THE LABIAL LABYRINTH IN UTO-AZTECAN

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Introduction. The behavior of Proto-Uto-Aztecan (PUA) *k^w and its interaction with other labials—particularly *p and *w—need clarification; solutions are preferable, but even clearer statements of the problems would be helpful. This paper proposes a new perspective for PUA *k^w before round vowels; it also explores interfacing between *k^w and *p, velarization of some bilabials, directions of sound change, and ranges of reflex variation in the labiovelar spectrum.

The Uto-Aztecan (UA) reflexes for PUA *k^w in initial position have long been accepted as fairly straightforward. They are as shown in table 1 for the various languages and branches of UA cited in this paper (Miller 1967; 1988).

The Uto-Aztecan words for 'tail' are among the cleanest and most complete sets in UA. Though most sets present many more problems, in table 1 only Sr and Tbr are exceptional to the usual correspondences; nevertheless, the forms in table 1 demonstrate the basic reflexes for PUA *k^w. However, data exist to suggest historically different behavior for PUA *k^w before back round vowels (*o*, *u*).

O'odham. PUA did not have a large inventory of consonants and vowels. Miller (1967) lists thirteen consonants and five vowels. It is not unreasonable to suppose that most of the CV combinations existed in PUA. However, if the CV sequences *k^wo and *k^wu existed in PUA, then either they disappeared in O'odham (Od) and most UA languages, or they have eluded detection in our lacking a key to recognize them. Some evidence suggests the latter for some etyma. Consider the statistics shown in table 2 for initial CV combinations in Od (according to morpheme count in Saxton, Saxton, and Enos 1983).

First, one can see that there are no *bo* or *bu* syllables in Od (*b* being the accepted Tepiman reflex of PUA *k^w). Second, not only does Od lack *bo/bu* syllables, but it has about twice as many *ko* and *ku* syllables as *ka*, *kɨ*, and *ki* syllables (70 and 88 vs. 48, 20, and 13). Third, it seems odd that a language with fairly limited inventory of phonemes would entirely lack a certain CV combination. In addition, the fact that two such combinations are lacking (*bo/bu*) and that they are phonologically similar (labial + round vowel)

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TABLE 1

	Language	Abbreviation	PUA *k^w	*k^w*asi* 'tail'
Numic				
	Northern Paiute	NP	k^w	*k^wasi*
	Panamint	Pn	k^w	*k^wasi*
	Shoshoni	Sh	k^w	*k^waisi*
	Comanche	Cm	k^w	*k^was(i)*
	Kawaiisu	Kw	k^w	*k^wasi-/kosi-*
	Southern Paiute	SP	k^w	*k^wasi-*
	Colorado Ute	CU	k^w	*k^wasi-*
	Hopi	Hp	k^w	*k^wasi* 'penis'
	Tubatulabal	Tb	*w*	—
Takic				
	Cahuilla	Ca	k^w,*w*	*-k^was*
	Luiseño	Ls	k^w	*-píqwsiv*
	Cupeño	Cp	k^w	*q^was*
	Serrano	Sr	k^w	*-wad*
Sonoran				
Tepiman	O?odham	Od	*b*	*bahi*
"	Pima Bajo	PB	*b*	*vahi*
"	Mountain Pima	MP	*b*	*bahi*
	Eudeve	Eu	*b*	*basít*
Cahitan	Yaqui	Yq	b^w	*b^wásia*
"	Mayo	My	b^w	*b^wasia*
Other	Tarahumara	Tr	*w*	*wasí*
Sonoran	Guarijio	Wr	*w*	*wahsí*
"	Tubar	Tbr	k^w	*bakusí-r*
Corachol	Cora	Cr	k^w, $č^w$	*k^waasí*
Aztecan				
	Nahuatl	N	k^w	—

TABLE 2

	a	*ɨ*	*i*	*o*	*u*	Total
b	40 (*ba*)	5 (*bɨ*)	28 (*bi*)	0	0	73
k	48 (*ka*)	20 (*kɨ*)	13 (*ki*)	70 (*ko*)	88 (*ku*)	239

suggests a cause-effect relationship for that lack: perhaps UA *$k^w o/k^w u$ > Od *ko/ku* (rather than expected *bo/bu*) before back round vowels. The double number of *ko/ku* syllables and the complete lack of *b* (< PUA *k^w) before round vowels suggest PUA *$k^w o/k^w u$ > *ko/ku* rather than *bo/bu* in Od. In addition to the above statistics, alternate forms in Od for the name of a certain plant suggest the same:

(1) *bihul* and *hikul* 'a plant' (Mathiot 1976:362)

In light of the above rule, these alternate forms can be explained as a metathesis of *h* (< **s*) and *b* (< *k^w). The *h* remains the same in both phonological environments, whether first or second consonant; however, UA *k^w is *b* in Od before *i* and is k^w before *u*, yielding *bihul* and *hikul* (UA *$k^w isul$ > Od *bihul* and UA *$k^w isul$ > **sikwul* > Od *hikul*). If the two forms are related (which seems probable), then it follows that a metathesized PUA *k^w stood as k^w before round vowels, but *b* before other vowels, in Od.

For labialized consonants to yield their labialization to a following round vowel is common: e.g., in English, *sword* > *sord*; *two* > *tu*; $h^w o$ > *hu* (*who*). Such a rule in Od (UA *$k^w o/k^w u$ > Od *ko/ku* instead of expected *bo/bu*) would merge the normally expected Od **bo/bu* syllables with the **ko/ku* syllables, so that the two would be indistinguishable in Od, since both underlying PUA *$k^w o/k^w u$ and PUA **ko/ku* would surface as *ko/ku* in Od. The larger concern, however, is that the same indistinguishability would apply to all the k^w-languages as well (those languages for which k^w is the reflex of PUA *k^w), which include Nahuatl, Corachol, and nearly all of Northern UA.

Whenever UA languages reflect a *ko* or *ku* syllable, it has generally been assumed to derive from PUA **k* plus the respective round vowel, rather than PUA *k^w plus round vowel. Most of the UA languages are k^w-languages. That fact combined with Tepiman *b* surfacing as *k* (*k^w*) before round vowels could produce a number of cognate sets mistakenly attributed to **ko/ku* that really might belong to *$k^w o/k^w u$.

In fact, one argument is that this assimilation of *$k^w o/k^w u$ to *ko/ku* took place early at near proto-levels in UA, thus eliminating traces of *$k^w o/k^w u$ in the language family at very early stages (personal communication: Wick Miller, in our last conversation not many days before his untimely death, mentioned to me this view, yet was intrigued by the possibilities presented in this paper after reviewing an early draft). The Od *bihul/hikul* metathesis, however, suggests a later productivity of *k^w/b* alternation or transformation in Od than at PUA levels. In addition, if *$k^w o/k^w u$ > *ko/ku* happened near PUA levels, then we could not expect the kinds of evidence that follow.

Comparative UA. Among the most telling of the UA languages for this phenomenon may be the Cahitan languages—Yaqui and Mayo. The reflex in the Cahitan pair of languages for PUA *k^w is b^w; and just as Od has no

TABLE 3

PUA	*$k^w a$	*$k^w o/k^w u$	*ko	*po	*$?o$	*wo	*$k^w i$
k^w-Languages	$k^w a$	ko	ko				
O?odham	ba	ko	ko				
Yq and My	$b^w a$	bo		bo/po			
Tr	wa	o			o		
Wr	wa	wo				wo	
N	$k^w a$	$ko/k^w i$					$k^w i$

bo/bu syllables, neither does Cahitan have $b^w o/b^w u$ syllables. This observation begs an explanation: that neither in O?odham nor in the Cahitan languages does the reflex for PUA *k^w exist before round vowels.

In Cahitan, PUA *p mysteriously appears as both *p* and *b*; therefore, Yq and My *b*'s have been presumed to be from PUA *p, and many of them are. However, a reasonable guess for the whereabouts of underlying $b^w o/b^w u$ in Cahitan (< PUA *$k^w o/k^w u$) could be *bo/bu*; and when we examine some of the *bo/bu* syllables of Cahitan, possibilities emerge (2, 3, 7, 8, 13, and 14 below).

Another reflex of PUA *k^w is *w*, as found in Tarahumara (Tr). Interestingly, Tr does not have any *wo/wu* syllables either, consistent with Od, Yq, and My in lacking the listed reflex of PUA *k^w plus round vowel. We might expect *wo/wu* to simplify to *o/u* in initial position. A number of lexical sets suggest the same (3, 4, 7, 8, 10, 11, 13, 14, 21, 24, and 25). In contrast to Tr, its twin sister language Guarihio (Wr) seems to show *wo/wu* for *$k^w o/k^w u$.

