

THE VOWEL SYSTEMS OF CALIFORNIA HOKAN¹

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Unlike the consonants, the vowels of Hokan are remarkably conservative.

—Haas (1963:44)

*The evidence as I view it points to a 3-vowel proto-system consisting of the apex vowels *i, *a, *u.*

—Silver (1976:197)

I am not willing, however, to concede that this suggests [Proto-Hokan] had just three vowels... The issue is open, though, and I could change my mind.

—Kaufman (1988:105)

1. INTRODUCTION. The central question that this paper attempts to address is the motivation for the statements given above. Specifically, assuming there was a Proto-Hokan, what evidence is there for the shape of its vowel system? With the exception of Kaufman's somewhat equivocal statement above, the general (but basically unsupported) verdict has been that Proto-Hokan had three vowels, *i, *a, and *u. This conclusion dates back to at least Sapir (1917, 1920, 1925) who implies a three-vowel system in his reconstructions of Proto-Hokan forms. However, as far as I am aware, no one has carefully articulated why they think the Proto-Hokan system should have been of one form instead of another (though Kaufman (1988) does discuss some of his reasons).² Furthermore, while reconstructions of Proto-Hokan forms exist, it has not yet been possible to provide a detailed analysis of the sound changes required to relate reconstructed forms to attested forms. As a result, even though the reconstructions themselves are valuable, they cannot serve as a strong argument for the particular proto vowel system they implicitly or explicitly assume.

This paper will not be an attempt at any serious reconstruction of the Hokan vowel system. Rather, it will take a broad view, comparing the vowel systems of the California Hokan languages to determine if there is any indication from them as to what vowels were present in their parent language. This study, therefore, is designed to complement the more traditional approach of etymological reconstruction and serve to guide any future attempts to reconstruct Proto-Hokan. As such, the focus is not simply on the distribution of vowel phonemes in California Hokan, but also on those proposed diachronic and documented synchronic processes found within the stock which may shed light on how the present-day vowel systems could have evolved from some Proto-Hokan vowel system.³

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² It should also be pointed out, from the outset, that Kaufman's (1988) conclusions were based on data both from California and non-California Hokan, unlike this paper.

³ Kaufman (1988) is an important attempt at extensive lexical reconstruction of Proto-Hokan which also includes valuable information on the phonological systems of the Hokan languages. However, the result of its different emphasis is that it is less detailed than the present paper with respect to comparative phonology.

The tentative conclusion of this paper will be that the comparative evidence indicates Proto-Hokan most likely had a three-vowel system. However, this conclusion is intended to be only of secondary importance. The main goal of this work is simply to gather all the available data on the phonological systems of languages in the Hokan stock which has bearing on how many vowels may have been in proto language.

2. LANGUAGES CONSIDERED. Two proto languages and eight attested languages will be considered in this survey. They are: Proto-Yuman, Proto-Pomo, Salinan, Karok, Yanan, Shasta, Atsugewi, Achumawi, Chimariko, and Washo. Each of these is considered in turn. The geographic areas of these languages are shaded in the map given below.

Map adapted from Hinton (1994).

Some possible California Hokan languages will not be considered here. One is Esselen, simply because we lack extensive data on the language. The Chumashan languages will also not be considered because there has been a growing consensus that no strong evidence has been found

which would place these languages in the Hokan stock (Kaufman 1988:54–58; Kathryn Klar, personal communication).

3. OVERVIEW OF THE VOWEL SYSTEMS OF CALIFORNIA HOKAN.

3.1 PROTO-YUMAN. Langdon (1976:146) offers the reconstruction for the vowel system of Proto-Yuman given in the table in (1).

- (1) *i *u
 *a
 length *:

Langdon’s reconstruction of Proto-Yuman offers some potentially important insights into the general question of what the shape of the Proto-Hokan vowel system may have been. Going over the attested vowel systems in the Yuman languages, Langdon concludes that, “Numbers thus seem to favor the five-vowel system.” But, “[t]he five-vowel systems... show some differences which may have historical significance (Langdon 1976:129–130).” Since some Yuman languages apparently innovated their five-vowel systems, the family can be used as a model for how a three-vowel system in a Hokan language can develop into a five-vowel one.

