi	'hare'	*su?wih-ta	
Na	si?-λi	'GrMo'	*su?-wəh-ta	(+ augm.)
Na	o?-λi	'road'	*poh-wəh-ta	(+ augm.)
Na	a(a)yo?-λi	'squash'	*?ahya-?-wəh-ta	(+augm)
Na	pi?-λi	'eSi'	*piiya-wəh-ta	(+ augm)
		or maybe	*piCya-ta	
Na	no?-pal-li	'prickly pear plant'	*naa[v]o-w h-PA	
	(cf nooč-λi	'prickly pear fruit'	*naa[v]o-ci-ta	
	and tooc-λi	'rabbit'	*taa[v]u-ci-ta)	

in Na kwaaw-λi 'eagle' < *k^waa?a-wəh-ta (+ augm)
the *ʔ is interrocalic and thus drops.

in Na aayo(o)-λ 'turtle' *?ahya-wəh-ta (+ augm)
the stem does not end in *H.

in Na tekoloo-λ 'owl' < *tukuri-wəh-ta (+ augm)
the stem does not end *H.

in Na ostoo-λ 'cave' < *taaso-wəh-ta (+ augm)
the stem does not end in *H.

in Na iknoo-λ 'bereft' *kuhya-wəh-ta (+augm)
the stem does not end in *H.

	pUA	preNa	Na
*	su?wih	suCwi	si?
*	su?wəh	suCwe	si?
*	poh-wəh	voCwe	o?
*	?ahya?-w h	āyaCwe	aayo?
*	piCya	piCya	pi?
or *	piiya-wəh	piCwe	
*	naa[v]oH-w h	noCwe	no?

At this point we wish to summarize what we believe to be the main features of pUA phonology as they can be reconstructed in the light of the previously discussed material.

The consonants of pUA were

p	t	c	k	k^w	ʔ
		s			h
m	n				
		y		w	
	-r				

The vowels of pUA were

i ə u

o

a

Morpheme canons are

roots			suffixes	
#	CV..CV	CVCV..	-CV..	-VCV..
CVV_1	CV..CVV_1	CVV_1CV..	-hCV..	-VhCV..
CVh	CV..CVh	CVhCV..	-nCV..	-VnCV..
CVn	CV..CVn	CVnCV..		
CV?	#	CV?CV..		

syllable canon is consequently CV(H)

Notes

*s *h *? *-r do not occur preceded by *h or *n

nouns of shape CVCV are not reconstructable,

only *CVCVV or *CVVCV.

verbs may end in V or VV_1 only

no monosyllabic verb roots are reconstructable.

most roots consist of 2 syllables

there are no sure cases of *..ti..., which may explain the pUA morphophonemic rule *t → *c/ _.i (. means morpheme boundary)

A few nouns of shape CVT are reconstructed, primarily on the evidence of Tub.

*wip 'fat' (Tub, Se) *pok 'road' (Tub, Se)

*tap 'sinew' (Tub)

*səp 'cold' (Tub)

cf. also *kapsii 'thigh' (Tub)

S *tekpu 'flea' (based on Na.)

*muk-pi 'nose'

Conceivably all the above stems contain a morpheme boundary between the two medial consonants, and this may be responsible for the cluster being unassimilated in some languages.

(1) *kapsii yields Tub hapsii-l; other languages point to *kahsi

(2) *tekpu yields Na tekpin; other SUA languages point to *teHpu

(e) *muk-piX: Tub points to *muhpih

Tak points to *muupii

Num points to *muupih

pUA *-hC- vs. *-nC-

One might rightly be uneasy about reconstructing both *hC and *nC to pNUA (and therefore pUA) on the basis of data from Num and Tub only. However, certain *hC: *nC pairs have distinct reflexes in other UA languages (as shown in the following sound correspondence charts), though phonetic nasals never appear. These reflexes support the *hC: *nC distinction for pUA, though they do not directly help establish the phonetic realities.

*hc and *nc have distinct reflexes in (Num, Tub,) Hop, Tep, Ta-Gu, YM, Na.

*ht and *nt have distinct reflexes in (Num, Tub,) Tak, Ta

*nn and *n have distinct reflexes in (Num), Tep, YM

e.g. *tannah 'foot' → YM táaruk 'roadrunner'; PP tad (via *taara)

*kanni 'house' YM káari

*nm and *m have distinct reflexes in (Num), YM

e.g. *kinma 'to come' YM kiimu but

*kunmi 'to nibble' YM kuume; PP kuum (via *kumV)

There is no contrast between *ns and *nc in pUA; it is nevertheless possible that both *//ns// and *//nc// can be posited for pUA.

	-HC-	O = number of instances			
p	hp 6	np 1	?p 1	(kp) 2	
t	ht 2	nt 2	//?.t// 5	(p.t)	(k.t)
c	hc 7	nc 1	?c 2		
k	hk 3>5	nk 1>5	?k 2		
k^w	hk^w 1				
m	//h.m// 1	nm 1			
n		nn 2			
y	hy 6				
w		nw 1	?w 1		
y	hy 8	//n.y// 1	?y 1		
s			?s 1	(ps) 1	

certain medial contrasts are supported by Num only

$*V_1y$ vs. *hy

$*V_1y$ vs. *hy

We expect evidence for *hw to surface sometime.

The evidence for clusters of shape HR where H = *h or *n and R= *m *n *y *w suggests that such clusters did not show a contrast in the first element between *h and *n. For certain HR clusters there seems general support for *hR, for others for *nR, and for others the evidence is ambiguous, which is what would be expected if there was no contrast in this context.

We do not, however, wish to claim that such was indeed the case in pUA; we merely suggest that it may have been, and we go on to reconstruct each cluster with what seems to be the phonetically indicated (via its reflexes) preconsonantal element. We would not be dismayed to find clear evidence for a contrast *nw: *hw or *ny;*hy, etc. The clusters we reconstruct are *nm, *nn, *nw, *hy, *hy.

reflexes of HHR clusters

*kunmi				
*kinma	*tannah	*cohŋi	*?ahya	*konwa
*tonmo	*kanni(i)	*cuhŋi/u		*ŋanwa

phonetically	*nm	*nn	*hŋ	*hy	*hw
phonemically (?)	/Hm/	/Hn/	/Hŋ/	/Hy/	/Hw/
Num	nm	hn	hŋ	hy	
Tub	←m	←n	? Vŋ	Vy	ŋ^{w}
Tak	m		Vŋ	Vy	ŋ^{w}
Hop	m	n	Vŋ	Vy	ŋ^{w}
PP		V_1r			V̆]w
YM	V_1m	V_1r	Vŋ	Vy	V̆]w
Na		l			

Evidence for vowel length in pUA.

A. In the first vowel:

The following languages reflect pUA vowel length in the first syllable straightforwardly:

Tub; Tak--Lu, Se; Hop; YM Na.

PP (and Gu) reflect it indirectly, as will be shown in §. This means that all subfamilies of UA except Num and Tub and possibly C-H support the reconstruction of pUA vowel length.

Examples of pUA *VV_1 abound in the examples previously cited in this study.

Morpheme-final long vowels in polysyllables are supported directly only by Tub and Tak. They may be present morphophonemically in Hopi, and available data suggests such to be the case, but show it only sporadically. Na ~~may~~ provides evidence that certain polysyllabic stems end in *-VV, *-Vh, or *-Vn. No other languages with $\bar{V}$ show underlying $\bar{V}$ at the ends of polysyllabic stems, as far as we have been able to determine, but such evidence may be forthcoming in the future.

The evidence for final VV_1 in nouns can be found under 'final features'. The evidence for final VV_1 in verbs is direct only in Tub. In Tub, in verbs, a final *V drops, and a final *$\bar{V}$ is shortened, but not dropped. We expect Tak and Hop possibly to show evidence for the contrast V̆#: $\bar{V}$# in verbs, but cannot pull such evidence out from the available data.