In addition, Nahuatl may well provide another key for the detection of *$k^w u$ in that PUA *u became *i* in N; therefore, rather than Nahuatl *ku* for *$k^w u$ as in other k^w-languages, we might expect to find N $k^w i$ syllables (< *$k^w u$) matching Cahitan *bu* syllables (< $b^w u$ < *$k^w u$), Tr *o*, etc. The occurrence of such less-than-obvious matches speaks convincingly for the $k^w o/k^w u$ phenomenon (3, 7, 8).

The above possibilities yield an adjusted appearance to the sound correspondences of PUA *k^w when preceding round vowels. At a glance, note the contrast, shown in table 3, between the reflexes of PUA *k^w before *a* (as known for years) vs. *o/u* (as suggested in this paper).

The last five columns in table 3 are added to illustrate that these newly suggested reflexes for PUA *$k^w o$/*$k^w u$ are identical to some other PUA consonant plus *o/u* for most languages, which dual identity probably helped obscure them. In light of the above possibilities for PUA *$k^w o/k^w u$, consider the following sets. (Reconstructions[1] are merely tentative approximations to

[1] Lexical items are taken from sources listed in the bibliography for the individual languages, as well as Miller (1988); orthographically, *U* in Ute is the high back unrounded vowel

help the non-Uto-Aztecanist see the base forms from which the others might derive.)

(2) *k^wo 'at, in'
Yq and My *-bo/-po* 'locative: at a place'
Od *-ko* 'in, on, at a place'
N *-ko* 'locative: in, among'
As expected for *k^wo in all languages

(3) *$k^wu(?)ta$ 'untie, loose'
Yq *búta* 'untie'
My *buttia* 'untie, let loose'
Tr *o?ta-* 'be slack, loose'; Tr *o?ta-na* 'let loose, give freedom, pardon'
N *$k^wi\lambda$ašiwi* 'get loose, go weak'
perhaps Eu *kóranan* 'untie, undo, take apart'
and Ls *kurá-vi-* 'untie'; Ls *kú:ra/i* 'shed hair or skin, unwind a string'

Miller shows Wr and Tr having both *u* and *o* corresponding to PUA **u* (1967:6), so Yq, My, Tr, and N all show the first two syllables agreeing with *k^wuta (*k^wuta > Yq and My *but(a)*; > Tr *o?ta*; and > N *$k^wi\lambda a$*). Eu and Ls are listed as tentative for two reasons. First, I am not sure that *r* can be equated to *t*, though intervocalic *t* becoming *r* is common worldwide as well as in Uto-Aztecan languages, and *r* being an alternate of *t* is common in Tr, Numic, and other branches of UA. Ls is a k^w-language and does show *l* corresponding to medial *t*, and *r*'s and *l*'s are even more highly interchangeable in UA than *r*'s and *t*'s. Second, some Eu labials need clarification. Eudeve is phonologically similar to the Tepiman languages in that PUA *k^w is usually reflected as Eu *b* (*k^wasi 'tail' > Eu *basít* 'tail'), and PUA **y* is *d*. Regarding the k^wo phenomenon, Eu sometimes appears to retain a bilabial (11, 12, 13, 22), yet other times shows possible *ko* syllables. Nevertheless, regardless of the inclusion of Eu and Ls, the diverse appearances of the Yq, My, Tr, and N forms all coinciding with *k^wuta provide compelling support for the k^wu/k^wo phenomenon, since the suggested outcome for *k^wu is as expected in Yq and My *bu*, Tr *o*, and N k^wi for the initial syllable, and except for the truncated My stem, all show *ta* for the second syllable as well.

(4) *k^wawi 'point, edge, sharp'
Yq $b^wawí$-*te* 'sharpen, make an edge'
Arizona Yq b^wawia 'sharpened end'
My b^wawi 'have an edge, be sharp'

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listed in Givón (1979); *δ* in Od is *th* of Saxton, Saxton, and Enos's (1983) dictionary, and *d* of the 1969 version; for the *v* and *w* that have both been used for the Od reflex of PUA **p*, I here use *v* to help the less familiar to see its relationship to **p* rather than **w*.

MP *ku:g* 'point'
Od *ku:g/kugi* 'edge, end'
Od *ku:giδ* 'make a point'; Od *ku:gia* 'erection';
Tr *owá-* 'sharpen to a point'
CU *kúwaa* 'sharp edge'; Ute *kuwá-pU* 'a sharp point, sharpness' (*U* = high back unrounded vowel)
N *k^{w}awi* 'tree, stick'
Cr *kɨyé* 'tree, stick'
Cp *k^{w}iti* 'sharp-pointed'
perhaps Eu *kowát* 'point' (borrowed from a *k^{w}*-language?)

(4) may be a significant set in that Od *g* corresponds to PUA **w*, and therefore Cahitan (Yq and My) *b^{w}awi-* and Od *ku:gi* both manifest **k^{w}-__-w-i*; and for the vowel *a* to assimilate to rounding between two round segments (*k^{w}* and *w*) is natural (**k^{w}Vw > kuw* in Od, Tr, Eu, and CU). What's more is that N *k^{w}awi* is exactly parallel to Cahitan *b^{w}awi*, with a slight semantic extension of . . . well . . . 'extension: tree, stick', as compared to Arizona Yq 'sharpened end' and Od 'erection, end, point'—all having to do with long, pointed objects. Cr *ɨ* corresponds to PUA **u*; therefore, the first three segments of Cr *kɨy*—semantically identical to N 'tree, stick'—could easily reflect **kuwi* (< **k^{w}uwi* < **k^{w}awi*). Cp *i* corresponds to PUA **o*; therefore, if the *a* of **k^{w}aw* rounded to **k^{w}ow* (> *k^{w}o* > *k^{w}i*), then the first syllable of Cp is a possibility also.

The vowel reduction apparent in this set (**k^{w}VC > koC/kuC*) is natural and common (table 1, 5, 6, 10, 11, 14, 17). The next two items demonstrate that vowel reduction more clearly.

(5) **k^{w}asa* 'eagle'
Yq *b^{w}asaʔaka* 'bird of prey'
Tbr *k^{w}asá* 'large bird that fishes'
Tr *kusá* 'little eagle' (for Tr *ku* > **k^{w}u*, cf. 17, 46, 48)
Ca *k^{w}asanemčíip* 'baldheaded bird'

(6) **k^{w}is* 'grasp, take'
Tr *wisí* 'snatch, take away'
Yq and My *b^{w}ise* 'grasp, take'
Hp *k^{w}iisi* 'trapped, snared'
Od *behi/behe* 'get, take, acquire'
Ca *-kuṣ-* 'take, get hold of'
Cp *kuṣa* 'get, fetch, take'
Ls *kuṣáni* 'take, grasp'

Note that the Tr form in (5) and all the Takic forms (Ca, Cp, Ls) in (6) have reduced **k^{w}VC* to *kuC*; in other words, the vowel following **k^{w}* reduces, assimilates, or disappears to leave a *ko/ku* form of the *k^{w}* plus *V*. The Kawaiisu forms in table 1 are another example of this reduction (Kawaiisu

'tail' *k*ʷ*asi/kosi*). Though obvious, this phenomenon merits formal mention because it happens so often in the sets listed.

Also worth mentioning is the fact that sets exhibiting this *k*ʷ*o/k*ʷ*u* phenomenon sometimes contain an *o/u* variability. That may be due to the reduction of the rounding of **k*ʷ to *ko* or *ku*. Is the *w* of **k*ʷ closer to *o* or *u*? When the sequences *aua* and *aoa* are spoken quickly, both sound like *awa*. So unless the *w* or rounding of **k*ʷ can be identified as closer to *o* or *u*, then the *o/u* variability in the *k*ʷ*o* phenomenon almost indirectly supports it being from the more elusive *w* rather than from either PUA **o* or **u*. Single round vowels (nondiphthongs) from PUA **o* or **u* should align with one or the other, but the rounding of **k*ʷ when reduced to *ko/ku* could easily be perceived as either. Furthermore, when a nonround vowel falls between two rounded or labial consonants (as in 4, 10, 11, 14, etc.) and thus assimilates to the labial consonants on both sides to become a round vowel (e.g., *k*ʷ*aw* > *k*ʷ*ow* or *k*ʷ*uw*, i.e., > *ko/ku*), UA linguistics has hardly progressed so far as to predict the degree of effect or which round vowel to expect—*o* or *u*—for the various environments of each language.

