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ASPECTS OF SERI PHONOLOGY

Stephen A. Marlett

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0. Introduction. An abstract analysis of Seri, a Hokan language of northern Mexico, might posit the following systematic phonemes.1

Consonants

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Vowels

i i:

o o:

e [ə] e: [æː] a a:

In the following sections I will discuss the presence of the surface segments W, kw, xw, n, and nasalization, and the status of the phoneme /w/ in present-day Seri. I will also discuss other prominent aspects of Seri phonology, especially those features in which this analysis differs from that of Moser and Moser 1965.

1. Consonant and vowel lengthening. A striking feature of the Seri language is what Moser (1978) has called a "staccato delivery" since consonants and vowels are noticeably lengthened under certain conditions.2 The following sentence illustrates the pervasiveness of lengthened segments. (Forms written without brackets are intermediate representations.)
(1) \( \text{i-ʔamok k? iti t-om ma-χ} \quad \text{i-ʔi:saχ tintika t-άταχ-χ} \rightarrow \)
\[ [\text{iʔam:o:k?ititom:axiʔi:saχtintikatát:ax}] \]

When she would lie down at night, when her spirit would go, ...

The long \( i \) in \([iʔi:saχ] \) is an underlying long vowel. The long \( m \) in \([\text{tom:ax}] \) is the result of the juxtaposition of two morphemes, one ending in \( m \), one beginning with \( m \). Non-nasal geminate consonant clusters and also clusters such as \( \text{kkw} \) tend to degeminate except when both consonants are in the same word and the second consonant is stem-initial; in the latter case they are realized as single long consonants. These rules are stated informally and illustrated below.

(2) Degemination: \( C_i \rightarrow \emptyset / C_i \quad Z \)
\[ [-\text{nas}] \quad [-\text{segment}] \]
where \( Z \neq \#

(3) Coalescence: \( C_i \quad C_2 \Rightarrow [+\text{ln}g] \emptyset \)

(4) \( \text{iʔp-p-ʔ:p+} \rightarrow [\text{iʔpå:p+}] \quad \text{when I am cold} \)
\( \text{s-ʔamok-kaʔa} \rightarrow [\text{sʔam:o:kaʔa}] \quad \text{it will be night} \)
\( \text{po-pän$:x$-$x$} \rightarrow [\text{popän$:x$}] \quad \text{if he runs} \)

\( \chi$pe \quad \text{kom-m-f:pe} \rightarrow [\chi$p:e:kom:í:f:pe] \quad \text{The sea is good (calm).} \)
\( \chi$íx \quad \text{k-káp} \rightarrow [\chi$íx:k:áp] \quad \text{thing that flies, i.e. airplane} \)

To avoid confusion, I will henceforth represent long consonants which result from (3) as clusters.³

Consonant lengthening. A consonant is lengthened if it follows a stressed vowel nucleus of a certain type and precedes a vowel. The amount of lengthening is greater with a higher degree of stress. The stressed vowel nucleus may be composed of a single vowel (long or short) or a short vowel followed by a short high front vowel (i). This is obviously a restriction on total nucleus length that is difficult to capture notationally.⁴ There is also a condition that the consonant be in the same word as the stressed vowel and not be a suffixal consonant. The rule is given in (5).

(5) Consonant Lengthening: \( C \rightarrow [+\text{ln}g] / V \quad \left< V \right| \left< -\text{lo} \right| \left< -\text{bac} \right| \left< -\text{ln}g \right> \quad \Rightarrow \quad V \)

Conditions: 1) The \( C \) must be in the same word as the stressed \( V \).
2) The \( C \) may not be a suffixal \( C \).
This formalization represents rules (6) and (7) below which are illustrated individually. The need for the conditions is illustrated in (8) and (9).