The crucial observation of Langdon’s is that the five-vowel systems of Yuman are defective in ways which point to an analysis where they are treated as innovative. For example, she notes, that in two of the three languages with five-vowel systems, Paipai and Walapai, the vowels *i*, *a*, and *u* are much more common than the vowels *e* and *o*. (Yuma has a more robust five-vowel system.) No comparable irregularities exist in the languages with three-vowel systems, Cocopa and Diegueño (Langdon 1976:130). This type of pattern will appear again in the discussions of many of the other Hokan vowel systems—that is, there is often something defective about the systems of those languages with five vowels.

Under Langdon’s account of how Proto-Yuman developed into its various daughter languages, two basic types of diachronic changes are proposed which triggered the innovation of five-vowel systems: phonemicization of allophonic variation and simplification of diphthongs to mid vowels. The primary evidence for these proposed changes are synchronic alternations found in the various Yuman languages. For example, synchronically, in Yuma, the short high vowels *i* and *u* are lowered to *e* and *o* when they are not followed by a palatal consonant *k* or *s* (Langdon 1976:136), thus indicating allophony was a source of at least some mid vowels. Furthermore, in Paipai, the cluster *ay* alternates with *e* and the cluster *aw* alternates with *o* in certain sets of non-plural and plural verbs (1976:143), thus pointing to diphthong simplification as a source of mid vowels.

Langdon’s analysis of Yuman not only can serve as a model for a general analysis of the development of the Hokan vowel systems as having developed from a proto three-vowel system, but also, importantly, her reconstruction of Proto-Yuman as a three-vowel system casts some doubt generally on the idea that Proto-Hokan had a five-vowel system. This is because a five-vowel reconstruction of Proto-Hokan would require such a system to collapse to a three-vowel system in Proto-Yuman and, then, in some Yuman languages, re-expand to its original

five-vowel shape. While such a change is hardly impossible, it adds complications which are simply not found if Proto-Hokan, like Proto-Yuman, is taken to have had a three-vowel system.

3.2 PROTO-POMO. Like Proto-Yuman, the phonological system of Proto-Pomo has also been reconstructed. The table in (2) is taken from McLendon (1973:52).

- (2) *i *u
 *e *o
 *a
 length *:

Proto-Pomo offers the strongest evidence for the argument that Proto-Hokan had a five-vowel system. This is because, not only is it reconstructed as having one, but, unlike many of the other five-vowel systems we will see below, there are no major irregularities or gaps in the Proto-Pomo phonological system which indicate that the five-vowel system is innovative. In strong contrast to the Yuman, situation, “[T]he seven languages of the Pomoan family show considerable morphological diversity, but relatively minor phonetic change. Vowel quality has undergone little mutation. . . (Moshinsky 1976:55).”

McLendon (1973:41–44) does propose a range of vowel assimilations for the various Pomoan daughter languages. However, these processes, generally, don’t indicate that a five-vowel system in the Pomoan languages arose from a three-vowel one.

One important process, for example, involves potential assimilation of *a to /o/ before /o/. Such a process might indicate how mid-vowels could have spread throughout the language once they developed but can not explain what the historical source of mid vowels could have been in the first place. Examples are given in the table in (3) contrasting Kashaya Pomo, which underwent the sound change, with Central Pomo, which did not (forms taken from McLendon (1973)).⁴

(3)

	PROTO-POMO	KASHAYA	CENTRAL
MUSSEL	*lãʔq’ò	noʔq’o	la:kó
PEOPLE	*náhp ^h ó	nohp ^h o	na:hp ^h ó
WILDCAT	*dã:lóm(?)	dolomʔ	da:lóm

McLendon (1973:44) also notes one case of apparent dissimilation where a *i is realized as /e/, but this process, found only in two forms, seems an unlikely kind of source for mid-vowels generally. These forms are given in the table in (4), again contrasting the innovative Kashaya Pomo with Eastern Pomo.

(4)

	PROTO-POMO	KASHAYA	EASTERN
TO FLY (2)	*p ^h udí-	p ^h ude-	p ^h u:dí-
STRING	*su:límaʔ	sulemaʔ	ʔ’ásulim

⁴ The symbol *ã* is used by McLendon, following Oswald (1964:158), to distinguish *a’s which do harmonize from those that do not.