Evidence for final V in posyllylables

	nouns		verbs	
	*V	*V̄	*V	*V̄
Tub	V	VV_1	∅	V
Tak	V	VV_1	V	?
Hop	V	VV_1/with suffix	V	V
YM	V	?	V	V
Na	V droppable	V unDroppable	V	V

Na shows evidence for stem final complex vowels (*VV, *Vh, *Vn) by the fact that they do not drop in noun and adjective stems -- but Na does not provide evidence of any distinctions among final complex vowels.

An example of an unrelated language that shows many of the phonological properties we attribute to pUA, let us look at Xinca, an isolated small family of SE Guatemala.

Data are from the dialect of Guazacapán

Consonants

p	t		č	k	
p'	t'	ƛ'	č'	k'	?
	ɬ	s	š		h
ʔw	-l'	-r'	-y'		
w		-r	y		
m	n				
ʔm	-n'				

vowels

i	ə	u
e		o
	a	

V_1V_1

s is from earlier *ɬ
š is from earlier *s
ɬ is from earlier *l

Xinca stems may begin or end with one consonant only, and may have 1 or 2 consonants intervocalically. Only certain consonants regularly occur in final position: -?, -h, -n, -y, -ɬ, -k (-p, -t rarely). A long vowel may not occur before 2 consants, or a final consonant.

Xinca has glottalized consonants which have no analogue in UA but note the similarities:

(1) only certain consonants may occur stem or word final
(2) r occurs, but not initially
(3) no initial or final clusters
(4) up to 2 consonants medially
(5) no long V before syllable-closing consonant

Xi	UA
P	P
t	t
*c	c
c	-
k(#)	k
-	k^w
?(#)	?
*s	s
h‿(#)	h‿(#)
w	w
y‿(#)	y
-r	-r
m	m
n‿(#)	n‿(#)
*l‿(#)	-
-	ɬ

Xi	UA
i	i
e	-
a	a
o	o
u	u
ə	ə

The purpose of this comparison is not to suggest that UA and Xinca are related, but rather to show that our postulated pUA system is quite like that of a natural language. Needless to say, our reconstruction in no way depends on Xinca as a model.

pUA may have had any number of possible final consonants. But such are found only in Tub (and sometimes Se) in monosyllabic roots (nominal, mainly).

	'sinew'	'fat'	'cold'
*p	*tap	*wip	*sap
*t			
*c			
*k	*pak	'road'	
*?	*ta?	'we'	
*s			
*h			
*m			
*n			

	'thou'
*y	*?ay
*r	
*w	
*y	

Summary of Sound Correspondences

	initial and after H											
pUA	*p	*t	*c	*k	*k^w	*s	*m	*#n/-n-	*ŋ	*w	*y	*h
Num	p	t	c;y	k	k^w	s	m	n	#n/ŋ	w	y	?	h
Tub	p	t	c;y	k;h	w	s	m	n	#n/ŋ	w	y	?	ø/h
Tak	p	t	c;y	k;q	k^w	s	m	n	ŋ	w	y	?	h
Hop	p	t	c;y	k;q	k^w	s	m	n	ŋ	w	y	?	h
Tep	#v/p	t	s	k	b	h	m	n/r	n	w	y	?	H
Ta-Gu	p	t	c	k	w	s	m	n/r	n	w	y	?	h
Ca	#v/p	t	c	k	b^w	s	m	n/r	n	w	y	?	h
Azt	#ø/p	t;λ	c;č	k	k^w	s;š	m	n;l	n	w	y	ø	ø

*c: but see *nc which > **ns> :s in all except Tak, Tub

*w: but see *nw

in NUA *c> y /ə(H)_

in SUA all medial consonants have single reflexes except that p/V̆_≠p/VH_

← medial after V, V̄ : *hp, *ht, *hc, *hk, *hkʷ ; *np, *nt, *nc, *nk, *(nkʷ) ; *nm, *nn, *nw, *nʸ ; *hʸ, *hs, *hʷ ← lower

*[ɣ]

pUA	*p	*r	*V]C	*V]hT	*V]nT	*V]nR	*V]hR	*V]:C	*nw	*nc
Num	p	?	C	**hT**	nT	nN	hR	C	nw,hw	?s
Tub	[b]	l	C	TT	nT	N	:R	:C	gʷ;w	[nz]
Tak	v	ɣ	C	HT(>:T)	HT(>:T)	N	:R	:C	gʷ(g,w)	Hc (>:c)
Hop	v	r	C	**hT**	hT	N	:R	:C	gʷ	:s
Tep	v	r	:C	:T	:T	R	R	C	w	h
T-G	p	r	**hC**	hT	hT	R	R	C	w	s
YM	v	r	C	T	T	R	:R	:C	w	:s
Azt	∅	l	c	T	T	R	:R	:C	w	:s/:š

(in Lu *ht > t, but nt > :t)

Tep: *nn → V_1r ; *nm → m

T-G: *nʸ → n ; *nn → :r ; *nm → :m ; *nw → w

NUA: medial consonants after V,V

pUA	*t	*c	*k	*kʷ	*s	*y
Num	t	c;∅	k	kʷ	hs;h	∅
Tub	l	[z];y	k;h	w	s	y
Tak	ɣ	s;y	k;x	?	s	y
Hop	t	c;y	k;q	kʷ	s	y

(Se c : Cup l) (Se g : Cup x)

in NUA, i.e. pNum, Tub, pTak, and Hop medial *m *n *ʸ *w *? *h after V,V̄ have the same reflexes as after H: see previous chart

vowels

pUA	*i	*ə	*u	*o	*a
Num	i	ə	u	o	a;a
Tub	i	ə	u	o	a
Tak	i	ə	u	~~o~~	a
Hop	i	ə	o	~~o~~	a
Tep	i	ə	u	o	a
Ta-Gu	i	e	u	o	a
Ca	i	e	u	o	a
Azt	i	e	i,e	o	a;e

Coran reflexes: without accounting for V length and preconsonantal features, the regular correspondences for pUA phonemes in Coran is as follows:

consonants

p	h;p
t	t
c	c
k	k
kʷ	kʷ
s	s
m	m
-	-/r (m-dial)
y	n
w	w
y	y
?	?
h	∅
r	-

vowels

i	i
ə	e
u	ə
o	u
a	a;e

Undealt-with matters

More regular sound correspondences no doubt remain to be recognized. We trust they will not modify the set of pUA phonemes we propose here, but some additional details of distribution may be worked out. As an example, we cite the following pUA noun stems reconstructed earlier in this study:

*sahpə 'belly'

*paawəh 'blood/red'

*?aatəh 'spear thrower'

*sawən 'unripe'

*?ahpə '(Gr)Fa'

All these etyma show the vowel sequencing a...ə in Numic; a...a in all other subfamilies. The extra-Numic forms can be explained through leveling and general initial stress. The Num forms, which preserve the pUA scheme, probably owe it to predominant pNum second-mora stress.

(pp 128-135)

Sonoran Languages

VVH outline some of the phonological characteristics of the traditional 'Sonoran' branch of UA.

In terms of the reconstruction we have made, although we also accept that there is probably a protolanguage that we can label protoSonoran, the phonological developments that characterize it vis-a-vis pUA are not always the same as those cited by VH.

"protoSonoran" would be the ancestor of Tepiman, Cora-Huichol, Yaqui-Mayo, Tarahumara-Guarijío, Ópata-Eudeve, Tubar, (and probably Aztecan).

There are numerous ways in which Na does not agree lexically with other Sonoran languages. Largely this may be due to loss of an item in Na.

We find it convenient to distinguish SUA (=Son + Na) from Sonoran (=SUA -Na), but there are no phonological consequences of this distinctions.