(6) $C \rightarrow [+l_{ng}] / \hat{\hat{V}} \quad V \\
\quad \quad [\neg l_{ng}] \quad [\neg o] \\
\quad \quad [\neg b_{ac}] \\
\quad \quad [\neg l_{ng}] \\

- $k\acute{a}-\text{i}k-o-t \rightarrow [k\acute{a}i\acute{k}:o:t] \quad \text{kill for someone (sg. punct., nom.)}$
- $k\acute{o}i\acute{p}:a+\text{im} \rightarrow [k\acute{o}i\acute{p}:a+\text{im}] \quad \text{be elliptical (sg. iter., nom.)}$
- $?\dot{a}\dot{\text{onam}} \rightarrow [?\dot{a}\dot{\text{onam}}] \quad \text{hat}$
- $k\text{-ap}o\ddot{\text{i}}:\text{n}-\text{im} \rightarrow [k\text{ap}o\ddot{\text{i}}:\text{n}-\text{im}] \quad \text{wring out (sg. iter., nom.)}$
- $k\dot{k}\acute{a}:\text{l}\chi-\text{im} \rightarrow [k\dot{k}\acute{a}:\text{l}\chi-\text{im}] \quad \text{scrape away (sg. iter., nom.)}$
- $k\acute{a}-\text{at}-\text{im} \rightarrow [k\acute{a}-\text{at}-\text{im}] \quad \text{play (sg. iter., nom.)}$

(7) $C \rightarrow [+l_{ng}] / \hat{\hat{V}} \quad V \\

- $k\acute{a}t\text{-im} \rightarrow [k\acute{a}t\text{-im}] \quad \text{cook in ashes (sg. iter., nom.)}$
- $k\acute{a}-\text{f}a-p\text{-im} \rightarrow [k\acute{a}-\text{f}a-p\text{-im}] \quad \text{arrive (sg. iter., nom.)}$
- $k\dot{k}\acute{a}-\text{papx-}\text{im} \rightarrow [k\dot{k}\acute{a}-\text{papx-}\text{im}] \quad \text{crack with teeth (sg. iter., nom.)}$
- $?\dot{\text{ax}}\text{xox} \rightarrow [?\dot{\text{ax}}\text{xox}] \quad \text{shore}$

(8) Condition: The consonant must be in the same word as the stressed vowel.

- $m\text{o}-k\text{-a-t} \rightarrow [m\text{o}-k\text{-a-t}] \quad \text{come (pl. punct., nom.)}$
- $?\text{ant po-f}:\text{ta} \rightarrow [?\text{ant po-f}:\text{ta}] \quad \text{when it is tomorrow}$
- $?\text{ái kop} \rightarrow [?\text{ái kop}] \quad \text{the wind}$

(9) Condition: The consonant may not be a suffixal consonant.

- $m\text{o}-k\text{-a-t} \rightarrow [m\text{o}-k\text{-a-t}] \quad \text{come (pl. punct., nom.)}$
- $k\acute{a}-\text{t}-\text{im} \rightarrow [k\acute{a}-\text{t}-\text{im}] \quad \text{grind grain (sg. iter., nom.)}$
- $s-p\text{í}-\text{k}:\text{a?}a \rightarrow [s-p\text{í}-\text{k}:\text{a?}a] \quad \text{he will taste it}$
Notice that the conditions are responsible for the generation of surface contrast between long and short consonants in the forms k-á:t-im [ká:t:im] cooK in ashes (eg. iter., nom.) and k-á:-tim [ká:tim] grind grain (eg. iter., nom.) (see (7) and (9) above).

Vowel lengthening. There is also a vowel lengthening rule that lengthens an unstressed vowel when it follows the same type of stressed vowel nucleus and a consonant and is followed by a consonant. Conditions similar to those in (5) apply for this rule also. Compare k-ó:s-i?a [kó:s:i?a] sing (eg. punct., nom.) with k-ó:si-?a [kó:si-?a] sing (pl. punct., nom.). The rule is given as (10).

(10) Vowel Lengthening: \[ V + [+lng] / \hat{V} \left\langle -[lng] \right\rangle \]

\[ \langle -[lo] \rangle \]

\[ \langle -[bac] \rangle \]

\[ \langle -[lng] \rangle \]

Conditions: 1) The V must be in the same word as the stressed V.
2) The V may not be a suffixal V.

These lengthening rules are productive and yet they do not apply to most loanwords, as seen in the data in (11).