(7) **k*ʷ*uy* 'growl, snarl, bark, scold'
My *bu:ye* 'bark, regañar' (snarl, growl, and/or scold)
Tr *oyo-* 'become angry'
Eu *vúde-* 'growl, bark'
N *k*ʷ*ik*ʷ*inaka* 'make a low sound in the throat; for a person, to hum; for a dog, to growl'
perhaps Od *kodog* 'rumble, gurgle'
and Hp *qöyqöy* 'scold'

Nahuatl *k*ʷ*i* (in a probable compound) agrees with **k*ʷ*u*, not **k*ʷ*o*, since **k*ʷ*o* yields *ko* in N (see 2) but **k*ʷ*u* yields *k*ʷ*i* (3, 7, 8). As second consonant, *y* is clear in five of the six languages—My, Tr, Eu, Od, and Hp (Eu *d* and Od *d* correspond to PUA **y*)—and is easily possible in N as well, since *y* following nearly identical *i* would be hardly perceptible (**k*ʷ*iy* > *k*ʷ*i*). Od and Hp show PUA **o* instead of **u* apparent in the other four languages. As for Od, the wary, muffled *growl* of a dog is very much a *rumbling, gurgling* noise. Nevertheless, even if we choose to discard Hp and Od for their aberrant vowel, the other four languages show exactly as expected for **k*ʷ*uy*; or including Hp and Od with the *o/u* variability (which, as mentioned, is common to the *k*ʷ*o/k*ʷ*u* phenomenon), all six languages produce a nice composite for **k*ʷ*uy* and are quite consistent semantically.

(8) **k*ʷ*uh* 'grain coming off ears'
Cah *búh-te* 'espigarse' (grain or seed to fall from ears)
Tr *ohó-* 'desgranar' (remove grain from ears)

N *kʷi?kʷi* 'chip off (wood or stone), clean up a surface, take something away, get ready, be prepared'

All items are phonologically as expected for **kʷu*: > Cah *bu*; > Tr *o/u*; > N *kʷi*. The N form is semantically less than certain, though the N meanings 'knocking off pieces of something' and 'cleaning a surface' are what 'cleaning grains from ears' amounts to, especially if in 'preparation or getting ready' for storage or the coming season. Regardless of Nahuatl's inclusion, Tr and Cahitan both agree with PUA **kʷuh(V)*.

(9) **cakʷV* 'grasp, catch, enclose'
Cp *cákʷe* 'catch, grab'
Ls *caqʷi* 'catch, seize'
Eu *zápa-n* 'grab, seize'
Od *ṣaakum* 'catch, grasp'
N *cakʷa* 'enclose, close, lock up'

This is a curious set in that Od appears to show *kʷ*, though no following round vowel is apparent in the other reflexes to trigger the *kʷo* phenomenon. Yet all forms show reflexes of **cakʷ* for the first three segments (Od *s* < **c*) and are identical semantically, except N. But even if the N form were excluded, the Od form remains intriguing. Could the following bilabial *m*, as a form of rounding, have motivated *kʷ* in Od like round vowels do or is it simply a reduction (*kʷVm* or *kʷm* > *kum*)? Or, on the other hand, is it a different morpheme altogether that just happens to have an identical initial syllable and meaning as the other forms? The following set may be another example of *m* producing the *kʷo* phenomenon in Od.

(10) **kʷalma* 'hug, wrap arms around'
Od *ko:m-k* 'hug'
Od *ko:m-C* 'have in one's arms'
Ca *kʷálma* 'hug, put arm around, hold under the arm'
Cp *kʷalma* 'carry under the arm'
Tr *omabi-* 'cross or fold arms, wrap or dress oneself in something'
Wr *komí-* 'hug, carry in the arms'

The Ca and Cp forms show *kʷ*, and interestingly the Od forms, if cognate, also show *kʷ* before the round vowel, not *b*, and the two Od forms have the same pair of meanings as Ca *kʷálma*. *L*'s are easily lost as first elements in a cluster: e.g., *walk*, *talk*, *salmon*, *folks*, *should*, *half*. One might put Wr and Od together as from **kom*, considering the others to be from a different stem, which is possible; however, in light of all five languages showing *m* in the second consonant or cluster, and being semantically quite specific and similar, and fitting the newly suggested correspondences for the **kʷ*

phenomenon (except Wr, which may be borrowed), their relationship should be considered.

(11) *k^w*awe* 'invite'
Cp *k^wawe* 'call, invite'
Tr *o?wí-* 'invite'
Wr *oí-* 'invite to work' (perhaps borrowed from Tr; otherwise, *woí*)
Eu *bowá* 'invite'
perhaps Sr *ko:han* 'call, invite'
and Od *baamuð* 'plead, invite'

Cp, Tr, Wr, and Eu match nicely. The vowel reduction to *o* or *u* as discussed previously is even more likely when rounded elements (labials) are found on both sides of the vowel (e.g., 4, 10, 11, 14), which then sets up the *k^wo/k^wu* phenomenon. Note the further consistency of Cp maintaining initial Cp *k^wa* in both (10) and (11), which in both cases corresponds to Tr *o*. The Sr and Od forms, if related, lost the second syllable to compounding.

k^wawe > *k^wa-* > Od *baa-*
> *k^wawe* > Cp *k^wawe*
> *k^wowe* > Tr *owí*; Wr *oí*; Sr *koo-*; Eu *bowá*

(12) *k^wusi* 'dust' (ashes?)
Np *kusi-bɨ* 'dust'
Eu *puse-* 'make dust'

The record of now extinct Eu provides some uncertainty in the recording of bilabials; nevertheless, Eu, similar to the Tepiman languages, generally shows bilabials (whether *b*, *v*, *p*) corresponding to UA *k^w, as seen in table 1 (*basít* < *k^wasi*) but does not always undergo the *k^w* phenomenon as in Od; Eu thus often leaves bilabials as bilabials before round vowels. This fact provides additional key contrasts for the *k^wo/k^wu* phenomenon (11, 12, 13). The above pair (12) may be related to UA 'ashes' **kusi* (Miller 1988), though neither item is listed in Miller (1988). Whatever the case for that, NP *kusi* 'dust' and Eu *puse* 'make dust' match well: the *k^w* phenomenon before round vowel as expected for each language; *u*; *s*; and a high front vowel.

(13*a*) **sek^{w}ori* 'fly'
Eu *sébor* 'fly'
Tr *se?orí* 'fly; bee'
Wr *se?wá* and *so?óri* 'a kind of fly'
My *sé?ebori* 'fly'
My *kuku-sebo?ori* 'bumblebee'

N *šiiko?-λi* 'bumblebee'
Ca *kuŋ-sex^{w}et* 'bumblebee' (*sex^{w}et* < **sek^{w}et*)

Eu *b* corresponds to UA **k^{w}*, and Tr and Wr *w* normally reflect PUA **k^{w}* in initial position. Here in medial position, the Tr and Wr words for 'fly' show *?w* and *?o* as medial variants of PUA **k^{w}*, which is interesting since *?w* is phonologically nearer to **k^{w}* than *w* is, and *?w* and *?o* could not be from **p*, because Tr and Wr show *p/b* for **p*. In addition, Ca *k^{w}* and N *ko* certainly show *k^{w}* rather than **p*, and all six forms—Eu *sebor*, Tr *se?orí*, Wr *sa?wa*, My *sebori*, Ca **-sekwet*, and N *šiiko?*—nicely demonstrate the *k^{w}o* phenomenon medially. Since Takic *kuŋ* is a word for 'husband', that morpheme may apply to the My form as well and thus reflect in both languages (Ca and My) a historical compound of 'husband-bee' for 'bumblebee'.

While My *bo* could feasibly reflect either **po* or **b^{w}o* (< **k^{w}o*), the reflexes of Tr, Wr, Ca, and N could not reflect **p* but only **k^{w}*. In contrast, the forms in (13*b*) appear to suggest medial **p*; even Cr *h* corresponds to PUA **p*.

(13*b*) Tbr *sayvol* 'bee'
PB *saivori* 'bee'
Cr *sá?ihiru* 'fly'
Hch *sáip̨i* 'fly'
N *sa:yo:l-in* 'fly'

However, some, if not all, the forms in (13*b*) are more likely borrowed from core Sonoran languages. In fact, borrowing is certain in the case of PB, since the Tepiman languages have *h*, not *s*, corresponding to PUA **s* of the other UA languages. Both the Tbr and PB forms may be borrowed from Cahitan (Yq or My) in view of their being geographic neighbors to Cahitan, the similarity of form with Cahitan, and the fact that Cahitan as the loan source would explain quasi-medial **p*, since Cahitan *b* (in the *bo* syllable) would be taken as *p* in other UA loans. Nahuatl *sa:yo:l-in* 'fly', in turn, is probably borrowed from one of those. Except for the missing bilabial *v*, note the similarity of both Tbr *sayvol* and PB *saivori* to N *sa:yo:l-in* in that all five remaining segments of N are basically identical to Tbr and PB: *s a y/i* (*v*) *o l/r*.