Oswalt (1976:17) reconstructs Proto-Pomo prefixes as having the shape CV where V is only **i*, **a*, or **u*. Some of the daughter languages have mid vowels in their prefixes due to harmony with the vowel in the stem. This aspect of Proto-Pomo morphology could be understood as a relic of an earlier three-vowel system in Proto-Pomo's parent language—however, this is highly speculative. Thus, Proto-Pomo offers the strongest evidence that Proto-Hokan had a five-vowel system. An important part of any proper reconstruction of Proto-Hokan as having three vowels would be to determine how Proto-Pomo developed such a robust five-vowel system.

One possibility, that seems to not have been previously proposed, is that the Proto-Pomo vowel system reflects some sort of areal influence. The Pomoan languages are not bordered by any other Hokan languages and a cursory examination of the vowel systems of their geographic neighbors for which there were available sources, Wappo (Sawyer 1991:23, Radin 1929:11), Patwin (Whistler 1976:65), Bodega Miwok (Callaghan 1970), Lake Miwok (Callaghan 1965), and Yuki (Sawyer and Schlichter 1984:10) reveals, that all but Yuki have a five-vowel system with length. Yuki shows a similar vowel system but adds long and short nasal \tilde{a} . As we will see in the discussion of Washo, areal influence has been implicated before in the development of Hokan vowel systems.

3.3 SALINAN. The Salinan vowel system, taken from Turner (1987:64–7), is given in the table in (5). The segment *i* is only marginally a phoneme in Salinan (Turner 1987:65)—hence, the question mark next to it in the table. If it is a phoneme, only short *i* and *e* are contrastive.

(5)

i (?)	
e	o
	a
length :	

Salinan appears to have essentially a three-vowel system. The only deviance from a standard three-vowel system is the phonemicization of the non-low vowels as mid vowels instead of high ones.

Though only marginal synchronically, the phoneme *i* is relevant to the present discussion. In particular, it is important to see if it can be established whether it is an emerging phoneme or one which was once more prevalent and is now being lost. If the former, then the Salinan vowel system could be taken as evidence for a three-vowel system in its parent language. If the latter, then Salinan could be taken as evidence for (at least) a four-vowel system in its parent.

Turner notes a high degree of variability in the pronunciation of the non-low Salinan vowels (1987:65–67). Thus, Mason (1918:8) lists nine vowel phones for the language, Harrington gives eight (Turner 1987:15), and Jacobsen gives eleven (Turner 1987:16). Harrington's notes specifically indicate free variation in some instances among the allophones [i], [e], and [ɨ] of /e/ and the allophones [u], [o], and [ɔ] of /o/ (Turner 1987:64–65). Turner further notes that the allophonic variation is at least partially predictable (1987:66). Therefore, the marginal phoneme *i* could be emerging in Salinan in much the same way Langdon (1976) analyzed allophonic variation in Yuman being phonemicized. However, for now, too little data is available—particularly on the relevant phonological environments of the allophones—to make this argument strongly.

Furthermore, Turner offers a potential argument in favor of the idea that *i* is in the process of being lost rather than emerging: “. . . there is some evidence for a marginal contrast between short [i] and [e] in Jacobsen’s data, especially before final ʔ. . . where stress may reveal an otherwise weakly attested contrast (1987:65–66).” We could take this to mean that a short *i* phoneme is archaic and relegated to a very limited phonological environment. However, Turner (1987:66) also offers one example of potentially contrastive short *i* and *e* in a context where the vowels are not stressed—thus countering the idea that this contrast is only found in stressed syllables.

The evidence is not completely convincing either way. However, given that the short *i* phoneme is so marginal, and there is no strong case for calling its presence an archaism, I believe Salinan supports the existence of a three-vowel system instead of a five-vowel one for Proto-Hokan.

3.4 KAROK. The Karok vowel system, as described by Bright (1957:7) is given below in the table in (6).

(6)	i	u	i:	u:
			e:	o:
	a		a:	

Karok has an interestingly defective vowel system with three short vowels and five long ones. Without further analysis, this system could have plausibly derived from either a five-vowel system, which has partially collapsed, or a three-vowel system which has expanded.

Synchronic alternations, however, indicate that, at an earlier stage, Karok had a three-vowel system—along with phonemic length. In various environments, a high vowel and *a* coalesce into long mid vowels. Thus, {*ai,ia*} → *e:* and {*au,ua*} → *o:*. Examples from Bright (1957:34) are given in (7).