(11) singular         plural

[mó:na]        [mó:na]            monkey
[pašá:to]       [pašá:to]          shoe
[třó:ki]        [třó:ki]           car, truck
[ká:p:o:ta]     [ká:p:o:ta]        jacket
[kót:o:n]       [kót:o:]           shirt, blouse
[mí:st]         [mí:s:t]           cat

a-Infixation. It may be easily shown that the lengthening rules are productive in spite of the data in (11). One way to indicate disbelief or disgust in Seri is by using the appropriate intonation and adding the suffix /-aya/ to a word.

(12) sták sták-aya pumice

The effect of this morpheme is to change a word such as sták pumice into something equivalent to the English 'Pumice? Ha!' or 'Pumice, my eye!' The phonetic realization of sták-aya is as expected: [sták:aya]. If a consonant cluster immediately follows the stressed vowel nucleus (which has the same restrictions as above), however, an a is infixed following the first consonant of that cluster, as shown below. (The a of /-aya/
sometimes deletes by a rule that degeminates vowels under certain conditions (see note 3).

(13) ?ást  ?ás-a-t-aya  stone
    ptkámn  ptkám-a-n-aya  lobster
    ná:pχa  ná:p-a-χa-ya  red-headed buzzard
    yéktš  yék-a-tš-aya  Yaqui
    k-pán-ko-χ-+ka  k-pán-a-ko-χ-+ka-ya  run (sg. iter., nom.)
    k tôik-+k  k tôik-a-+k-aya  lizards

Therefore the morpheme is actually /-aya/ [+LPM a-Infixation] where LPM means label the preceding morpheme to undergo, in this case, the morphological rule of a-Infixation. This rule might be written as (14).

(14) a-Infixation:  \( \emptyset \rightarrow +a \) / \( V \) \( \langle -\mathtt{ng} \rangle \left( \begin{array}{c} V \end{array} \right) \) \( C \_ \_ \_ C \)

    Condition:  1) Word-bounded.
    2) The first C may not be suffixal.

The condition is necessary to explain the following type of data.

(15) šá:+ka  šá:+ka-aya  caves

This rule feeds Consonant Lengthening, but the a does not lengthen since it is an infix.

(16) ?ás-a-t-aya  \[ ?ás:ataya \]  stone

Loanwords may undergo lengthening if a-Infixation has applied. (The suffix /-aya/ itself is not generally used with loanwords, the infixation rule along being used.)

(17) elefánte  elefán-a-te  \[ elefán:ate \]  elephant

The a-Infixation rule is also used with the morpheme ?a+χ rather.

(18) m-6:χp  It is white.

?a+χ m-6:χ-a-p  It is rather white.

I will be using this rule as an important test in later sections of this paper.

Problems. There are some additional data that should be compared with respect to Consonant and Vowel Lengthening. The segments ? and i lengthen in the verb /-a?ít/ eat.
(19) k-á?it → [ká?:i:t]  eat (sg. punct., nom.)

The causative prefix may be added to this root, the resulting verb meaning feed; go fishing. Note that the lengthening rules still apply. (The stress shifts from the stem vowel to the prefix vowel and the sequence áa is realized as [á:]).

(20) k-á-a?it → [ká?:i:t]  feed (sg. punct., nom.)

This form poses a problem unless the lengthening rules could apply to a form whose stressed vowel nucleus consists of two identical short vowels. I have tentatively ruled out this solution on the basis of a very few forms such as the following which I analyze as having a sequence of short vowels. Note that the lengthening rules have not applied.

(21) k-áa+-im → [ká:im]  play (sg. punct., nom.)

I have not decided what is the best way to handle these few problematical data.

2. The round consonants. There are three round surface consonants in Seri which would be posited as phonemes in a less abstract analysis (see Moser and Moser 1965). Although I cannot yet account for all of their occurrences, it has become obvious that these are derived segments. (The labialized velar fricative xw also occurs occasionally at the most detailed phonetic level. This segment will be discussed later.) First I will discuss the phonetic realizations of kw, xw, and w.

Offglide. A round consonant has a voiced offglide when it precedes a (voiced) vowel or semivowel. (Again, the representations on the left are intermediate. The symbols kw and xw in the intermediate representations signify [+rd] consonants, the phonetic realizations of the feature [round] being specified by the environment in which the round consonant occurs. In the phonetic transcriptions, kw and xw represent back consonants with voiced offglides.)