(1) UA *nC → *V_1s

(2) UA *ə→*e (but remains in Tepiman)

(3) UA *p→ *v initially and after *V(V) (except in Ta-Gu)

(4) UA *HT → *T [presupposes 1 and 3]

(5) UA *HR → *V_1R

(6) UA *-n- → *-r-

(7) UA *ŋ → *n [presupposes 6]

(8) UA *-Vh#, *-Vn# → *-VV if Na is part of Sonoran

Sonoran can be seen to have simplified the pUA sound system in numerous specific details.

A few additional sound changes occur in specific subfamilies of Sonoran only.

	*CV́CV → *[CV́C·V]	Tep, Ta-Gu, YM (not Na)
	*[CV́C·V]→ *CVhCV	Tep, Ta-Gu
Son	*CV́VCV → CVCV	Tep, Ta-Gu

Tep, Ta-Gu	*CV́hCV →	CVCV	Tep, Ta (not Gu)
	*CV́(h)CV	CV(h)CV́	Ta-Gu

	*k^w →	b	Tepiman, Opata-Eudeve
	*w →	g	
	*y →	d	
ordered	*h →	Ø	Tepiman only
	*s →	h	
	*c →	s	

The proto Tepiman sound system, in the light of previously given sound changes, looks as follows:

p	t	k	?	i	ə	u	VV_1
b	d	g				o	
-v	s		h		a		
m	n						
	-r						

Note that the above rules invert vowel length in PP, i.e. pSon *V̄ is reflected as a short vowel, and pSon *V̆ is reflected as a long vowel in the initial syllable of a stem.

The following examples from PP illustrate the above statements

Note that in PP there are CVhV and CV?V stems, but no CVVhV* and CVV?V* stems. This means that the length contrast has been neutralized in those latter 2 environments.

	pUA, pSon	*CVCV → PP CVVCV		
	*muni..	muuni	'bean'	(diffused: cf Hop mori)
	*muci..	muusI	'vagina'	
Son	*matə	maačI	'to know'	(~ NUA *maatV)
Son	*nəŋin	nəəŋi	'tongue'	(~ NUA *naŋin)
Son	*koco	koošA	'to sleep'	
	*suŋu..	suuni	'corn'	
	*wih	giigʔ[R]	'fat'	
	*sutən	suučI	'nail'	
	*k^wita	biitA	'shit'	
	*yakaa	daak	'nose'	
	*məkaH	məək	'far'	
	*makaa	maak	'give'	
	*toŋoo	toon	'knee'	
	*yoma	doom	'to fuck'	
	*coma	soom	'to sew'	
	*huci	ʔuusI	'tree, stick'	
	*hu[v]a	ʔuuv	'smelly'	
	*[v]aki	vaak	'to enter'	

A = underlying low vowel

I = underlying high vowel

pUA	*CVHCV →	PP ⌒ CVVCV	
	*tu(h)ka..	ču:kō	'far back'
	*ku(h)ta	ku:tā	'torch'
	*woh-ka	go:k	'2'
	*kanma	ka:m	'cheek'
	*[v]ə(h)tah	va:čɨ	'heavy'
	*kə(n)kə	kə:k	'to stand'
	*səhpə..	sə:p[id	'to be cold'
	*nanka	na:k	'ear'
	*t nwa	ča:g[ig	'to name'
	*taHpa	ta:p	'to be split'
	*kuHpa	ku:p	'to close'

	pUA, pSon * CVVCV →	PP CVCV	
	*huu[v]i	?uvi	'woman'
Son	*kuŋa	kunA	'Hu' (UA *kuhŋa)
	*[v]ii[v]ah	viv	'tobacco'
Son	*taarah	tad̤A	'foot' (UA *tannah)
Son	*k^{w}iiya	bid̤A	'earth'
Son	*[v]uusi	vuhi	'eye' (UA *punci)
	*t:aŋi	činɨ	'mouth'
	*tuuku	cuk	'black'
Son	*yaasa	dahā	'to sit' (UA *yanca)
	*?a:ca	?əšA	'to plant'
	*waaki	gaki	'dry'
Son	*saarah	had̤a[m	'sticky' (UA *saanah)
	*sə:kaa	hək	'armpit'
	*sə:ma	həmā	'one'
	*siikuⁿ	hik	'navel'
Son	*siimi	him	'to walk'
Son	*suura	hud̤ā	'waist, midriff' (UA *suuna)
Son	*maara	mad̤A	'woman's Ch' (UA *maana)
Son	*mə:ra	məd̤A	'to run' (UA *mə:na/i)
	*naa[v]ə/uh	nav	'cactus'
	*nə:maa	nəm	'liver'
	*?oŋa	?onA	'salt'
	*?oo[v]in	?ovi[ɲ]	'awl'
	*tə:so..	čəhō	'cave'
	*siisi	hihi[ɲ]	'his guts'

*cii[v]u..	siv	'bitter'
*taacah	tasA	'sun, day, time'
*toogi	toni	'to be hot'

The following data from Guarijio illustrate the rules of vowel change and syllable structure change stated above

pUA			pUA		
*CVCV			*CVVCV		
*CVhCV					
*CVnCV					
nahká	'ear'	*nanka	wiká	'sing'	*k^{w}iika
pahcí	'seed'	*pahci	seká	'aim'	*s kaa
yahká	'nose'	*yakaa			

The following forms agree with Tarahumara for presence of /?/.

pa?cí 'eBr' < *paa-ci (has a morpheme boundary);

ma?sá 'feathers' < *masa

ta?pána 'split' < *taHpa

The NUA languages show almost no common phonological changes from the pUA phonological system.

*k > *[q] ⌒ /V$_{low}$ but not in all of Numic

*c > *y /ə__

*hc > *hy /V$_{high}$

Survey of previous comparative /reconstructive efforts for pUA

The following scholars have made substantial contributions to comparative UA phonology and lexicons.

Sapir

Whorf

VVH

Miller

Langacker (though we deny its validy)

We will discuss the contribution of each in turn with reference mainly to our own results, but also referring earlier to later and later to earlier.

We point out that Sapir offered no reconstructions, and that what Miller offers as starred form are explained by him as indexing the sound correspondences found in the cognate sets, not as standing for the pUA phonemes of pUA morphemes.

What Whorf, VVH and Langacker give however, purport to be reconstructions, and are subject to judgment/evaluation.

Sapir

In "Southern Paiute and Nahuatl --

Sapir noted sound correspondences that led him to suppose that pUA had a sound system somewhat like the following:

p	t	λ	c	k	k^{w}	(?)	i	u
			s			(h)	e	o
m	n			(ŋ)			a	
	l							
			y		w		vowel length	

*? was dubious

*ɣ and *h (are parenthesized for some reason - check original)

*c is [ʧ ~ č]

*s is [s ~ š]

*o is [ɔ]

*u is [o ~ u]

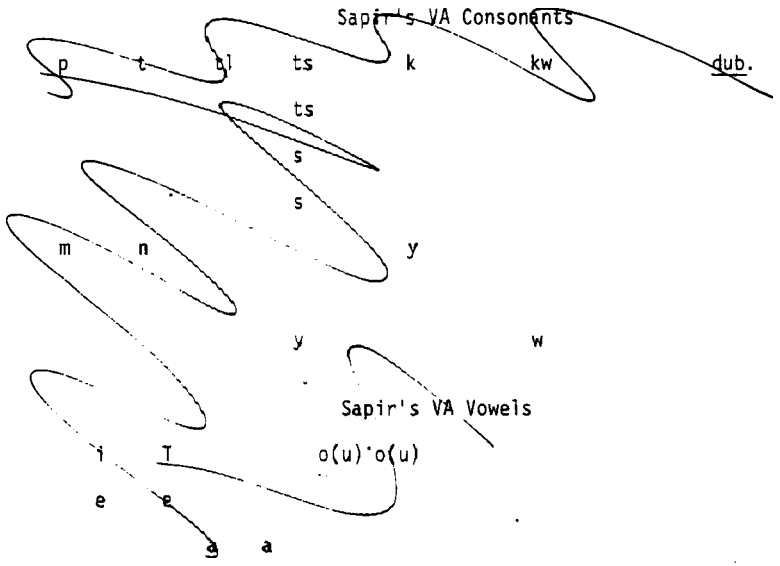
whether Sapir supported *hC, *nC unclear -- check original

λ is of course based on Na data; Whorf showed that Na λ comes from *t/_a.