(7)	/amyiv-ara/	→	[amyê:ra]
	‘soot’-ADJ		‘sooty’
	/ʔánav-ikyáva:n/	→	[ʔane:kyáva:n]
	‘medicine-maker’		‘doctor’
	/ʔá:ku-va/	→	[ʔaʔko:]
	‘hit’-PL		‘hit (pl.)’
	/pa=ʔúkra:m/	→	[pó:kra:m]
	‘the-lake’		‘the lake’

The alternations exemplified in (7) show that Karok is likely to have developed from a language with a three-vowel system, with vowel coalescence as the source of the mid vowels. This is because vowel coalescence not only gives us a plausible source for the appearance of mid vowels generally, but can also explain specifically why the system contains only long, and no short, mid vowels.

3.5 YANAN. The Yanan vowel system, taken from Sapir and Swadesh (1960:3–4), is given below in the table in (8). Yanan here is a cover term for Northern Yana, Central Yana, Southern Yana, and Yahi. From a phonemic standpoint, the dialects all have the same vowel system. Short *e* and *o* are found in the Yanan languages, but these are allophonic variants of the long vowels in closed syllables (Newman 1932:1).

(8)	i	u	i:	u:
			e:	o:
	a		a:	

The Yanan vowel system has the same basic structure as the Karok vowel system. Unlike Karok, the synchronic phonology of Yanan does not point to the source of the long mid vowels in the languages. However, these vowels have a very restricted distribution. “In all dialects /e/ and /o/ occur almost exclusively in the initial syllable of the word, where they function nearly always as morphological mutants of the other three vowels (Sapir and Swadesh 1960:4).” The forms in (9), from Northern Yana, give examples of the alternations described by Sapir and Swadesh.

(9)	/ma-/	‘eat’
	[masiwa’a]	‘it is eaten’
	[moosindja]	‘I eat’
	/ha-/	‘one female goes’
	[hasaasi]	‘she goes away’
	[hoosa’asi]	‘he causes her to go away’ (Sapir 1922:233)

Based on the defective distribution of /e/ and /o/ in Yana, Nevin (1976:249) proposes that the Yanan vowel system should have only three underlying vowels /i,a,u/ and surface [ee] and [oo] (potentially shortened in closed syllables) should be derived from underlying /ia/ and /ua/. His basic intuition, therefore, is that the mid vowels in Yanan are secondary in nature.

Despite Nevin’s synchronic analysis, no diachronic data, specific to Yanan, has been uncovered which would indicate what the vowel system of its parent language might have been. The present-day Yanan system could have plausibly derived from a Pomo-like five-vowel system or a Yuman-like three vowel system. However, insofar as the examples of Yuman and Karok give us clear examples, within Hokan, of how a three-vowel system could develop into a five-vowel system (with Karok showing us how a Yanan-like system specifically could develop), the bias in a diachronic analysis of the Yanan system should probably be that it developed from an original three-vowel system. (Though other five-vowel systems will be discussed below, none of them offer any particular, special insight into the analysis of Yanan.)

3.6 SHASTA. The Shasta vowel system, as described by Silver (1966:22), is given in the table in (10).

(10)	i	u
	e	
	a	
	length :	

Shasta is the only California Hokan language which has a fully developed four-vowel system. In particular, it has a contrast between *e* and *i*. Haas (1963:42) indicates one source for long *e* in the language. Specifically, she claims that **ima* and **ami* in Proto-Hokan reduce to *e*: in Shasta. Examples, from Haas (1963:47–51), are given in the table in (11).

(11)	PROTO-HOKAN		SHASTA	
	*čimapasi	>	ʔé:psi	‘liver’
	*imarak ^w i	>	ʔé:raw	‘navel’
	*amirax ^w a	>	ʔé:raxa	‘nails’

These examples from Shasta are reminiscent of the effects of coalescence seen in Karok. However, unlike Karok, Shasta has both long and short *e*—so, such a sound change cannot fully explain the present shape of the Shasta system.

There is a fair amount of positional and assimilatory allophony in the Shastan phonological system (Silver 1966:34). So, it could be the case that phonemic *e* in Shasta developed as the result of the phonemicization of allophonic variation at some point in its history—we saw in the discussion of Yuman that such changes partially account for the five-vowel systems seen in some of those languages. However, at present, this is all fairly speculative. The phonemic inventory of Shasta is, presumably, one of the reasons Kaufman (1988:103) was open to the idea Proto-Hokan may have had a four-vowel system, *i*, *a*, *u*, and *e*, but was more resistant to the idea that Proto-Hokan could have had only a three-vowel system.