(14) **k^{w}a?a*(*ru*) > **k^{w}a?u*(*ru*) > **k^{w}u?u*(*ru*) 'big, many'
Yq *b^{w}é?u* 'big'; Yq *bú?u/ búu?u* 'big, many'
My *b^{w}é?uru* and *b^{w}eere* 'big'; My *bú?uru* 'many'
Tr *wa?rú/o?rú* 'big, many'
Wr *we?werú* 'many' (reduplicated form)

for discussion purposes, consider also:
Od *ge?el/ge?e* 'big'
Tepiman **g̊i?i̊* 'big'; *g̊i?i̊g̊ir̊i̊* 'big, pl.' (Bascom)
MP *ge?e* 'big'; *ge?eger* 'pl.'
Cr *be?é* 'big'
Od *ba?ama* 'abundantly, plentifully'

In the alternate pairs of Cahitan *b^{w}e?u/bu?u* and Tr *wa?ru/o?ru*, the diachronic phenomenon under discussion is visible synchronically. Beyond that, the above sets present a historical difficulty. The Tr and Wr reflex *w* can correspond to either PUA **w* or **k^{w}*, and lexemes exist for both directions. Cahitan *b^{w}* can only be from **k^{w}*, not **w*, while Od *ge?el* and Cr *be?é* both correspond to initial **w*, not **k^{w}*, yet, when Od *ge?el*, Tepiman generally, Tr, Yq, and My all show the same second and possibly third consonants, it is difficult to say that the forms are not related, though more than one morpheme may be involved. Tr and Wr may be pivotal in this case, as their reflex (*w*) agrees with both sets. One possible explanation for this group of words is that an original form with initial **k^{w}* is the primary base for the original cognates: Cahitan **b^{w}e?u(ru)/b^{w}eere*, Tr *wa?rú*, Wr *we?weru*, and perhaps Od *ba?ama* minus the last syllable. Subsequent to them, a far-reaching borrowing from Wr/Tr to other Southern UA languages may explain the others. Tr/Wr, reflecting *w* for **k^{w}*, may be the source from which later loans developed, which correspond to initial **w*, such as Od *ge?el*; in fact, note the four-consonant similarity in the plural or reduplicated forms between Wr *we?weru* and Tepiman **g̊i?i̊g̊ir̊i̊*. If this is a loan, it would have to have occurred very early, before the Tepiman sound change of **w* to *g*, at which early date SUA was probably not as widespread as it is now.

With regard to Cr *b* reflecting **w*, additional examples are in order. Miller (1967) lists both *w* and *b* as Cr reflexes of medial **w*, but only Cr *w* for initial **w*. However, Cr *b* seems also to reflect initial PUA **w* as well, in (15) and (16) below, and in (14) above.

(15) **wiluku* 'buzzard, turkey buzzard, zopilote'
Hp *wisoko*
Sr *wirokt*
Yq *wiiru*
My *wiiru*
Tr *wirú*
Tbr *wilú*
Cr *bisk̊i̊*
Hch *wir̊i̊k̊i̊*
Kw *wiku-mahaa-zi*
CU *wḥkúci-ge-t̊i̊* (*ḥ* is a nondescript voiceless vowel)

Since PUA **u* corresponds to Cr *i̵*, Hch *i̵*, and Hp *o*, all vowels agree with **-i-u-u*, except possibly one voiceless vowel (CU *ḥ*) that could be anything. Hp and Cr apparently devoiced the medial liquid (*r* > *s*), while the Numic languages (here Kw and Ute) lost the middle syllable altogether, as Cr almost did. This sizable number of forms quite cleanly accord with **wiluku*, and Cr *b* is a reflex of initial **w*.

(16) **wiku(y)/*piku* 'to whistle'
Od *gikuj*
PB *wikuda*
NT *gikúdyi* and *vikúdyi* (Northern Tepehuan, from Bascom 1965)
ST *gikudyi* (Southern Tepehuan, from Bascom 1965)
Eu *bíkudawa*
Yq *bikué* and *bíute*
My *bikué*
Wr *wikoé-*
Tr *wikuwa-*
Cr *bíki̵ʔe*

This set is more puzzling. The Tepiman languages (first four) represent well the dichotomy, since they are split between **w* and **p*. Tepiman *g* corresponds to PUA **w* and Tepiman *w/v* corresponds to PUA **p*. Three of them show *g* (< **w*) and two show *w/v* (< **p*), with NT having both forms in the same language. Yq and My agree with **p*, while Wr, Tr, and Cr agree with **w*—a veritable **w/*p* dichotomy—though patterns of borrowing may again explain some forms.

(17) **kʷicia* (< **kʷit-koa*) ? 'worm'
Yq *bʷíčia* 'worm'
My *bʷíčia* 'worm'
Tbr *kʷicí-t* 'worm'
Tr *kucíwa-ri* 'worm'
Wr *ihkucíwa* 'worm'
Hch *kʷici* 'worm'
N *kʷit-ko:a:-λ* 'tapeworm (excrement-snake)'
perhaps Od *kosvul* 'cocoon'
Ca *-kúʔa* 'become wormy'
and Cr *čuʔihinu* 'worm'

The similarity of the N form (*kʷitko:a:*) to the Yq, My, Tbr, Tr, Wr, and Hch forms (**kʷicia*) appears suspicious, especially when all that is needed to explain the change is one assimilated vowel and one cluster reduction, both of which are common changes. A *tk* cluster, as still exists in N, becoming *c/č*

is easily possible (e.g., Spanish *noche*, *ocho*, etc. from Latin *kt* clusters), and if the second of three vowels (*o*) assimilated to its preceding vowel (*i*), then the following high front vowel would make the change *tk* > *č* even more likely (**k^{w}itkoa* > **k^{w}itkia* > **k^{w}icia*)

The Tr and Wr forms may further support a change of **k^{w}itkoa* > **k^{w}icia*. First, *ku* is a possible variant of **k^w* reduction in Tr (cf. 5, 17, 46, 48); second, if the *ko:a:* morpheme of the N compound contained an underlying *w* (*owa*) or if it was even perceived in Tr and Wr as containing such, then Tr/Wr *kuciwa* could be a vowel metathesis of **k^{w}icowa* or a forward shift of vowels: **k^{w}icowa* > *ikuciwa*. Tr does exhibit such behavior on occasion; compare the alternate forms meaning 'self' in Tr *binói* and *boné*. In other words, *k^{w}icia* from *k^{w}itko:a:* is easily possible phonologically and merits consideration. More significantly, the compound nature of Sonoran **k^{w}icia* would reveal two very common PUA stems: **k^{w}it-*ko:a:* 'excrement-snake'. When two stops are involved in a cluster, the result for one or both is often a glottal stop (English *dictate* > *di?tet*, *cotton* > *ka?n*); therefore, the Ca form *kú?a* is listed in the possibility of vowel reduction and the cluster being reduced to glottal stop, and since Cr *čw* corresponds to **k^w*, the same may apply to Cr *ču?i-*. The Od element *-vul* appears in other berry words, so Od *kosvul* 'cocoon' may be a compound of 'worm-berry'.[2] Od *kos* matches **k^{w}ic* with vowel reduction, since Od *s* does correspond to PUA **c*.

(18) **k^{w}Vtas-* 'leather, skin, hide'
N *k^{w}eλaš-λi* 'leather, hide, skin'
Hp *kola:sa* 'leather'
Sr *qöch* 'skin, hide'
Tbr *kocí-t/ k^{w}ici-* 'skin'
Wr *wohcí* 'leather'; Wr *wi?cí* 'skin'
Tr *wičí* 'skin'

Hp *kola:sa* may be a borrowing from N *k^{w}eλaš-λi*. The geographic distance is no barrier to borrowing, as seen in Navajo *biso:di* 'pig' < Hp *pico:ti* < Nahuatl *peco-λ*. The Sr, Tbr, and Wr forms certainly appear related to each other, showing the **k^{w}o* phenomenon, whether or not they are related to the N and Hp forms. However, a vowel loss that would cluster *t* and *s* produces the alveolar affricate *c* quite naturally: **k^{w}Vtas-ti* > **k^{w}Vtsi-* > **koci/k^{w}ici*. Thus, all the forms may be related.