Sapir did not reconstruct any pUA forms.

One rule stated by Sapir and repeated in VH is wrong, namely that single postvocalic *n became ~~a~~ in SP. The item supporting this supposed development, SP ~~soo~~ soo- 'lung' = PP hon is really from *soonyo. Postvocalic *ɣ drops in SP.

What about *nw?



Whorf

Whorf allows for the following UA sounds and regular sound correspondences.

p/v	t	c	~~k~~/k	k^w	?		i	u
							e	o
		s			h		o	
m/$ɣ^w$	n		y				V̆ (V) V̄	
w	l		r	y				

VHC and V̄HC both allowed for

v is a variant of p

~~k~~ has a reflex different from that of k only in Hopi

$ɣ^w$ is somehow related to m

among spirantizing-resisting medials or

hp, ht, hc, h~~k~~=hk, hk^w (written *t ɸ, etc)

and mp, nt, nc, $ɣ$~~k~~=$ɣ$k, $ɣk^w$, ns, nn (written *^{n}t, etc)

"secondary" forms of *l, *r are l̥, r̥

both *l and *r are postulated as occurring initially

Whorf mistakenly grouped *[m] and *[$ɣ^w$] together because they have the same medial reflex (*$ɣ^w$ occurs only medially) in SP. They have different reflexes in all other languages.

Whorf set up both *~~k~~ and *k solely on Hopi evidence. An explanation has been made for how pUA *k split into k and q in Hopi, which applies also to k,q, and x in Takic and k and h in Tub, namely that k → q (x,h) when adjacent to a low vowel in the same syllable.

Whorf claims 3 degrees of vowel length for pUA (as in the surface phonology or phonetics of Hopi), but never reconstructs more than 2. Whorf correctly

provides for medial *hC and *nC clusters, writing them *ˣC and *ⁿC, but he allows both long and short vowels to occur before them, which is unnecessary, and provides for a kind of syllable structure which UA languages do not have, and in fact, few languages at all do. Whorf claims not only traditional medial *l and *r, but also gives correspondences without supporting evidence for both in initial position.

One supposes that the pUA reconstructions given in Whorf and Trager 1939 (the AA 1937 relationship of UA and Tanoan) are by Whorf. Of the 67 sets given there, 41 at least involve unexceptionable UA cognate sets. The others are doubtful or ambiguous. Whorf was a good deal freer in allowing things to be cognate than we are.

In fairness to our readers and to ourselves, and not to the credit of Whorf, the reconstructions in Whorf's three articles do not make use of the same set of symbols, or implicit proto-phonemes. This is unfortunate, since looking back we do not find it easy to gauge Whorf's real intentions in all cases. Not that we need his guidance, but we wish to judge him fairly. His rather probing insight is marred by a lack of decisiveness. Or put another way, the depth of his vision is more superficial than it might seem to be at first glance.

In his 3 articles Whorf offers about 100 different reconstructions. Some of them (about 35 in all) are based on equations which may not in fact involve cognates, or where we do not feel confident about the exact reconstruction.

39 of them are in essential agreement with our reconstructions.

	BLW		TK
1,2,3	*tʃəkə /a	'to cut'	ə
1	*hɔ·ka	'wind'	*həəkan
1,3	*yansa	'to sit'	*yanca
1,3	*ma	'hand'	*mah~maa
1,3	*paa	'water'	ə
1	*huu	'arrow'	ə
1,2,3	*katə	'to sit'	ə
1	*punsi	'eye'	*punci
1,3	*to/uri	'hen'	*tori
1,3	*wokon	'pine tree'	*wokon
1,3	*səh	'ice, cold'	*səp>*səh
1	*tən	'stone'	ə
1	*təhka	'to eat'	ə
1,2,3	*sutun	'nail'	ə
2	*taman	'tooth'	ə
2	*kʷita	'excrement' ~~'excitement'~~	ə
2	*mata	'mortar'	*mataa
2	*na-	'refl/dupl'	*naa-(~*ŋa-)
2	*nasi	'ashes'	ə
2,3	*tusi, *tusu	'to grind'	*tuusi/u
3	*wəva	'to whip'	*wəpaa
1	*tala	'foot'	*tannah
3	*poh-	'road'	*poh<*pok
3	*pahi	'3'	*paahih
3	*pa-ci	'eBr'	*paa-ci

3	*ʔasi	'to bathe'	* aasi

3	*cuva	'to gather'	*cupa
3	*ciru	'bird'	*ciruH
3	*tavah	'pine-nut'	*tapah
3	*wana	'to stand'	*wana
3	*poho	'hair'	*pohoo ~ *powaa ~ *pohaa
3	*anᵍwa	'to name'	*tanwa
3	*kʷiya	'oak'	*kʷiiya
3	*kʷasa	'to take'	*kʷasV
3	*curu	'bird'	*cuuru..
3	*soho	'cottonwood'	=
3	*mala	'to walk'	*maana/a raise
3	*na(?)(a)	'I'	*na

*sakʷa	'green'	→	=
*maka	'to give'	→	*makaa

To make this list, we had to assume that Whorf's *V and *V are both equivalent to our *V (plain, or short), but in (3) V means *V̄.

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Others, however, ~~# of them~~, are incorrect or incomplete :

1	*ya	'mother'	*ya?
1	*ka	'to bite'	*ka?i/a raise
1	*mu•hki	'to die'	*muuki/u raise
1	*ta-mu•hki	'to dream'	*t h-muuki/u raise
2	*lani	'tongue'	*nani ~ nani
2	*pahi	'3'	*paahi
2,3	*kasi, *kah(pa)si	'thigh, leg'	*kapsii
2	*ta, *ta?i	'fire'	*tahi
2,3	*uh	'black'	*uu
2,3	*tu•hka	'black, dark, night'	*tuuka/u raise
2	*toka	'to call, cry, name'	*tooka
1	*hi•	'to drink'	*hi?(i)

3	*su-	'GrMo'	*su?
3	hihkʷi	'to breathe'	..iya=kʷisV 'take breath'
3	*kura	'neck'	*kuta
~~3~~	~~*kah(pa)si~~	~~'leg, thigh'~~	~~*kapsii~~
3	*kʷasi	'tail'	*kʷasii
3	*siwa	'woman'	*sunwaa
3	*maya	'to go'	*miya
3	*puya ~ *puca	'to blow'	*puhca
3	*wahki	'dry'	*waaki
3	*wo(ya)	'2'	*woh(-yo)
3	*wika	'hoe'	*wi?kah
3	*amaa, *angᵂe	'you'	*?aŋ

Yoegelin, Vogelin, and Hale (VH)

VH reconstruct the following phonemes for pUA

p	t	c	k	k^w	?		i	u
		s			h			o
m	n							a
	l	-r	y	w				

They do not reconstruct vowel length or stress. FN1

They reconstruct initial *l- in one item only, 'tongue'.

They reconstruct medial *-n- in a number of items, mostly limited to SUA, where *-n- is our reconstruction.

They reconstruct transitions between V_1 and C_2 of roots which they label

(a) *V_sC 'suspending' (suspends stopness or nasal articulation of following C)

(b) *V_uC 'unaltering'

(c) *V_nC 'nasalizing' They consider them morphophonemic properties of vowels, rather than presence or absence of particular consonantal segments as do we. FN2

In our terms, these features correspond to

(a) no consonant = vowel length i.e. *V(V)C

(b) preconsonantal h *VhC

(c) preconsonantal n *VnC

VH have 171 numbered cognate sets.