(22) ktámkw-i?a → [ktámkw i?a] They are men.

ktámkw-ya → [ktámkw ya] Are they men?


k-kápW-i?a → [kkápW i?a] He is chewing it.

A consonant followed by a glottal stop is realized as a glottalized consonant. Therefore kw and a following ? are realized as [k'w]--an ejective velar stop with a voiced offglide (since it only occurs before vowels). The rule is given informally as (23). (Most of the phonetic transcriptions in this paper will not be so detailed so as to show the effect of this rule.)

(23) C ? → C' Ø

1 2 1 2

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(24) $k^w\tilde{a}:s \rightarrow [k^w\tilde{a}:s]$  Give it to him to drink!

The segment $k^w$ has a voiceless offglide before a (voiceless) obstruent. (The offglide is only variably perceptible before strident segments.)

(25) $k^w-t-p\tilde{a}n\tilde{s}_x \rightarrow [k^wt-p\tilde{a}n\tilde{s}_x]$  He is running like him.

$k-\dot{o}:k^w-s_x \rightarrow [k^{\dot{o}}:k^w-s_x]$  - $[k^{\dot{o}}:k^w-s_x]$  shake (sg. punct., nom.)

Stops are optionally slightly aspirated before pause in Seri (Moser and Moser 1965:53) and probably it is by this same process that $k^w$ is sometimes realized as $[k^w]$ in this position.

(26) $\tilde{a}k^w \rightarrow [\tilde{a}k] - [\tilde{a}k^w]$  wood

Elsewhere than the environments described above the round consonants do not have an offglide, but only simultaneous lip-rounding.

(27) $k-t-f:p\chi^w-s_i \rightarrow [k\tilde{f}:p\chi^w-s_i]$  squeeze (pl. punct., nom.)

$\tilde{\dot{a}}m^w \rightarrow [\tilde{\dot{a}}m]$  maguey

$k-\dot{\chi}:k^w-nix \rightarrow [k^{\dot{\chi}}:k^w-nix]$  shake (sg. punct., nom.)

I will refer to these processes affecting the offglide of the round consonants as the Offglide Detail rule.


(28) Rounding:  $C \rightarrow [+rd] / C$  (left to right iterative)

Condition: Phrase-bounded.

(29) $k-\tilde{o}:\chi^w_k \rightarrow [k\tilde{o}:\chi^w_k]$  be four (sg. punct., nom.)

$s-\chi^w\tilde{a}:p\tilde{a}\tilde{a} \rightarrow [s\chi^w\tilde{a}:p\tilde{a}\tilde{a}]$  He will tremble.

$k^w-\chi^w-p\tilde{a}n\tilde{s}_x \rightarrow [k^w\chi^w-p\tilde{a}n\tilde{s}_x]$  He ran like him!

Notice the following derivations.

(30)  

Round (28)  

Degem (2)  

C Length (5)  

V Length (10)  

Offglide  

$[k^w\tilde{o}:\chi^w\tilde{a}:koi]$  

$[k^w\tilde{o}:\chi^w\tilde{k}t\tilde{n}s\tilde{o}:koi]$  

the four men  

the four men soraping
Diphthongization. As described in Moser and Moser 1965, a [-round] vowel immediately preceding a [+round] consonant in the same word becomes a diphthong with a non-low round offglide that agrees in the feature [high] with that vowel. The rule is given in (31).

\[(31) \text{ Diphthongization: } \emptyset \rightarrow \left[ \text{-syl} \right] / \begin{array}{l} \begin{array}{l} \begin{array}{l} \text{v} \\ \text{c} \\ \text{a} \\ \text{lo} \\ \text{bac} \end{array} \\ \begin{array}{l} \text{[ahi]} \\ \text{[-rd]} \\ \text{[a]hi} \\ \text{[-rd]} \\ \text{[a]hi} \end{array} \end{array} \end{array} \]

Condition: Word-bounded.