[2] Od *koavul* 'any species or edible fruit of the wolfberry'; Tb *wopul* 'gooseberry'. In light of these two forms containing UA **-pul* and both meaning 'berry', it is plausible that Od *kosvul* 'cocoon' is a compound of *kos*, which corresponds to UA **k^{w}ic* 'worm' and *-vul* 'berry'; thus, Od *kosvul* 'cocoon' may be a compound meaning 'worm-berry'.

(19) *k^w*alani* 'angry'
N *k^wala:-ni* 'get angry'
Hp *k^wala* 'be angry'
Cp *welne-t* 'angry'
Tb *wɨɨdɨ* 'be angry'
Ls *wóltu-* 'be angry'
Tr *onía* 'be angry' (an irregular subjunctive form of Tr *oyo-*)

Cp and Ls normally show *k^w* for PUA *k^w*, but *w/k^w* alternations do occur in the Takic languages (see table 1 'tail'), and Ls *o* is the reflex for PUA **e*; therefore, due to Cp *ln* being in place and being the same two consonants as in N *k^walaani*, even if separate morphemes, we should not exclude the possibility. What's more is that an original *ln* cluster could easily become *d* as in Tb or *n* as in Tr. Medial consonants are not yet entirely clear in UA, much less reduced medial clusters made quite opaque in the reductions. The Cp and Ls clusters—*ln* and *lt*, respectively—are interesting in that an *n/t* alternation exists in Kiowa-Tanoan phonology and the *lt* is perhaps nearer Tb *d* than the others—*l* is voiced and *t* is a stop, perhaps resulting in a voiced stop (*d*), and all are alveolars.

A point worth mentioning is that some of these sets include items that, while plausible, are less than certain—appropriate to the fact that beyond initial CV, matters are less certain in UA. Medial consonants are often notoriously elusive. As Miller states, "The PUA vowels and consonants of initial syllables can be reconstructed in considerable detail, but there are still many problems for noninitial syllables" (1983:115). A glance at initial vs. medial consonant correspondences reinforces the same (Miller 1967:9). Though rigorous accounting for all segments is the end sought, a hindrance to reaching that end may be too strict an adherence to the handful of UA certainties thus far obvious, at the exclusion of plausibilities that may be key to insights indispensable to the eventual necessary rigor.

Much of the difficulty with medial consonant correspondences in UA may lie in many medial consonants being reductions of clusters that were not single consonants at all originally (cf. 10, 17, 18, 19). Such processes as syncope reducing syllables to consonant clusters (as Cr in 15) and then to single consonants would produce considerable variety in the assumed "medial consonants" since they would really be reductions of clusters (CVCVCV > CVCCV > CVCV or CVʔV). The fact that 13 consonants can create more than 100 cluster combinations, added to the fact that each cluster possibility is likely to change in more ways than a single consonant would, may partially explain the difficulties of the noninitial consonants. Note that in (10) and (19), Takic languages have retained an *L* (as first element of a cluster) that has been lost in the other UA languages.

(20) *k^woca/*k^waca 'lizard'
Wr *wocá* 'lizard'
Hp *qöqöci* 'lizard'
N *k^wecpal-in* 'lizard'
Tbr *k^wacara* 'type of lizard'

A change from *k^wac > *koc* due to the vowel reduction mentioned above would account for Wr and Hp, since Hp *ö* does correspond to Wr and UA **o*, and though medial **c* > *y* is a sound law for many **c* of northern UA (Manaster Ramer 1992), forms exist to show it not so for all. Thus, the four forms could well be related, N obviously a compound.

(21) *k^wuku 'owl'
Tr *okowí/okó-turi* 'owl, small type of owl'; Tr *o*kó* 'type of owl'
Od *kuukvul* 'elf owl'; Od *kokoho* 'burrowing owl'
Ca *kúkul* 'ground owl'
Hp *koko* 'ground owl, little owl'

This set may be onomatopoeic; however, Tr's expected *o* in contrast with the other *k^w* forms and the fact that all vowels, except Od, agree with PUA **u* combine to allow *k^wuku* as a possibility for some of the above, though it could be argued that Tr simply lost initial *k*, which is also plausible.

(22) *k^wut/k^wuCC 'hang'
Tr *otorinto* 'hanging, suspended'
Tr *o?há-/ go?há-/wiha-mea* 'hang, be pendulous'
Od *ku:kta* 'hanging shelf' (if second *k* from reduplication)
Hp *kolca* 'shelf'
Eu *purúce/puríce* 'hang, be pendulous'

These may not be related due to problems beyond initial CV, though the first syllables show the *k^wo/k^wu* pattern with *t* or *l* (either of which could be glottal stop in a cluster) as possible second consonants for all that follows the round vowel. Nevertheless, whether cognate or not, these forms contain subsets of features worth noting. The first Tr form is obviously a compound. The second row of Tr forms is interesting in that all three exhibit possibilities for initial *k^w* and *h* in the second consonant or cluster; compare the alternate forms of Tr *witá/guté* 'feces' (< *k^wita) and the *o* vs. *ko/go* items in (39)–(43). The Hp and Eu lexemes also form an interesting pair. Given the possibility of a semantic tie between 'hanging' and 'shelf' (as in the Od form), Hp and Eu both phonologically fit *k^wul(V)c*, since *p* is an orthographic variant of *b* in the recording of Eu, and Hp *o* corresponds to **u*.

(23) *k^wak^w 'thanks'
Hp k^wak^wha 'thank you' (man speaking)
Wr *wo?kóba* 'give thanks' (in prayer)

(24) *$k^wu?p$ 'downhill, descend'
Tr *o?pi-* 'descend, go down, lose altitude'
Od *kuivo* 'downstream'
Od *kuivodam* 'sloping downward' (Mathiot 1976)

Except for the third segment or whatever precedes *p, the first, second, and fourth segments of Tr and Od yield something near *k^wu_p.

(25) *$k^wu?ip$ 'to boil'
Tr *o?wiba-* 'be cooked, boiled'
Od *ku?ivo-ni* 'boil'

If Tr *w* is the rounding being carried past the glottal stop, then they yield something near *$k^wu?ip$, though two morphemes are probably involved.

Variation in the Sonoran languages. The Sonoran languages—especially Tr—exhibit considerable variation in the labiovelar spectrum. Besides underlying *k^wo/k^wu simplifying to Tr *o/u* (PUA *k^wo > Proto-Wr/Tr *wo > Tr *o*), even some *w* plus nonround vowels simplify to *o* in the alternate forms that follow:

(26) Tr *wa?rú/o?rú* 'big'

(27) Tr *wisoró/osoró* 'white poplar'

(28) Tr *weke-ma/oke-ma* 'cry, weep'

More curious are the *w/b* alternations:

(29) Tr *wa?wé/ba?wé* 'eagle' (*$k^wa?we$ > Od *ba?ag*; Eu *páwe*; Wr *wa?wé*)

(30) Tr *wemóri/bemóri* 'cloud, dust' (< *k^wi)

(31) Tr *wasu/basu* 'cook in water' (< *k^wasɨ)

(32) Tr *wíko/bíko* 'entrails, intestines'

(33) Tr *wasona/basona* 'duck'

(34) Tr *wasi-/basi-* 'tail' in *wasi-bura/basi-bura* (< *k^wasi)

(35) Tr *wíso/bíso* 'pus' (Tb *piskis*; Cm *pisi-pp*ɨ; Wr *pehsóni*)

(36) Tr *wisúra/bisúra* 'heart'

(37) Tr *wici-ma/bicí-ma* 'believe' (Wr *piciké*; Tbr *wici-mwá*; Eu *vicwace-*)

(38) Tr *o:kíri/bo:kíri* 'waterfall'

Item (30) is a compound of *wee* 'earth' and *mo* 'up'; the *wee* is a reflex of the well-known UA stem **k^{w}iya* 'land, earth'; so the *bemóri* form (30), (29), and (34) Tr *basi-bura* (< PUA **k^{w}asi*) all show *b* alternates in Tr for PUA **k^w*, as the Tepiman *b* for **k^w*. The Tr *w/b* alternations in (35) and (37) appear to correspond to PUA **p*.