FN1 p.34 "Series generating components which are specified for the daughter languages, as LENGTH and one of three kinds of STRESS--predictable stress, word stress, alternating stress--remain to be reconstructed for proto Uto-Aztecan".

FN2 p.98 "Proto UA is reconstructed without vowel clusters and without consonant clusters".

Since VH is the only principled reconstruction presenting a sizeable body of data, we will note those reconstructions of specific pUA morphemes which we can show to be wrong on the data we have presented, and for which we ourselves have offered reconstructions. We also point out where VH have correctly reconstructed *-hC- and *-nC-.

We rewrite VH *ɨ as *ə, *$_u$C as *hC, *$_n$C as *nC, and *V_sC as *VC.

In the following cases VH correctly reconstruct *-nC-:

(5) *punsi 'eye' (TK prefers *punci)

(20) *tənwa 'to name'

(46) *punku 'dog, pet'

(47) *nanka 'ear'

(76) *yansa 'to sit' (TK prefers *yanca)

In the following cases VH correctly reconstruct *-hC-:

(58) *?ahŋa 'wing, feather, arm'

(153) *kuhp(i) 'to close eyes, sleep'

(163) *təhka 'to eat'

(9) *kuhpa 'head hair'

In the following cases VH reconstruct *-hN-, wnere we reconstruct *-nN-:

(156) *tahŋa 'to kick' TK *tanŋa

(87) *kahma 'mouth, cheek, to taste' TK *kanma

(88) *kuhmi/a 'to eat-as corn, to nibble' TK *kunmi

(165) *tohmo 'winter' TK *tonmo?

(159) *kihma 'to come' TK *kinma

In the following cases VH unnecessarily reconstruct *-hs-:

(31) *tohsa 'white' TK *tosa..

(50) *k^{W}ahsə /i 'cooked, ripe' TK *k^{W}asi/ə..

(51) *k^{W}ahsi 'tail' TK *k^{W}asi

(75) *tuhsu/i 'to grind' TK *tuusu/i

In the following cases VH unnecessarily reconstruct *-h?-:

(43) *kəh(?i/ə 'to bite' TK *kə?i/ə

(456) *k_h?i_ 'to k..., d..e-pl' ... *..../..

(67) sih(?i/a) 'to urinate' TK *ci?i/a

(95b) *nah?a 'to burn' TK *na?a

(168) *yəh?ə 'to swallow' TK *yə?ə

In the following cases VH reconstruct *-hC- where *-ɲC- is correct:

(196) *təhpa 'mortar' TK *tənpahaa

In the following cases VH fail to reconstruct a medial preconsontal feature:

(141) *kali 'house' TK *kanni(i)

(97) *kuŋa 'husband' TK *kuhŋa

(41) *kasi 'leg, thigh' TK *kapsi

(14) *sə-po 'eyebrow' TK *sə?-pəə/poho

In the following cases VH fail to notice that pUA *c → NUA *y/ə __:

(119) *?ə(ca) 'to plant' TK *?əəca

(120) *?ə- 'theft' TK *?əhci/a

(158) *məya 'moon' TK *məəca

In the following cases VH fail to reconstruct a medial preconsonantal feature:

(141) *kali 'house' TK *kanni(i)

(97) *kuŋa 'husband' TK *kuhŋa

(41) *kasi 'leg, thigh' TK *kapsi

(14) *sə-po 'eyebrow' TK *sə?-pəə/poho

In the following cases VH fail to notice that pUA *c → NUA *y/ə __:

(119) *? (ca) 'to plant' TK *? ca

(120) *? 'theft' TK *? hci/a

(158) *m ya 'moon' TK *m ca

In the following cases VH fail to notice that SUA medial *n comes from pUA *ŋ, and only from *ŋ.

(38) *co(ni) 'head hair' TK *coh(ŋi)

(166) *sono 'lung' TK *soŋŋa

(19) *təhni 'mouth' TK *təəŋa

(93) *sunu 'corn(cob)' TK *suŋu

(92) *tani 'to ask, beg' TK *taŋi

(91) *pini 'to suck on it' TK *piŋi

In the following cases VH incorrectly reconstruct *-hC-: (one reason is from failure to note that SP c after *i comes from *t not *ht.)

(143) *pihtə 'to arrive' TK *pitə

(11) *səh(pə) 'cold' TK *səəp > *səh; *səpə..

(22) *tuhku 'meat' TK *tuku(wa) (Numic deviant)

(23) *tuh(ku) 'black' TK *tuuku

(26) *suhtu~sihtu 'fingernail' TK *sutun

(27) *tahca 'sun, summer' TK *taacah

(54) *k^{w}ihta 'exciement' TK *k^{w}ita

(86) *muhki/u 'to die'sg' TK *muuki/u

(14a) *tahpu 'flea' TK *tapu

In the following case VH reconstruct *-hC- where it is not clear whether the pUA form had *-hC- or *-nC-:

(10) *tahpa 'to split' TK *taHpa

Two other cases are in disagreement with our reconstructions:

(7) *po 'body hair, fur' TK *pohoo~*powaa

(61) *?oho 'bone' TK *?oh

We find the following items doubtful:

(136) *k^{w}ahna 'smelly' TK *k^{w}ana Numic only

(167) *tohno 'hill, rise' TK no reconstruction

Except for failure to reconstruct vowel length or final features the rest of VH's UA reconstructions are acceptable. We can convert their *l to our *n with no information loss.

In general, then in spite of a few incorrect reconstructions offered by VH our efforts {may / must / can} be {viewed / seen} as building on their formulation by (a) expanding the data base (largely to be found in Miller UACS), (b) reconstructing features VH were too conservative to reconstruct and (c) eliminating redundancies.

(a) means we have more and consequently securer examples of the various sound correspondences

(b) involves stress, vowel length, *-hC-, *-nC- *-?C- and final features

(c) involves reinterpreting and eliminating their *l and medial *n.

Some scholars writing after VH have expressed doubt about such pUA phonemes as *ŋ and *r without offering an account of where they may have come from, or at least not one that recognizes as axiomatic the regularity of sound change. Miller supposes traditional *ŋ to be a conditioned reflex of *n. He is disturbed by the fact that a phoneme ŋ occurs only in NUA, and initially only in Takic and Hopi. He considers traditional *r to be a reflex of *t; it is found only word-medially.

Miller, however, has not committed himself on these matters, and cannot be called to task for things he did not do. Many readers of Miller's UACS suppose that the starred forms given with the majority of the cognate sets reflect Miller's considered opinion as to what the protoform really was. This is not so. In the Introduction, p 7:

> "...the starred forms in this monograph represent a shorthand notation to enable the reader to see what phonemes have been compared. A true reconstruction would have to indicate a larger number of contrasts, either by setting up more proto-phonemes or by setting up clusters."

Miller has 514 numbered sets, but several of the numbers are multiplied by subdivision, e.g. 509a, 509b, 509c, 509d. Consequently the total number is closer to 550 or 600.

Miller's UACS is an invaluable collection of data. In a few cases we would add or subtract a form from Miller's proposed set. We find a few sets invalid. We can add a few new sets. But without extensive lexical collections becoming available for many languages the order of magnitude of UA etymologies will remain on pretty much the same level as in Miller's work.

Miller labels the sound correspondences he lays out in the introduction to

UACS (pp 6-8) with the following symbols:

p	t	c	k	k^w	?	i	u
		s			h	e	o
m	n					a	
	-l						
		y		w			

We see that (a) *ŋ and *r are not accepted (though Whorf and VVH reconstruct them) (b) vowel length, preconsonantal features, and final features are not reconstructed (Whorf did all of these).

Lanacker _____ , shows that pUA probably had *[+], as reconstructed by VVH and not *[e] as reconstructed or suggested by Sapir, Whorf, and Miller.