\[(32) \begin{array}{l} \text{?d} \chi^w + \rightarrow \left[ ?d \chi^w + \right] \text{ cherry stone clam} \\ \text{k-} \text{l-} \text{k} \text{w} \rightarrow \left[ \text{k} \text{l} \text{k} \text{w} \right] \text{ kill (pl. punct., nom.)} \\ \text{?a} \text{k?w} \rightarrow \left[ ?a \text{k?w} \right] \text{ firewood} \\ \text{?d} \text{k} \rightarrow \left[ ?d \text{k} \right] \text{ wood} \\ \text{?d} : \text{k} \text{w} \rightarrow \left[ ?d : \text{k} \text{w} \right] \text{ his arrival there} \end{array} \]

Velarization. When a \( p \) follows \( \text{k} \) in the same word, the \( p \) becomes \( \text{k} \) (the resulting geminate cluster being realized as a long segment). This process tends to apply in casual speech even when the \( p \) is in the following word.
(33) Velarization: 

\[ +lab \rightarrow [+bac] / [+lab] \quad +ant \rightarrow [+hi] / [+bac] \quad -cnt \rightarrow [+ant] / [-cnt] \]


(34) \( k^w \)-po-pán\( \text{-}^\chi \rightarrow [k^w k^w \text{opán\( \text{-}^\chi \)] \}

\( ?\tilde{o}^\text{k} \text{a} \)k \rightarrow [?\tilde{o}^\text{k}^w \text{ak}] \rightarrow [?\tilde{o}^\text{k}^w \text{ak}] \)

\( k^w \) and \( \chi^w \) as units. It is demonstrable that \( k^w \) and \( \chi^w \) are clearly units and not the sequences \( k^w \) and \( \chi^w \) (or even \( k^w \) and \( \chi^w \)) by the way these segments interact with the a-Infixation rule.

(35) derogatory

\( ?\tilde{o}^\text{k} \)w \( \rightarrow ?\tilde{o}^\text{k}^w \text{aya} \) wood

\( k^w s\chi \rightarrow k^w k^w \text{asxa} \) shake (eg. punct., nom.)

\( ?\tilde{\alpha}^w s\chi \rightarrow ?\tilde{\alpha}^w k^w \text{ata} \) cherry stone clam

\( k^w \text{ax} \rightarrow k^w k^w \text{ata} \) speak (eg. punct., nom.)

\( k^w, \chi^w \) and \( W \) as derived segments. Although \( k^w \) and \( \chi^w \) are units at the level in the derivation at which a-Infixation applies, there is evidence that they are both derived from underlying \( k^\omega \) and \( \chi^\omega \) respectively, and that \( W \) derives from /o/, as I will now demonstrate.

For many verbs iterative aspect is expressed simply by suffixing /-tim/ to the verb stem as shown in (36). The \( t \) of /-tim/ is deleted following a consonant that is preceded by an unstressed vowel.

(36) k-\( \text{méke} \) k-\( \text{méke-} \)tim be lukewarm

k-\( \text{moš}^\text{ime} \) k-\( \text{moš}^\text{ime-} \)tim be drunk

k-\( \text{á}^\text{a} \) k-\( \text{á}^\text{a-} \)tim call

k-\( \text{pito}^\text{t} \) k-\( \text{pito}^\text{t-} \)im be bloated

k-\( \text{ípon} \) k-\( \text{ípon-} \)im cry out

The deletion rule could be stated as (37).

(37) \( t \rightarrow \emptyset / \quad V \quad C + \quad \) [-stress]

Iterative aspect is indicated by this suffix on many verbs and in addition punctiliar aspect is indicated on these verbs by deleting a vowel in the verb stem. Some examples are given in (38). The deletion rule is given
in a simplified form in (39).

(38) k-níp  k-nípa-tim  *hit with hand*
    k-kóxp  k-kóxop-im  *bolt*
    k-mí?śx  k-mí?śx-im  *slip*
    k-ká:kp  k-ká:kop-im  *pound*

(39) **Syncope:**  
\[ V \rightarrow \emptyset / \emptyset \]  
\[ (V) \text{ in certain forms} \]
\[ [+\text{stress}] \]

(The operation of this deletion rule is actually quite idiosyncratic for a given verb—it may apply in any or all of the four forms marked for number/aspect.) In addition, when the vowel to be deleted is an \( o \) and when it is contiguous to a back consonant, labialization or \( W \) usually shows up in the "syncopated" form. Some examples are given below.