Other Tr cases exhibit *o/ko* alternations (or *u/ku*, let *o* represent both round vowels) and *bo/ko* alternations (44, 45). The latter are quite astonishing, because they show opposite ends of the *k^w/b* spectrum in UA, in spite of the fact that Tr normally has neither one, but rather *w* for UA **k^w* generally, though Tr velarization (or *k^w*) for **k^w* is apparent on occasion (5, 17, 46, 48), as is Tr *b* for PUA **k^w* on occasion (29, 30, 34).

(39) Tr *upisi/kupisi* 'firefly'

(40) Tr *uusabi/kuusabi/guusabi* 'Prunus Capuli'

(41) Tr *o:na/ko:na* 'corncob' (Wr *wo?ná*)

(42) Tr *oná/koná* 'salt' (Wr *woná*)

(43) Tr *orogá/gorogá* 'collar, necklace'

(44) Tr *utuburi/tutuguri/r'utuburi* 'type of dance'

(45) Tr *bo?o/ko?o* 'to, at, from the other side'

(46) Tr *witá/guté* 'feces' (< PUA **k^{w}ita*)

UA **ona* 'salt' is a widespread and secure lexeme among UA languages, and definitely does not begin with initial **k^w*, regardless the Tr alternate form *kona*. Fortunately, Wr, twin sister language of Tr, may provide a clue to what is happening in Tr. In Wr *wona* 'salt', Wr has somehow intensified the initial rounding to begin the lexeme with *wo* rather than *o*, as found in most UA languages. That *w* or greater intensification of initial rounding may be involved in triggering a *k^w*-like form in Tr, since Tr *w* is also the Tr reflex for PUA **k^w* and Tr does show occasional *k^w* forms for **k^w*. In other words, the initial *w*-like perception may have triggered a switch to or overlap with the underlying phoneme **k^w* (normally Tr *w* but surfacing as *k^w* at times): **ona* > **wona* > Tr *ona/kona*. That lexeme does not stand alone in this phenomenon. In addition to 'salt', the Wr and Tr words for 'corncob' provide the same pattern of Wr *wo* and Tr *o/ko* alternations: Wr *wo?ná* 'corncob'; Tr *o:na/ko:na* 'corncob'.

(47) Most intriguing is the Tr pair: Tr *bineri* 'alone, only (sg.)'; and Tr *aʔwineri* 'alone, only (pl.)'. The element *ʔw* may be considered intermediary between *b* and k^w, and since *k* becoming *ʔ* is common, this pair is not unlike (44) and (45), in nearly showing the entire range of the UA k^w/b spectrum also.

Most examples thus far have dealt with $*k^w$ in initial position. For the Sonoran languages, curious variations occur in medial position as well.

(48) 'rob' *ʔɨcikwa (Lionnet 1985): Tr *ciwá* and *cigó*; Yq *ʔétbwa*; Tbr *icikwa*

All forms point to medial $*k^w$ in the last syllable—Yq and Tbr certainly so, and the Tr pair more interestingly so, in that the two Tr forms resemble the *o/ko* variation seen in initial position (39–43 and 46); i.e., *ciwá* and *cigó* may derive historically from separate reflexes for $*k^w$—*w* and k^w respectively—in medial position. The Tr pair for 'rob' (*ciwá* and *cigó*) are not unlike the Tr pair for 'feces' (*witá* and *guté*)—containing similar alternations in medial and initial positions respectively. Both pairs show both alternates—*w* and k^w (undergoing voicing and reduction to *go/gu*)—from $*k^w$. Contrary to the agreement toward $*k^w$ in (48) above, the forms in (49) below do not show such agreement, but awkwardly straddle $*k^w$ and **p*.

(49) 'egg': Tr *kaʔwa*; Yq *kaba*; My *kabba*; Eu *akabo-ra* (Lionnet 1985)

Yq and My (Cahitan) normally have b^w corresponding to UA $*k^w$, while Cah *b* normally corresponds to UA **p*; however, Tr usually yields *p* or *b* for PUA **p*, not *ʔw*; so the combination of Tr *ʔw* and Cah *b* in 'egg' does not easily fit either $*k^w$ or **p*.

If the second consonant of this collection of 'eggs' is PUA **p*, then Tr *kaʔwa* shows **p* nearly changed to k^w (as Tr and Wr *ʔw* < PUA $*k^w$ in 'fly' [13]). If we count the second consonant as $*k^w$, then the *b*'s in Yq and My 'egg' would correspond to $*k^w$, which is also an exception to our present understanding of comparative UA, since *b*'s in Yq/My have always been considered from UA **p*. In fact, the Tr pair *bineri/aʔwineri* presents the same problem as Tr *kaʔwa* 'egg'. If the *b* in *bineri* is attributed to PUA **p* (as *b*'s usually are in Tr), then Tr *aʔwineri* also shows **p* > *ʔw* or k^w. On the other hand, if we relate that Tr phoneme to $*k^w$, then we have $*k^w$ surfacing as *b* in Tr (sg.), like the Tepiman reflex, which change we have seen in Tr. Either way, the Tr forms are exceptional, not agreeing with the traditional view of PUA $*k^w$ > Tr *w* and **p* > Tr *p/b*. The Tr pair *bineri/aʔwineri* suggests some kind of interplay between UA $*k^w$ and **p*. Examples of this overlap or interfacing between $*k^w$ and **p* only multiply upon investigation (13, 47, 49, 50, 51, 52).

One fact probably relevant to all this is that reflexes of *k^w do not appear medially with nearly the frequency that they do initially in UA. For example, in Od there are about three times as many initial *b* as medial *b* (unofficial count in Saxton et al. 1983: 73/24). Likewise, in Miller (1988) the ratio is about two to one for UA cognate sets. (I unofficially counted thirty-six initial k^w sets vs. seventeen medial k^w.) A second fact possibly related to the first is that k^w/p interchanges seem to happen more often in medial position than in initial position. In addition to (47) and (49), three of the next four sets are examples of medial *k^w/*p interchanges (47, 49, 50, 51, and Cora and NP in 53).

(50) *$k^w ici$ 'smoke'
Hp $k^w i{:}kwici$
My $b^w ici$
CU $k^w ií$
Tbr *ku-picí-t*

The first three forms clearly show initial *k^w; however, in Tbr—which is a k^w-language—a prefix makes an otherwise initial consonant noninitial, and interestingly, Tbr shows *p* instead of k^w but is identical in the other three segments. So it would be rather preposterous to suggest that the Tbr form is not related to UA *$k^w ici$, yet here in a k^w-language we have a noninitial *p* corresponding to *k^w.

(51) 'autumn' (Miller 1988)
Mn *yɨpa*
NP *yɨpano*
Pn *yɨpani*
Sh *yɨpani*
Kw *yɨpana*
SP *yɨpanna-G* (Sapir 1930: *yɨvanna-G* and *yɨv^{w}anna-G*)
CU *yɨk^{w}ana/yɨp^{w}ana*

A medial *p* in Numic has obviously become k^w in one language, Colorado Ute (Givón 1979). More significant is how that happening ($p > p^w > k^w$) may be similar to the Tr *o/ko* alternations. Kw, SP, and CU form a west-to-east line of Southern Numic languages. The Kawaisu form (nearest the Numic homeland) agrees with Numic generally (*yɨpana*), while SP has two alternate forms, one of which introduces vocalic rounding associated with the bilabial (*yɨvanna/yɨv^{w}anna* < **yɨpanna*). Colorado Ute, the next language to the east, also has alternate forms: one like the second SP form with vocalic rounding (*yɨp^{w}ana*), but the other goes one step further to velarization of the vocalic rounding (*yɨk^{w}ana*), as if the introduction of the labiovelar semivowel (*w*) triggered velar contact or velarization. This happening or change

is very parallel to the Wr and Tr words for 'salt' and 'corncob' (41, 42), where the introduction of *w* triggered velarization (PUA **ona* > **wona* > *ona/kona*).

(52) **poci/k^{w}oci* 'grandfather, father's father'
Eu *boc*
Od *vos-k* and *voji(gi)*
PB *bos-ka*
Tr *ocí-kari*
Wr *wocí*

All mean specifically 'father's father'. Od *s* and PB *s* correspond to UA **c*, so everything beyond the initial consonant corresponds—**__oci*. Regarding the initial consonant, on the other hand, Od *vos-* suggests **poci* since Od *v* corresponds to UA **p*; however, Tr and Wr should be *poci* or *boci* for **poci*. Tr and Wr agree in having the expected beginnings for **k^{w}oci*. Eu *boc* could feasibly be either **k^w* or **p*. If Od *vos-k* were borrowed, then we would not expect the second consonant *s* to agree so well with **c*, unless the loan occurred before the Tepiman sound change (**c* > *s*). Outside of that possibility, Od *vos-* and the other forms present another instance of the **k^w–*p* dichotomy in **poci* vs. **k^{w}oci*.