Langacker UAG rejects *ŋ and *r from pUA.
He supposes traditional *ŋ is ultimately derived from *m by " lenition ", and that *r comes from *t by the same route. Not only that, but he also supposes that traditional *l's, which are only medial, also come from pre-UA *t's through " lenition ", though he accepts *l as a pUA phoneme.
Unfortunately RL cannot explain *ŋ and *r by appeal to regular sound change. The best he can do is suggest that a number of batches of reconstructions based on the regularity of sound change axiom that are not identical but partially similar both semantically and phonologically are in fact etymological doublets, where one member of the set show an unlenited consonant and the other(s) show(s) lenited consonants.
We must concede that in 3 or 4 cases RL has correctly associated some non-identical reconstructions. We do not however, accept his explanation of non-

identity as arising from differential survival of allomorphs created by lenition. We accept only that a handful of pUA morphemes, mostly grammatical, had more than one allomorph. We allow *mi ~ *wi [postposition]
*ma ~ *wa [pronoun/demonstrative 'yon']

Langacker seems to accept both $*\overline{V}$ and *hC and *nC as features of pUA phonology, though he does not postulate $\overline{V}$ in any specific reconstructions.

Steele, in the Black Book, accepts Langacker's pUA phoneme charts as representing the state of the art. We think that a more critical attitude would have been more appropriate. (She is a student of Langacker). She says that only VVH reconstruct *ŋ and *r, but Whorf reconstructs both, and Sapir accepts *ŋ.

Lenition à la Langacker

In four different publications Ronald Langacker refers to "consonant gradation" and "lenition" in UA lgs and in pUA.

NDA Non-Distinct Arguments in Uto-Aztecan [CPL]82 (1976)
(esp. pp 95-98, 155-161)

NCG A Note on Uto-Aztecan Consonant Gradation IJAL 42.3 374-379 (1976)

UAG An Overview of Uto-Aztecan Grammar SIL/UTA 1977

PAV Proto-Aztecan Vowels IJAL 44-95-102, 197-210, 262-279 (1978)

In these publications RL supposes that the lenition of a labial consonant found in Numic, or the phonemicized weakening of certain postvocalic consonants found in Tub and Tak was phonetic (sometimes phonemicized) feature of pUA. A third kind of lenition is found in Ta, where a stop is voiced before an underlyingly unstressed vowel. Gu also has such a lenition, which however does not apply to word-initial consonants. In fact there is one and only one specific lenition that may be reasonably supposed to have characterized pUA, namely that postvocalic *p was probably voiced and maybe spirantized.

The reflexes are as follows:

Num	[β] /p/
Tub	[b] /p/
Tak	v
Hop	v
PP	v
Ta	// p //; in a few cases w is found
YM	β
C-H	h (<φ<β<b)
Na	∅ (<h, etc.)

Note that Tub undergoes no phonemic change, and the reflex is a stop.

Note also that in general Ta-Gu lack a special reflex of postvocalic *p; It has the same reflex as a *p after *n or *h.

In a handful of cases, noted above § ____ , Ta shows w where other SUA languages have [β], etc. If not a result of borrowing, this would be the normal reflex of lenited pUA *p, otherwise replaced by/remerged with p through some kind of analogy.

Most UA subfamilies presuppose [β]; Tub (and maybe Ta-Gu) do not support it, a__ _ c.a.g_ f._m [_ t_ [β] i_ .a.ural ...ugh and [β] does n.t need t_ b_ attributed to the protolanguage.

The best case that we can make for lenition in pUA is that postvocalic *p w__ [b], ____ __ ____ ____ p__ co___ a_ ____ _ eco s__ ct e a __, __e .

(This is somewhat analogous to the situation in protoMayan where the labial glottalized stop is basically voiced while all other glottalized obstruents are basically voiceless; an interesting, but not particularly impressive asymmetry in the phonetic system. We don't want to highlight the fact that labials are involved in both cases; this may be irrelevant). That *p did have a voiced allophone may have been the wedge for the development of voicing and/or spirantizing of other postvocalic consonants in the languages where it in fact occured.

But this lenition is hardly ancient. If pUA allophones was like that of, say, SP, it is hard to imagine the system remaining stable over 5000 years (or that most UA lgs have voiceless stops where SP has voiced or voiceless spirants). The fact that lenition does have phonemic consequences in Takic (for *p *t *c and *[q] suggests that it originated there. In Tub 'lenition' has shifted

postvocalic *t to l (where it merges with the prexisting reflex of *r). In Numic lenition is allophonic, and absent (except for postvocalic *p and *t) in Comanche, where although it may have been given up in Comanche, it would be tendentious to argue for the probable truth of such a guess. The conditions for lenition in Ta and Gu are quite different from that of Num, Tub, or Tak. Since voicing or spirantizing of consonants in weak (as in Ta-Gu) or intervocalic position (as in Num, Tub, and Tak) is so common throughout the world, it seems unnecessary to project this feature (except for *[b]) on to pUA, when it could well have occurred quite recently in all the cases (except in Tak) where it occurs.

Further, the form in which RL supposes 'lenition' occurred in proto UA, preUA, and early UA does not respect the principle of regular sound change. We find this unacceptable, and bad strategy in any event, since without the constraint of regular sound change you can explain any phenomenon in several different ways, and you can call disparate phenomena identical.

Only after the principle of regular sound change has carried us to its applicable limits can we legitimately offer explanations such as morphophonemic leveling and other kinds of grammatical analogy and semantic interference. And, we wish to point out, these limits have not even been approached in UA studies.

On Rabbits out of Hats

> Most times when someone allows an explanation involving irregularity in sound laws, somebody later on will be able to show that the phenomenon is in some way regular.
>
> The former type of explanation can do too much and is therefore not worthy of being promoted. Better to say 'I don't know'.

We outline below RL's claims.

RL supposes pUA to have had the following phonemes (UAG 21-23)

p	t	c	k	k^w	?		i	ə	u
		s			h				o
m	n							a	
	-l								
		y		w					

vowel length transitions:

hC <ʰC>
nC <ⁿC>

these are found in specific reconstructions offered in various places in UAG

Langacker believes that postvocalic consonants were weakened ('lenited') in preUA as well as in pUA, and that under unnamed conditions what were lenited allophones became phonemicized in various morphemes, and at various time periods.

"...medial consonant lenition in pUA was a very general phenemenon" (NGG375)

(We have already outlined the limits of lenition as we see it)

"...consonant gradation has been a continuing process in the history of UA, and ...we can detect two rounds of the process for the dental consonants" (NDA 160). "...in most UA languages we find only vestiges of a process that is no longer active" (NDA 156).

This while RL believes that pUA *l (medial only) originates in lenited preUA *t, he believes *l was a phoneme in pUA. (We have claimed above that traditional pUA *l is better treated as *n.)

RL claims the following alternations through lenition for pUA (and early UA)

basic		lenited
*t	>	*l
*k^{w}	>	ɣ^{w} > w
*m	>	ŋ^{w} > ŋ > n
	>	w̃ > w
*p	>	v > w
	>	ɸ > h > ∅
(implicitly claimed) *k	>	h (NDA 71-123)
*c	>	{ y { n/after nasal

RL claims that pUA had not *ŋ, but that known ŋ's come from the lenition of pUA *m. Our question is, if postvocalic pUA *m went to ŋ in those languages that have it, why are there pUA words that show the reflex m across the board in this environment? For example,

*nəmaa	'liver'
*nəmi	'to walk/live'
*taman	'tooth'

If RL is right that our medial *ŋ is from *m and our medial *n is UA *l (lenited from *t), then preUA would have had no medial *n -- an unlikely state of affairs.

For both *m and *p RL proposes 'alternate paths' of lenition under 'as yet undetermined' conditions, (NCG 375). That is, the same language may show both reflexes. If taken seriously, this has the effect of subverting the principal axiom of the compariative method - that of the regularity of sound change.

The chart on p 157 of NDA is a misrepresentation of regular sound correspondences

involving *t and traditional *l in UA languages, since SUA *r (PP *d, YM, etc r, Na l) never corresponds to NUA *t except by begging the question that RL wants to demonstrate.