3.7 ATISUGEWI. From the published sources, it is not entirely clear what the vowel inventory of Atisugewi is. Five vowels are found in most transcriptions. Olmsted (1984:5) gives six including long and short [̄]. Walters says that there are three phonemic vowels and that [e] and [o] “are the product of morphological rules (1977:154).” These rules are not described in any detail. Talmy (1972:407–467) gives a number of underlying forms for Atisugewi morphemes. Only one of these *ce-* a verbal prefix meaning ‘the eye’ or ‘an eye-shaped object’ contains a mid-vowel. In the table in (12) I give five vowels marking mid vowels as having questionable phonemic status.

(12)	i	u
	e (?)	o (?)
	a	
	length :	

It is clear from Talmy (1972), examining the underlying and surface forms he gives, that, at least in many cases, the mid vowels are allophonic variants of high vowels. In (13) I give two examples where vowels underlyingly analyzed as high are transcribed as surfacing as mid vowels. (The relevant vowels are bolded.) Talmy doesn’t give any detailed statements on the relationships between his underlying and surface forms—so, it is not clear if the alternations between high and mid vowels are purely phonological or conditioned by other factors as well.⁵

⁵ In a footnote, Talmy states that his underlying forms make use of the symbol “:” which represents “a morphophoneme phonetically realized as the length and lowering of an adjacent vowel (1976:26).” This morphophoneme can be found

- (13) a. /s-’-w-:-pri-st’aq’-ic’-^a/ → [sp’re:st’aq’íc’]
 ‘I picked up with my mouth the already-chewed gum/the guts from where it was stuck/they lay on the table’ (Talmy 1972:436).
- b. /s-’-w-phu-lup-im-^a/ → [sp’hol:upíw]
 ‘I spat out the round candy’ (Talmy 1972:438)

Some of the vowel alternations exemplified in (13) are presumably what was being referred to by Silver (1976:198), when she wrote, “In Atsugewi. . . i,u > e,o under certain phonological conditions involving length.”

It is difficult to come to any firm conclusions about Proto-Hokan on the basis of our present knowledge of Atsugewi phonology. However, unlike all the other languages (or proto languages) discussed to this point, Atsugewi is not an isolated member of the Hokan stock. It is closely related to Achumawi, which will be discussed next. I, therefore, hold off on any further discussion of Atsugewi until the vowel system of Achumawi has been described.⁶

3.8 ACHUMAWI. Like with Atsugewi, it is not completely clear what the vowel inventory of Achumawi is. Olmsted (1966:9) and Uldall (1935:75) specify schwa as part of the inventory (though only short, not long). de Angulo and Freeland (1931:78-80) only list five vowels, plus length, for the language. Nevin (1998:57–63) also gives five vowels, plus length, for the vowel system. Since Nevin (1998) is focused specifically on the phonological system and is especially thorough in documenting the phonemes and allophones of the system, I follow his vowel system in the table in (14).

- (14) i u
 e o
 a
 length :

de Angulo and Freeland (1931:93) list a range of stem alternations affecting vowels. One particular case, given in (15), shifts *a* and *u* to *e*. Though these alternations are not phonologically conditioned, reconstructing their original source may lend some insight as to whether or not the mid vowels of Achumawi may have emerged as the result of some sort of sound change.

- (15) *s-ǎ:n-á* ‘I came’ *s-ě:n-á* ‘I came home’
 s-á’tò:g-í ‘I arrived’ *s-é’tò:g-í* ‘I arrived home’
 t-úpt-é ‘go!’ *t-épt-é* ‘go home!’

Given that Achumawi and Atsugewi are clearly related and that one language has a five-vowel system and the other language potentially has a three-vowel system, determining the

in (13a). The example in (13b), where there is no “:” in the underlying form shows us that this morpheme is not the only trigger of surface mid vowels, however.