Five of the last six examples (47, 49–52) demonstrate interfacing between PUA **k^w* and **p*. These and similar examples of this **k^w–*p* overlap are seldom brought up, perhaps because presenting data without an accompanying solution may be feared as apparent incompetence. However, the first step to solution is a clear view of the problem and the problematic data relevant to the problem.

Regardless how elusive the explanations for these data may be, Tr shows *w/b* alternations (29–36), *w/k^w*-like alternations (39–43, 46, 48), and *b/k^w* alternations (44, 45). This array of alternations for labials in Tr (*w/b/k^w/ʔw/*) produces the whole UA spectrum for PUA **k^w* in Tr: *w* is the usual reflex; some Tr *b* (29, 30, 34) as in the Tepiman branch; an occasional *k^w* (7, 17, 46, 48) as in Northern UA and N; and *ʔw* (13, 47, 49), which is between *k^w* and *w*.

Miller (1983) mentions "considerable dialect diversity" among the Tarahumaras. This variety in Tr for **k^w* certainly supports that. The assortment of reflexes for **k^w* in Tarahumara is also consistent with the view that the Southern UA middle-lands (Sonoran) and Southern California (Takic) are the two areas of greatest diversity in UA—for Southern and Northern UA respectively (Miller 1984 and Cortina-Borja and Valinas 1989). However, variation for labials is not limited to Tarahumara. Lionnet (1985) portrays the diversity he sees in the labials of the Sonoran branch in a chart similar to table 4.

Northern UA (NUA) does not have the degree of variation for **k^w* that SUA has. Since NUA consists almost entirely of *k^w*-languages, the **k^{w}o/k^{w}u*

TABLE 4

	Tepiman	Opata-Eudeve	Cahitan	Tr, Wr	Tbr
*k^w	*b*	*p/b/w/b^w*	*b^w/p*	*p/w*	*k^w*
*p	*p/v*	*p/v/w/b*	*p/b/v*	*p/b*	*p/w*
*w	*g*	*w/g/g^w*	*w/g/g^w*	*w/g*	*w/m^w/g*
*y	*d*	*d*	*y*	*y*	*y*

phenomenon is quite opaque in NUA itself, except as NUA forms compare to *bo/bu* forms in Cahitan or *(w)o/(w)u* forms in Wr/Tr. In fact, it is nearly the case that only when a reflex exists in Yq, My, Wr, or Tr is the *k^wo/k^wu* phenomenon discernible. The Cahitan forms may not seem many, but of only five initial *bu* syllables in Collard and Collard's (1974) Mayo dictionary (which are not orthographic b^w nor from PUA *p), four of those five appear in this paper. For *bo* syllables, the percentage is lower.

True, the *k^wo/k^wu* phenomenon is more evident in SUA than in NUA, but only because of the greater varieties of *k^w in SUA than in NUA, since the non-k^w-languages are almost entirely in SUA. Nevertheless, the *k^wo/k^wu* phenomenon is apparent in NUA in the sense that the *k^wo/k^wu* syllables have merged with the *ko/ku* syllables in NUA, evidenced by NUA languages not showing surface k^wo/k^wu (but rather *ko/ku*) and by NUA k^w or *ko/ku* forms aligning with Eu and Cahitan *bo/bu* and Tr *o/u* in a number of sets. Those sets which contain both NUA and SUA forms are (4), (7), (9), (10), (11), (12), (18), (19), (20), (21), and (22).

Data in Kiowa-Tanoan. Some data in Kiowa-Tanoan (KT) are difficult to ignore. Though the demonstrated link between UA and KT is not yet as complete as it could be, the UA and Tewa words for 'navel' may be a significant pair in this labyrinth of labials:

(53) The UA reflexes for 'navel' reconstruct to **siku* 'navel' (SP *siku-*; Tr *sikura*; Tbr *siku-r*; N *siik*; Sr *sur*; Od *hik*)

A Tewa word for 'navel' is *sipu* (Ortiz 1969:19, 21).[3] In UA **siku* and Tewa **sipu*, three of four segments are identical (*s-i-__-u*), and 'navel' is seman-

[3] Ortiz (1969:19, 21) lists *sipu* 'navel'. Other dialects vary; for example, the *San Juan Pueblo Tewa Dictionary* lists *sipén* as 'navel', *sipú* as 'waist', and *sik?u* as 'belly, abdomen'. Dialect variation in both phonology and terminology is common among the Tewa pueblos. Is *sik?u* a UA loan (with changed meaning), or do *sipu* and *sik?u* represent old dialect variants, each finding its own, more exclusive semantic slot and surviving into modern times? As for the two terms that specifically mean 'navel', *sipén* and *sipú*, a semantic shift from 'navel' to 'waist' is certainly possible enough to compare 'waist' and 'navel' even without Ortiz's listing 'navel' as *sipu*; nevertheless, Ortiz does list Tewa 'navel' as *sipu*.

tically quite specific. Though KT **p* is not likely to correspond to UA **k*, what of UA **k*^{w}—a phoneme already laden with bilabial attachments in UA? As seen above, a number of UA bilabials correspond with UA **k*^{w} (*b*, *b*^{w}, *w*); so the possibility of KT bilabial *p* being related to the bilabial-affliated UA **k*^{w} in KT **sipu* 'navel' and UA **sikwu* 'navel' merits consideration. A couple of UA languages also show something near *sipu*: Cora *ne-sipu* 'my navel'; NP *sipoto* 'navel'. In the chart of sound correspondences (Miller 1967), the space is blank for medial **k*^{w} in Cora. The above item may partially explain why Cora medial **k*^{w} was not listed—perhaps it looks more like **p*; Corachol forms also show *p* for medial **k*^{w} in (13) above, as well. The overlap of **k*^{w} and **p* in UA itself is discussed above, as well as greater frequencies for UA **k*^{w} initially than medially.

The KT languages have the stop-glottalized-aspirated spectrum that does not exist in UA. In fact, little more is known (for KT bilabials) at this point than that a *p/b* alternation existed in Proto-KT (Hale 1967). Until a correlation between KT and UA is established for the spectrums of labials, these sets can hardly be validated. Nevertheless, a number of UA **k*^{w} and Tewa bilabial comparisons emerge as possibilities for consideration.

(54) Tewa *bo* 'at, in (a place)'
Yq and My *-bo/-po* 'locative: at a place'
N *-ko* 'among, at (a place)'
Od *-ko* 'in, on, at a place'

(55) Tewa *bun* 'return, turn around, turn back'
Cm *ko:nit͡ɬ* 'turn around'
SP *ko:nni* 'return'
Sh *ko:nih* 'turn around, move something back and forth'
Hp *qöni* 'make a turn'; Hp *qöni-kna* 'turned it around'

(56) Tewa *bii* 'turn'; *bín* 'spin, turn'
Pn *k*^{w}*inu* 'go round in twisting motion'
Pn *k*^{w}*inunnukwi* 'go round and round'
Ch *k*^{w}*inú?unu* 'spin, turn'
Od *binašvua* 'spin a top'

(57) Tewa *phíré* 'braid, n.'
Hp *k*^{w}*ite* 'braid, n.'
Wr *witá* 'v. braid rope, weave'

(58) Tewa *pípí* 'whistle, flute'
Cp *k*^{w}*iwe* 'vi. whistle'
Ca *k*^{w}*íwi* 'vi. whistle'
Wr *wikóe* 'vi. whistle'

(59) Tewa *phii* 'smoke, to give off smoke'
Hp *kʷi:kwici* 'smoke'
My *bʷici* 'smoke'
Ute *kʷií* 'smoke'
Tbr *ku-picí-t* 'smoke'

In (54) all is as expected for **kʷo*: Tewa and the UA *bʷ*-languages (Yq and My) show *-bo*, while the UA *kʷ*-languages show *-ko*. This is the same as set (2) with Tewa added. Sets (55)–(59) may also represent PUA **kʷ*–KT bilabial alignments, some even with nonround vowels following (56–59).

Direction of sound change. Among our explorations in the labial labyrinth of UA, we should note inconsistencies in the direction of sound change for the bilabial–labiovelar spectrum.