In NDA 160 RL is wrong to conclude that Ym kat-Lu gal 'to sit/be there' (pUA *katə) are not direct phonological cognates. Since RL wants to get UA *t > SUA *r by lenition, he has to assume YM t is from UA *ht, a totally unwarranted assumption.

UAG 106 refers to "the c/y/n alternation", which appeals to an undemonstrated assumption. In UAG 23 he says "There is...evidence for regarding some occurrences of y and n as spirantized and nasalized reflexes of *c." The evidence that RL cites in various places in support of this assumption is quite unconvincing.

Since RL believes [ŋ^{w}] where found is due to lenition of *m, he says (NCG 377) "The sound change of *w to ŋ^{w} after a nasalizing vowel in Tub and Hop should probably be abandoned..."

We have presented the known evidence (some of it worked up by us) in ... for pUA *nw, which must have contrasted with *m. We note further that the numerous Hop nouns ending in -wə contain the pUA augmentative suffix *-wəh, and claim that those ending in -ŋ^{w} also contain the same suffix added to a stem ending in final feature *¯nasality (written *n).

A non-sequitur in NDA p 158/9 is where RL states that Numic-like V..C transitions are "inherently unstable, or at least subject to modification, because a contrast manifested phonetically in one morpheme is due to an abstract property of an adjoining morpheme" This is a misrepresentation since (a) final features can be analyzed as underlying segments (b) these transitions

also occur when no morpheme boundary intervenes. Further, we have shown above that such transitions generally correspond excellently across languages and subfamilies. Lastly, if pUA was like Numic, as RL seems to believe, and the structure was unstable, as RL claims, Why is Numic so conservative, after 5000 years?

We will now proceed to examine the majority of the cases where RL claims to see evidence of post pUA lenition.
Part of RL's evidence is in what we would call etymological doublets (they would be if they really were from the same source). The other kind of "evidence" is based generally on failure to recognize regular sound correspondence.

We deal with the second type of data first.

RL derives pUA *tənwa 'name' from *təma (NCG 377).

He derives pUA *kuhəa 'Hu' from *kuma (NCG 378).

He gets Hop moŋʷə 'owl' from *muhu by reduplication and lenition of -m- to -ŋʷ- (NCG 377). We derive it from *mun-wəh (taugh), and Se mum-t <*mujmun-ta. *muhun is attested in other UA languages, but *mun is antecedent to the Hop and Se (also YM) forms.

RL wants to connect ɬhowi (RL *homi) 'dove' (an areal word) with Lu mixeel 'dove' (NCG 377), but this Cupan word has an uncertain first vowel (Ca -á-, Cu -ə-) and is probably another areal word.

Here we deal with etymological doublets proposed by RL which we reject. Those we accept, and there are a few, will be dealt with next. In all cases we cite our own pUA phonological reconstructions.

(A) (NCG 378, NDA 97)

(M-1) *kʷiiŋV (SP) Tub Hop ~ *kʷiiya (SP) Lu Ca Se
'(scrub) oak, acorn'

(M-2) *wi?an 'acorn' Num (Mo, Pa), Lu, Se. 'acorn'

Since both occur in Lu and Se and since the meanings are not identical, we claim these are separate UA etyma.

(B) (NCG 378, NDA 97)

(M-191) *kʷa(ya) 'frog' SP, Hop, Tep, Na (not Ta)

(M-192) *waaka 'frog' SP, Tub, Lu, Ca, Se, Ta

SP and Num generally have both items, so they are unlikely to reflect a single etymon. One may have meant 'toad', the other 'frog'; or they may have referred to two kinds of frog.

(C) (NCG 378, NDA 97)

(M-152a) *kʷa?a 'to eat' Tak, Tep, Ta, YM, Co, Na

(M-152d) *ko?i/a 'treat' Tak, Tep, Ta, YM (not mentioned by RL)

(M-153) *suwa 'to eat/use up Num, Hop, PP

Although *kʷa?a and *suwa are in C.D. by UA subfamily, one means 'eat' and the other 'eat up, use up'. Even *kʷa?a and *ko?i/a, which are phonetically similar and both roughly synonymous coexist in Tak, Tep, Ta, and YM.

(D) (NCG 378, NDA 97)

(M-76) 'to take, catch' *kʷəsə Num, Hop, YM; (Tep, C-H have truncated *kʷəsə to *kʷə)

(M-77) 'to carry' *wə Mo, Lu, YM

Both occur in Num and YM with different meanings

(E) (NCG 378, NDA 97)

(M-39a) *wəh 'big' Num, Se, Hop, Tep, Ta(?), Na

*-wəh 'augmentative suffix' Tak, Hop, Tep, YM, Na.

(M-39d) *k^{w}ə?ru YM, Gu

The second item is probably a local Sonoran innovation.

The following two sets seem promising and we would not initially reject them.

(F) (NCG 378, NDA 97)

(M-110a) *k^{w}a.. 'coyote': Hop k^{w}e-wə (< *k^{w}ə-wəh) 'wolf',

Tep *banai (< *k^{w}aa-ŋa), cf YM b^{w}aana 'to weep'.

cf Na koyoo- 'coyote'.

(M-110b) *wa.. 'coyote': Se wahei?, YM wó?i, Co waáve?e (+augm.).

The reflexes are in C.D. by subgroup and synonymous.

RL's evidence for *k^{w} ⇝ *w is not very good at all. One case; 'coyote', is worth thinking about, but not (a) necessarily believing that this is a real cognate set, (b) drawing any conclusions on the basis of the putative set. In the cases we have rejected, there is in each case some language or whole subfamily which has reflexes of both etyma. We would do well not to propose borrowing or etymological doublets on such slender grounds. Further, the pairs of items are for the most part not synonymous.

Among grammatical morphemes RL has made two proposals that lump etymological doublets that we find quite acceptable, though we do not accept his explanation for the existence of the doublets. (These are discussed above, §___).

(G) *mi~^{t}wi (postposition) 'to'

(H) *ma~^{t}wa (demonstrative) 'yon'

In re the few plausible *m~*w alternations proposed by RL:

It is the general experience of comparativists in most language families that the phonemes of apparently cognate affixes and particles do not always correspond exactly. Sometimes apparent cognates turn out not to be so. Other times accentual or other semi-remote phonological phenomena explain the apparent discrepancies. We do not feel that the plausible aggregating of a few phonologically slightly discrepant grammatical morphemes can reasonably be parlayed into a far-reaching hypothesis about the morphophonemics of pUA at this stage in UA comparative studies (which is still in its swaddling clothes).

Postpositional elements *ma? 'with' and *ŋa 'at' are considered to be etymologically distinct by us. We do not necessarily accept that Na naawak 'near, with' contains *ma (→ wa); an alternative proposal can derive it from *naa-wi-ka with vowel assimilation, since pUA *naa-wi means 'with'.

RL's *k~*h

RL reconstructs *na-ko-yə (< *na-k^{w}a-yə) for the pUA pronoun 'oneself' (we reconstruct *na-hku-yə). The h found in Num and Hop can be reflexes of UA *hk, and we need see no lenition here. To be sure RL doesn't claim to see it either, but maybe now he won't see it in the future either.

RL's *c~*y, *c~*n

We have shown above how pUA *c → NUA *y after high vowels. This does not seem to be what RL is looking at. Rather, he wants to lump etymologically certain transitivizing suffixes, namely *-ya, *-ca, and *-ŋa (in our reconstruction).

Items cited on page 106 of UAG purporting to support a pUA *naco~ *nayo 'all' are not at all convincing.

Most of RL's arguments require the marshalling of several simultaneous weakly supported assumptions, especially those of non-uniformity in the protolanguage and semi-sporadic (or grammatically interfered with) sound change. Such assumptions are warranted only when straightforward phonetic-semantic reconstruction can be shown to be unworkable. They are premature at the present stage of UA studies, and are, in any event, largely unnecessary for the cases RL discusses.