⁶ Olmsted (1964) is an ample demonstration that Atsugewi and Achumawi are related. His reconstruction of the proto language, however, is not reliable enough to be useful here.

shape of the vowel system of the language from which both developed is clearly of interest to the general question posed in this paper. Unfortunately, the only reconstruction of Proto-Palaihnihan (the name given to the ancestor language of Achumawi and Atsugewi), a work by Olmsted (1964), is not up to modern standards of reconstruction making its conclusions inadequate for the present study.⁷

Until it is determined what the most likely vowel system was for Proto-Palaihnihan, it is not really possible to use the data from Achumawi and Atsugewi to come to any conclusions as to the structure of the Proto-Hokan vowel system. However, it is at least clear that a proper reconstruction of Proto-Palaihnihan will be an important step in reconstructing Proto-Hokan.

3.9 CHIMARIKO. The Chimariko vowel system, as described from Grekoff (1967a:11) and (1982), is given in the table in (16).⁸ Dixon (1910:307–308) also has a description of the Chimariko vowel system, but, as Grekoff points out (1957:1), Dixon’s work was done before the phonemic era, thereby making it much less valuable for this study than Grekoff’s.

(16)

i	u
e	o
a	
length : (?)	

According to Grekoff, “With a higher degree of uncertainty, vocalic length is added as a 36th segment (1967a:11).” This citation comes from an apparently complete draft of a chapter on Chimariko phonology written as part of an unfinished Chimariko grammar. While this draft does not specify the reason for Grekoff’s uncertainty, later notes help clarify Grekoff’s earlier statements. “Vocalic length is found with all vowels, but instances of unequivocal phonemic length are rare. Most instances of recorded length are known variants of a VC sequence (C being *y*, *w*), so perhaps... the C in such cases is inadequately perceived (1982).” Undated notes, probably written around the same time as the phonology chapter, in a section of a notebook labelled “phonetics” offers further details. Grekoff writes that length for vowels is clear for *a*, less clear for *e*, *i*, and *o*, and that long *i* in Harrington’s transcriptions “seems always to represent *y*... but this maybe wrong (1967b(?)).”

The system that Grekoff describes appears more consistent with the other three-vowel systems of Hokan rather than the five vowel ones. This is because following the sum of Grekoff’s notes, the most likely Chimariko vowel system would appear to have six vowels total—*a*, *a:*, *e*, *i*, *o*, and *u*. From the perspective of phonological reconstruction, such a system is only slightly different from a system which makes use of three-vowel qualities and contrastive length on all its

⁷ To get some sense of the problems with Olmsted’s reconstructions, one only has to briefly examine the proposed proto vowel “phoneme” system which is taken to have consisted of sixteen short and twelve long vowels (Olmsted 1964:63) despite the fact that Olmsted’s own description of Achumawi lists only six short and five long vowels and his description of Atsugewi lists only six short and six long vowels.

⁸ All the Grekoff citations come from manuscripts in the Survey collections. These manuscripts were only recently donated to the Survey and a lot of work remains to be done on them. Only a small portion of the Grekoff collection was examined for this paper—however, I believe I examined all the most relevant materials. Grekoff’s notes on Chimariko are extensive, and, in the future, they will undoubtedly be of great value to Hokan studies.

vowels. Where a three-vowel system would differentiate its non-low vowels via length, Chimariko differentiates them via quality. Differences in length are often associated with differences in quality and vice versa in the world's languages, bringing the Chimariko system very closely in line with the three-vowel systems described here.⁹ Therefore, it would appear that, for the purposes of this paper, Chimariko should be grouped with the three-vowel systems and not the five-vowel ones.

3.10 WASHO. The Washo vowel system, as described by Jacobsen (1964:52), is given in the table in (17).

(17)	i	i	u	
	e		o	
		a		
	length :			

While the occurrence of the high central vowel in Washo might at first appear striking, Jacobsen (1966:126, 1986:43) argues that its presence in Washo is due to contact with Uto-Aztecan languages which are spoken to the east of Washo. In fact, contact seems to play a role more generally in the Washo vowel system. Washo is not bordered by any other Hokan language and six-vowel systems like Washo's are found throughout its neighboring languages. Langacker (1970) reconstructs a six-vowel system with the same vowels as those found in Washo for Proto-Uto-Aztecan, and Maidu and Sierra Miwok, spoken to the west of Washo, also both show the same six-vowel system (Shipley 1964:6–11, Freeland 1951:1).¹⁰ Thus, the shape of the Washo vowel system seems to be related to some more general areal phenomenon, making its role in resolving the central issue of this paper extremely limited.¹¹

While the overall vowel system of Washo seems to be related to its geography, there are some synchronic alternations found in the language which may be of value in understanding how its six-vowel system could have developed from a language with a three-vowel system. "Vowel-coloring" morphophonological alternations are common in the language which, among other things, trigger alternations between apex vowels and mid vowels. Examples taken from Jacobsen (1964) are given in (18) with the relevant vowels bolded. (The superscript vowels and the " symbol represent morphophonemes (Jacobsen 1964:258).)