(60)	PUA	SP
	**-mɨ* plural suffix	*-ŋʷɨ*
	**tama* tooth	*taŋʷa*

(61) 'autumn'
Mn *yɨpa*
NP *yɨpano*
Pn *yɨpani*
Sh *yɨpani*
Kw *yɨpana*
SP *yɨpanna/yɨpʷanna*
CU *yɨkʷana/yɨpʷana*

In (60) the direction of change for nasals differs from the UA obstruent **kʷ*: for nasals this change is from bilabial to labiovelar (*m* > *ŋʷ*), whereas the opposite direction—from labiovelar to bilabial—is the presumed direction of change for **kʷ* (PUA **kʷ* > *b/bʷ* in Tepiman and Cahitan respectively). Numic presents another example of the opposite direction of change (**p* > *kʷ*, not *kʷ* > *p*) in the Numic words for 'autumn' (61), involving the very obstruent under discussion (*kʷ*).

In addition to UA **m* to SP *ŋʷ* and the Ute velarization of **p* (> *kʷ*), Munro shows UA **w* as one source for Luiseño *ŋ* (Munro 1973) and Campbell posits underlying *ŋʷ* in Hueyapan Nahuatl for UA **w* (Campbell 1976). All four of those exemplify velarizations of labials. A non-UA example is found in Spanish dialects of northeast Argentina where initial *bʷ* and *w* became *gʷ*: *gʷeno* 'good' (< *bueno*); *gʷevo* 'egg' (< *huevo*).[4]

[4] Personal communication with Silvia Canelo Stubbs, a native speaker of Spanish who grew up in both Tucuman and Buenos Aires, Argentina.

The UA examples above, especially Campbell's suggestion of underlying $ŋ^w$ in one UA language, may be relevant to the fact that the KT languages are replete with k^w/g^w alternations with *w*.

(62) Tewa *wœ̲n* and Towa *kwœ̲́ní* 'pine' (nasalized vowels underlined)

In fact, Hale (1967) posits Proto-KT $*g^w$ for the frequently occurring *w*'s in KT, which sometimes correspond to UA **w*.

(63) Mn, NP Pn, Sh, Cm, Kw, SP, Ute, Ca, Sr, Tb, and Hp all show forms like *wɨnɨ/wɨnnɨ/wɨn/wen* for 'stand'. Tr *wiri/wer-*, Wr *weri*, and Eu *wehran*, all meaning 'stand', are probably related, exhibiting denasalization of the alveolar (*n* > *r*). In KT, Tewa *winu* 'stand' (combined form *-k^winu*) certainly appears related to UA **wɨnɨ* 'stand', if UA and KT are related at all.

Nevertheless, even though *w* is the most frequent form of the KT $w/g^w(k^w)$ alternations, the velarized forms are frequent enough that either Hale is correct in proposing $*g^w$ and Uto-Aztecanists need to rethink PUA **w*, or the Uto-Aztecanists are correct and Hale's proposal for the corresponding KT proto-phoneme needs adjustment (if a UA–KT relationship is ever decided). As demonstrated by Numic 'autumn' and Tr/Wr 'salt' and 'corncob', *w* can trigger k^w; thus, the correspondence of KT w/k^w to UA **w* and UA sets of 'autumn', 'salt', and 'corncob' may all be instances of $w > k^w$ (41, 42, 51, 63). Regardless of the connection with KT, the forms in UA 'autumn' and 'salt' are certainly velarizations of labials.

Austronesian offers similar complexities in the bilabial–velar spectrum that quite parallel UA. Blust (1981) presents these complexities in "a description, not an explanation" for velarized labials that appear rather sporadically in Austronesian. The words for 'man' or 'person' are an example: Aru *tamata*; Sangir *taumata*; Fordate *tamatta*; Manam *tamwata*; Tongan *tangata*; Samoan *Tagata*. The words for 'five' or 'hand' show velarization in yet different languages: Wogeo *lima*; Arosi *rima*; Puluwat *lim*; Samoan *lima*; Tongan *nima*; Mota *limwa*; Fijian *liga* 'hand' and *lima* 'five'. In a chart, Blust shows that m^w rather than *m* appears quite randomly, and that velars $g/ŋ$ also appear corresponding to these bilabials (m/m^w) with no more predictability, but with more frequency in Fijian and Samoan (Blust 1981:245). Both **m* and $*m^w$ have been proposed, the velars (g, $ŋ$) being considered secondary developments from the bilabials, but not without a disconcerting effect on students of Austronesian who proceed cautiously in the uncomfortable supposition that "a comparable origin for velarization is unknown" (Blust 1981:247). However, a comparable pattern for velarization does exist in UA. Similar to UA, note the existence of m^w (vocalic rounding on a bilabial) as a possible intermediate step from bilabial to velarization ($m > m^w > ŋ$) in

Austronesian, as happened in UA ($p > p^w > k^w$) in 'autumn' (*yɨpanna* > *yɨp^{w}anna* > *yɨk^{w}anna*) and in 'salt' (**ona* > *wona* > *kona*).

The similarity in direction of change from (bi)labial to velar—evident in UA **m* > SP $ŋ^w$, UA **w* > Ls $ŋ$, UA **w* > Hueyapan N $ŋ^w$, UA **p* > CU k^w, Spanish *w*/*b^w* > *g^w*, and Austronesian **m*/*m^w* > $ŋ$—offers little to explain the apparent opposite behavior of **k^w* > *b, b^w, w* in UA. Though all these phenomena involve the same articulatory range in the labial–velar spectrum, the suggested direction of change for the UA obstruent **k^w* runs contrary to the six examples above, four of which are from UA. Nevertheless, PIE **k^w* > Greek *p* is consistent with the suggested direction of change for PUA **k^w*. Additionally perplexing is the appearance of two or three variants for **k^w* in the same language for some UA languages, though a consolation is the consistency that those languages which show diversity or multiple variants in the labial–velar spectrum do coincide with the areas of greatest linguistic diversity generally for UA—in the Sonoran and Takic areas.

Another point worth touching on is the origin of PUA **k^w*. Some may propose that UA **k^w* originally came from **k* plus round vowel (*ko/ku* > *k^w*), which kind of sequence is traceable on occasion in UA. Proposing PUA **k^w* to be originally from **ko/ku* is not implausible, but some detractors must be kept in mind: that proposal would necessitate proto-forms containing diphthongs (*koa/kua* > *k^{w}a*), which is contrary to the basic CVCV patterns of UA; and if we avoid diphthongs in the proto-forms while suggesting a *ko/ku* origin for **k^w*, then we must assume a lost consonant, such as a glottal stop (pre-UA **ko?a* > **koa* > UA **k^{w}a*). In addition, the fact that *k^w* is a common phoneme among world languages and is so especially among Native American languages leaves no compelling reason to doubt the phonemic singularity of **k^w*, based on data available thus far.

Conclusions. The agenda of this presentation is as much awareness as solution—an awareness and exploration of matters relevant to the labial–velar spectrum in UA: the behavior of UA **k^w* before back round vowels; the introduction of *w* on bilabials triggering velarization (41, 42, 51); and interfacing between labiovelar phonemes (13, 14, 47, 49, 50, 51, 52). Some data presented point to possible solutions, while other data presented help sort through some complexities of the remaining problems. Certainly, the labials provide a labyrinth not yet entirely solved. Nevertheless, some data suggest that PUA **k^w* (plus *o/u*) rather than **k* (plus *o/u*) may underlie some *ko/ku* syllables in UA, and that PUA **k^w* before round vowels may produce an adjusted look to the sound correspondences for **k^w*—especially the unexpected *k^w* in the Tepiman branch. The data supporting these hypotheses include the following: (1) no *bo/bu* syllables in Od; (2) twice as many *ko/ku* syllables as *ka/kɨ/ki* syllables in Od; (3) metathesis of *bihul* and *hikul* in Od; (4) Od reflexes showing *k* rather than *b* before round vowels, which *ko/ku* syllables

correspond to PUA *k^w in the other UA languages (1, 4, 7, 9, 10, 17, 21, 22, 24, 25); (5) Tr *o/u* (usually in initial position) corresponding to *k^wo/k^wu (3, 4, 7, 8, 10, 11, 13, 14, 21, 22, 24, 25); (6) Cahitan *bo/bu* (< *b^wo/b^wu < *k^wo/k^wu) corresponding to UA *ko/ku* or more properly *k^wo/k^wu (2, 3, 7, 8, 13, 14); and (7) possible links between PUA *k^w and Kiowa-Tanoan bilabials (53–59). Though the k^wo/k^wu phenomenon may account for some of the data, much remains problematic. An eventual comprehensive solution to the labial labyrinth in UA must take into account the apparent instances of *k^w/*p interfacing (47, 49–52), the aberrant variation found in the labiovelar spectrum in the Sonoran languages, and perhaps the *w/*g^w discrepancy in Aztec-Tanoan.

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