(There is also a rule by which \( x \) becomes \( \pm \) in forms other than the singular punctiliar.)

(40) k-í-k\( w \)  k-í-ko-tim  *kill*
    k\( w \)-k-i-?á\( x \)\( o \)+  k\( w \)-k-i-?á\( x \)\( o \)+-im  *have eating utensil*
    k-káp\( w \)x  k-kápo+-im  *chew*
    k-\( x \)áp\( w \)x  k-\( x \)ápo+-im  *tremble*

The syncope rule then must have two parts; it is given informally as (41). The first part of this pair of rules will generate \( W \); a separate rule will coalesce back consonants and \( W \).

(41) **Syncope:**  
\[ o \rightarrow W \]
\[ \left\{ \begin{array}{c}
C \rightarrow [+\text{bac}] \\
C \rightarrow C \\
\end{array} \right\} \text{ in certain forms} \]
\[ \left\{ \begin{array}{c}
V(V) \\
\text{CC} \end{array} \right\} \]

(42) **Coalescence:**  
\[ C \rightarrow [+] \text{rd} \]
\[ W \rightarrow \emptyset \]
\[ 1 \ 2 \]

There is additional evidence for this analysis. The form 'loco' \textit{crazy} was borrowed from Spanish in quite regular ways. The voiced lateral was replaced by \( [\tilde{r}] \). Stressed vowels in loanwords are lengthened when they precede a consonant. Also, some version of the syncope rule applied. The Seri form is therefore \( \tilde{r}ó:k\( w \) \). The verb \textit{make crazy} is k-a-\( \tilde{r}ó:ko-t \).

The rule deleting \( t \) given above (rule (37)) does not take care of all the instances where the \( t \) of a suffix is deleted. This \( t \) also deletes if it
is preceded by a consonant cluster. I will formalize this as (43) below. Notice that (39) has applied in some of the plural forms in (45).

(43)  

(44)  

(45)  

(46)  

x-Deletion. There is now an important point to be clarified that was problematic for Moser and Moser (1965). In (40) we gave the singular punctiliar forms of chew and tremble as kkapWx and kyápWx respectively. We know that the x is there because of the x +.._ rule and the fact that the syncope rule requires a contiguous back consonant. The x is not present phonetically, however. The following rule accounts for its deletion.

(46)  

As the conditions indicate, the rule will not apply in careful speech if the x is followed by a back vowel. Otherwise, the x always deletes.

Moser and Moser (1965:54) set up the sequence kW in contrast with the unit kW on the basis of the superficially anomalous form [?ayáRkW] anklebone.
On the basis of the examples [ʔokʷ] wood and [ʔayaokW] ankle bone, /kʷ/ has been set up as in contrast with /kW/. There is a fairly large number of words which for some speakers terminate in [kW]. For all such words except [ʔayaokW], this varies freely toward [kW]. There is thus no convincing evidence of contrast apart from this one example. Morphophonemic evidence bears out the uniqueness of ʔayakW. All other words ending in isolation in either /kW/ or /kW/, when followed by a vowel in combined forms, have /kW/, not /kW/: ktamkW men, ktámkWi?a they are men; kšooxkW to be four, kšooxkWi?a there are four.

Elsewhere on the same page they add,

The phoneme /W/ after /k/, however, is clearly heard as an additional segment [in the word anklebone--SM]: ʔayakW ankle bone, ʔayakWi?a it is an ankle bone.

I will now present evidence that the morpheme anklebone is -yakwx (< /-yakox/), and that the final x is what causes the word to be pronounced differently from words ending in kʷ. The plurals of anklebone are -yákʷ+kk and -yákʷ+kx (collective). Nouns that have plurals with -k(a) often have singular forms ending in x (for whatever reason historically). A few examples are given in (47).

(47) tákx ták+k porpoise
ʔápx ʔápa+k octopus
šámix šámi+k palm
kopsí:x kopsí:+ka jellyfish
kótx kót+ka manta ray (sp.)
ká:nx ká:n+ka sea bass (sp.)

The plural suffix +k(a), however, also occurs on noun stems that do not end in x.