(18)	/g ^e m ^e í mi we?/	→	[gemémiwe?]	‘track it to the east’	(283)
	/g ^e s ^e b ^e í lb ^e " á?y i/	→	[gesebélba?yi]	‘he's blowing it away’	(287)
	/Ø h ^u á mad ug i/	→	[hómadugi]	‘wind is blowing from the north’	(289)

Reconstructing the original source of the alternations (18) could explain at least one of the sources of Washo mid vowels if it did indeed descend from a language with a three-vowel system.

⁹ We do not have to go far afield to find a language described as having vowel quality differences associated with vowel length differences. Nevin (1998:57–58) describes this exact situation for Achumawi, where long/short opposition is accompanied by predictable tense/lax variation.

¹⁰ Nisenan, related to Maidu, also spoken to the east of Washo, shows a comparable system except for the addition of schwa to the system (Uldall and Shipley 1966:2–3).

¹¹ The observation that Washo is part of a six-vowel linguistic area is due to William H. Jacobsen, Jr.

4. CONCLUSION. We can break down the ten languages surveyed here into three broad categories with respect to their vowel systems. Proto-Pomo, Achumawi, and Washo show full five-vowel systems (or even six vowels for Washo)—that is, each language has at least five long or short vowels. Proto-Yuman, Salinan, and Chimariko show three-vowel systems. Finally, Karok, Yanan, and Shasta show something in between three-vowel and five-vowel systems. Atsugewi cannot be firmly classified at present and could either belong with the five-vowel languages or the three-vowel ones.

Of the languages with five-vowel systems, Achumawi's relevance to the issue will be unclear until a proper reconstruction of the vowel system of Proto-Palaihnihan is undertaken, Washo's vowel system can plausibly be analyzed as having shifted due to language contact. Language contact can also be used to explain the shape of the Proto-Pomo vowel system.¹²

Of the languages with three-vowel systems, Proto-Yuman, Salinan, and Chimariko could all be used as evidence that Proto-Hokan had three vowels—though Salinan does offer the complication that its vowel system contains a marginal fourth vowel.

Two of the three “in-between” languages, Karok and Yanan have defective five-vowel systems which could be readily analyzed as having innovated long mid vowels from an original three-vowel system. This claim can be argued for fairly strongly for Karok since the synchronic phonology of the language shows alternations which directly indicate a possible source for the long mid vowels. The last of these three languages, Shasta shows a full four-vowel system, adding *e* to the standard set of *i*, *a*, and *u*. Seri, a language commonly considered to be Hokan (Kaufman 1988:54–58) but left out of this study since it is not Californian, also shows a four-vowel system like Shasta's (Moser and Moser 1965:55,65). And, a case could be made that Salinan, too, shows such a system. These languages could be used as evidence that Proto-Hokan had a four-vowel system *i*, *a*, *u*, and *e*. While, there is some evidence that Shasta may have innovated the *e*, no particularly strong case can be made for this at present.

While only a tentative conclusion can be reached, the balance of the evidence seems to come down in favor of a three-vowel system for Proto-Hokan. This is because not only are three-vowel systems well-attested but also because several mechanisms have already been established within the family via which a five-vowel could have developed from a three-vowel system. These are phonemicization of allophonic variation, simplification of diphthongs to mid vowels, and vowel coalescence of high and low vowels to mid vowels. No one has yet argued for any sound changes within Hokan languages wherein vowels were lost, which indicates a lack of evidence that any five-vowel (or four-vowel) systems have been reduced over time. The issue remains open, however, and the possibility that Proto-Hokan had a four-vowel system, along the lines of Shasta's, should not be ignored. Despite the lack of a definitive conclusion, it is hoped that the collection of facts brought together here will ultimately be useful in reconstructing Proto-Hokan phonology.

¹² The case for Proto-Pomo's vowel system as being influenced by contact is not as strong as the case for Washo for the simple reason that it is first being made here, as far as I am aware, and I only have the most cursory knowledge of the Pomoan languages.

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