Many of RL's formulations have an uncomfortably Boppesque feeling about them. He derives affixes from unattested roots with great freedom. Among affixes everything that is functionally equivalent and vaguely similar in pronunciation is assumed to be phonologically cognate, regular sound correspondence notwithstanding.

We have no a priori reason for believing that cross-language or within-language lexical diffusion has occurred in UA languages. Even were we to be forced to recognize it at some future date, we could not use such knowledge in building our model of the proto-language. For phonological reconstruction there is only one method - the comparative method. Without it, there is no reconstruction at all. The comparative method is what allows us to recognize data that will not fit and find other explanations such as analogy and borrowing. The comparative method allows that different scholars will extablish or recognize the same regular sound correspondences, and that their reconstructions will be roughly notational variants of each other. Without the assumption of regular sound change no two (semi-) independent reconstructions could ever be comparable, and the

evaluation of different reconstruction schemes would depend on explaining the unexplainable by appealing to the imponderable.

Progress in reconstruction in the framework of the comparative method involves recognition of previously unnoticed regularities and expanding or contracting the scope of previously recongnized ones. Thus, though no 2 sequential reconstructions are ever the same for a particular language group, at any particular point in time all scholars knowing of the same set of data and regularities in it would make comparable reconstructions, if they follow the principles of the comparative method.

TK takes exception to portions (or the totality) of the following etymologies in Cambell and Langacker's Proto Aztecan Vowels.

Langacker's etymological atrocites

201 'ashes' **nasi. WTa napiso, Y naposa do not fit.

202 'awl, needle' (**wi-). Reconstruction should be *wihcV.

Co cikare?e doe not fit; proto-gloss should be 'thorn'.

204 Na tootoo-λ 'bird' does not come from pUA *cuuru.

205 Several UA sets are conflated here: *?ɔnwa (NUA) 'blood'

*?ɔra (pUA) 'blood'. Na es-λi is not part of either set,

211 Na nooca 'call' cannot reasonably be derived from pUA

*ni?ooka 'name,speak' (as reconstructed by TK)

213 Na λiil-li 'soot' must be from the Son root *tahi 'fire', since only results from *t before *a. The accidental existence of pUA *tuu 'charcoal' should not lead the unwary astray.

214 'clean, sweep' is, as conceded, a highly speculative reconstruction which I will not bother to cite.

215 'comb' is "obviously problematic": Hu ʃikuweeta 'comb' is probably on loan from Na ʃikawas-λi.

217 'coyote' this is a disparate set. It begs the question of *w is a lenited variant of *k^{w}. However Na koyoo-λ, Hu kausai ('fox'), PP ban, Hop k^{w}ew ('wolf') may be a valid etymology, reconstructible *k^{w}a... The Co, Ta, YM and Se forms cited cannot be cognate.

221 'duck': as conceded by the author(s), "this set is speculative"

223 'eat' conflates two UA sets *k^{w}a?a and *ko?a/i

225 'extinguish' *tuuka: Na tooka 'plant, bury' is unacceptable as a cognate for both phonological and semantic reasons.

229 'fish' is "very speculative" according to the author(s), and furthermore begs the question of whether *w can be the lenited version of either *m or *k^{w} or both

230 'flow, run'. This set is "speculative" and involves both semantic and phonological discrepancies.

231 'flower'. The second syllable of Na *šooči-λ cannot be derived from pUA *..tu, and the evidence of Hu suuturi does not in any event support such a reconstruction. The pUA form is *sɔɔ?V *sɔɔwV. The Na form requires *siCoci as the antecedent form. *..ci is prob. the pUA diminutive suffix. *o, attested in Tepiman is prob. from leveling of *..wa...

232 'fly': Na mooyoo-λ cannot be gotten from pUA *muu- (as given by RL; if a valid set).

235 'go': Na wiiʃ 'come' cannot be gotten from pUA *miya; RL concedes the relationship is "speculative". Ca ɣiy- has a different origin also, Takic *ɣoyV 'return'.

236 'go out (fire): Na seewi is from pUA *sɔp 'cold', not from pUA *cuhpa (called **cu- by RL). Conceded to be "speculative"

237 'grass': Na saka-λ cannot be gotten from pUA *pasoho (RL calls it **paso). The Hu, WTa, PP and Tu forms don't fit either. Conceded to be "speculative"

240 'husband': Na iknoo-λ ' ' is semantically unlikely. Reconstructing pUA *kuma instead of the indicated *kuŋa, is simply a begging of the question of pUA lenition.

250 'leg, thigh'; pUA *kapsii (called **kasi by RL). The items cited at the end of the entry reflect pUA *kɔnkɔ, 'foot', hardly similar to *kapsii

256 'much'. **mɔ(?)i is prob. to be reconstructed *mu?i. Ta we(ka) and Hop wɔɔyak reflect pUA *wɔH 'big'. The association of these last 2 forms begs the question of pUA *w being lenited from *m.

258 'neck': Na kečλi can be related to the Co, Hu, PP and NT cited under a reconstruction something like *kucVpV. The other forms cited reflect pUA *kutaa, which can be subsumed with the former set by assuming that *kucVpV is *kut-ipV *kutaa+ -ipV.

240 'hair' derives Na ikpa-λ 'thread' from pUA *kuHpa 'head hair' (called pUA **kuupa 'hair' by RL).

262 'on': Na ikpa-k 'on top'. This is the Na item that should be derived from pUA *kuHpa 'head hair'. Either that, or it comes from pM *kopak 'head'. Cf also Na ⟨kopak-λi⟩ 'roof of mouth'.

263 'one'. RL's reconstruction for pUA as *sɔmayu (rather *sɔɔ-ma-yu) is not bad, but it contains 3 morphemes. *-yV is attested in at least some language for all three numerals *one, *two, *three: and *sɔɔ only is attested in some languages. The observations made on Numic lenition do not support lenition for UA generally.

264 'owl': Na tɔkoloo-λ derives from pUA *tukuri plus augmentative suffix *-wɔH (not **tɔkul- as suggested by RL). The Hu form cited does not fit.

270 'saliva/spit'. The items assembled here are not all cognate. Especially Na čihča cannot come from pUA **cu?a- (as reconstructed by RL). The Co, Ta, Ca, Hop, Tub, and Mo forms cited reflect at least 4 other etymologies.

272 'shine (sun)': Na toonal-li 'sun' and Hopi təŋva (< //tooŋVpa//) straightforwardly reflect pUA *tooŋa/i. It is unnecessary and unsupported to speak of *ŋ in this item as coming from *m.

275 'snake': Na is kowaa-λ, not koowa-λ. I reconstruct pUA *kon(wa)

276 'stiff, straight, hard': Na λak^{w}aawak 'hard' can be from pUA *tahk^{w}a (RL **tak^{w}a-), but čikaawak 'hard, strong' does not fit.

283 'urinate': Na šiiš-λi is from pUA *siisi, which has a (collateral) variant *si?i/a

301 'ant'. The items cited in this set are not demonstrably cognate. "speculative to a certain degree" is an understatement.

305 'deer'. The effort to etymologize each of the syllables of *maso (as per RL) is misguided.

306 'far'. pUA *məkaH (TK): Na wəhka- 'high' contains pUA *wəH 'big'. The similarity to pUA 'far', if allowed as cognate, would be one of the tiny set of data that suggest lenition for old common UA.

310 'leaf'. pSUA is *sawa. Co sam^{W}a and Hu sama ~ sawa seem to support RL's hypothesis about *m leniting to *w, but the evidence from these just these 2 languages is at best sporadic. The comments on UA words for 'grass' possibly being cognate are not persuasive.

311 'leave, remain' is "speculative", not convincing semantically, and not acceptable phonologically

314 'sew' *coma is an OK etymology, but references to WTa wasi and NP ʒo?na, as well as **cum (M92) 'close eyes' seem unhelpful.

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