(48) ná:pxa ná:pxa+k red-headed buzzard
nó:si nó:si+k mourning dove
klíši klíši+k sardine (sp.)
ʔáx ʔáx+k projectile point
koyóko koyóko+k dove

Therefore we might hypothesize a final x for [ʔayaokW] which would delete after it provides the environment for the Offglide Detail rule.
The best evidence comes from the a-Infixation rule, however.

(49) [ʔyakoKWːaxaya] Anklebone, my eye!

There the x surfaces indisputably—and quite mysteriously unless we posit ʔyakˈWx as a proper (intermediate) representation of anklebone.

Since the rule deleting x after kw may be collapsed with the x-Deletion Rule (46), it seems unnecessary to posit two separate x-Deletion rules (although I have not yet checked to see if the conditions on (46) apply to the other rule also). It is also important to point out that this is the only word that I am aware of for which a rule x + 0 / kw x is necessary. Therefore it seems highly desirable to consider deletion of x in ʔayakˈWx and the deletion of x in kxapWx to be effected by the same rule, even though in some cases the x is not recoverable from the phonetic form. The derivation of ʔayakˈWx and ʔayakˈwxaya would be as follows:

(50) UF

<table>
<thead>
<tr>
<th>Rule</th>
<th>Input</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Syncope (41)</td>
<td>ʔayakWx</td>
<td>ʔayakWxaya</td>
</tr>
<tr>
<td>Coalescence (42)</td>
<td>ʔayakˈWx</td>
<td>ʔayakˈWxaya</td>
</tr>
<tr>
<td>a-Infixation (14)</td>
<td>————</td>
<td>ʔayakˈWxaya</td>
</tr>
<tr>
<td>Rounding (28)</td>
<td>ʔayakˈWxw</td>
<td>————</td>
</tr>
<tr>
<td>C Length (5)</td>
<td>————</td>
<td>ʔayakˈW:axaya</td>
</tr>
<tr>
<td>V Length (10)</td>
<td>————</td>
<td>————</td>
</tr>
<tr>
<td>Diphthong (31)</td>
<td>ʔayakˈWkwW</td>
<td>ʔayakˈWkw:axaya</td>
</tr>
<tr>
<td>Offglide</td>
<td>ʔayakˈKWxW</td>
<td>ʔayakˈKWx:axaya</td>
</tr>
<tr>
<td>x-Deletion (46)</td>
<td>ʔayakˈkW</td>
<td>————</td>
</tr>
</tbody>
</table>

[ʔyakoKW] [ʔyakoKWxaya]

It is important to notice that x-Deletion (46) must apply after the Offglide Detail rule has applied.

Other rules generating kw and xW. Not all occurrences of intermediate kw and xW are generated by Syncope and Coalescence. The third person referent clitic has two allomorphs: kw- and ko-. It is usually kw- except before consonant clusters of which the first member is ʔ, m, or k in which case it is ko- as seen by the data below.
Give it to him to drink!

(he) who gives to drink

He ran like him.

He will run like him.

Did he run like him?

He is running like him.

(he) who runs like him

Run like him!

The third person referent clitic is also ko- in imperative forms if the verb stem begins with a short low vowel. By regular morphophonemic rules, the intermediate forms on the left in (52) result.

A special rule will be needed to handle the alternation between kw- and ko in this morpheme.

The segment w is also generated directly by a morphophonemic rule. When a prefix ending in o precedes a (long or short) o, the vowels coalesce and become short a if and only if the verb is intransitive. (Otherwise, the prefix vowel deletes.)

The rule describing this process could be summarized as (54).

Vowel Coalescence: \[ V + V \Rightarrow V \emptyset / - ] \]

\[
\begin{array}{c}
[+bac] [+bac] [+1o] [+1o] \\
[-lo] [-lo] [-1ng] [-1ng] \\
1 2 1 2 \\
\end{array}
\]
When the prefix $\chi$- (emphatic) is added to these stems, coalescence takes place and in addition the $\chi$ becomes $\chi\hat{u}$. The emphatic forms of the verbs above are: $\chi\hat{u}\text{átx}$, $\chi\hat{u}\text{ás}$, and $\chi\hat{u}\text{án}\hat{u}$. The rule describing this rounding could be written as (55).

(55) $\chi$-Rounding: $\chi \rightarrow [+rd] / V + V // _/_ V \text{ intr}$

$[+\text{bac}] [+\text{bac}] [-\text{lo}] [-\text{lo}]$

There is another rule that generates intermediate $k\hat{w}$. When $k$ follows $W$, they coalesce to become $k\hat{w}$.

(56) Coalescence II: $k \rightarrow \emptyset [+rd]$

In the following derivation (which goes to an intermediate level), another (syntactico-phonological) rule applies which deletes $\chi$ when it precedes $k$ in singular punctiliar forms; I call this the $\chi$-Rule.

(57) burst

<table>
<thead>
<tr>
<th></th>
<th>sing punct</th>
<th>sing iter</th>
</tr>
</thead>
<tbody>
<tr>
<td>UF</td>
<td>/k-mápxk/</td>
<td>/k-mápxk-tim/</td>
</tr>
<tr>
<td>$\chi$-Rule</td>
<td>kmápxk</td>
<td>-----------</td>
</tr>
<tr>
<td>Syncope (41)</td>
<td>kmápxk</td>
<td>-----------</td>
</tr>
<tr>
<td>Coalescence II (56)</td>
<td>kmápxk$\hat{w}$</td>
<td>-----------</td>
</tr>
<tr>
<td>$t$-Deletion (37)</td>
<td>---------</td>
<td>kmápxk-tim</td>
</tr>
<tr>
<td></td>
<td>kmápxk$\hat{w}$</td>
<td>kmápxk-tim</td>
</tr>
</tbody>
</table>

In the following verb, the $\chi$-Rule applies in the singular punctiliar form but not in the plural punctiliar form and is therefore the underlying cause of the surface contrast. (The plural punctiliar morpheme is $-\emptyset$ for this verb.)
As I have said, there are very few occurrences of Ṽ that cannot be accounted for. One outstanding example is the verb k-aWa~p be crushed; crush. In spite of such words, the preceding analysis seems to be well-motivated and probably historically valid as well.

3. Nasalization. Moser and Moser (1965:55) noted that "nasalization is restricted to vowel nuclei preceded by /kw/." Nasalized vowels are derived by three rules: two that lenite, and one that subsequently nasalizes the vowel or vowels that follow this nasal glide. The rules are given informally and illustrated below.

(58) be vertical

<table>
<thead>
<tr>
<th></th>
<th>sing punct</th>
<th>sing iter</th>
<th>plur punct</th>
</tr>
</thead>
<tbody>
<tr>
<td>UF</td>
<td>/k-ó:ɔɔk/</td>
<td>/k-ó:ɔɔk-tim/</td>
<td>/k-ó:ɔɔk/</td>
</tr>
<tr>
<td>x-Rule</td>
<td>kó:ɔok</td>
<td>-----------</td>
<td>-----------</td>
</tr>
<tr>
<td>Syncope (41)</td>
<td>kó:ɔWk</td>
<td>-----------</td>
<td>kó:ɔWxk</td>
</tr>
<tr>
<td>Coalescence II (56)</td>
<td>kó:ɔkW</td>
<td>-----------</td>
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<tr>
<td>t-Deletion (37)</td>
<td>-----------</td>
<td>kó:ɔxkim</td>
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</tr>
<tr>
<td>x-Deletion (46)</td>
<td>-----------</td>
<td>kó:ɔxWk</td>
<td>[kó:ɔkW]</td>
</tr>
</tbody>
</table>

3R-PERF-work he is working with him
tok \(kw\text{-mf}:-\text{skam}\) + [tok\(\text{w}\text{ti}\text{:skam}\)]

there 3R-PERF-[arrive-PLUR]

they arrived there

(62) Nasal Lenition II: \(m \rightarrow \text{\textipa{w}} / k\) ___ (Word-bounded)

(63) \(k\text{-mám} \rightarrow [kw\text{'am}]\hspace{1cm} that which is cooked\)

NOM-[be cooked]

\(k\text{-m-átíkpan} \rightarrow [kw\text{'átíkpan}]\hspace{1cm} Don't work!\)

IMP-NEG-work

\(kmíke \rightarrow [kw\text{'k}:e]\hspace{1cm} person; Seri\)

person/Seri

\(i?-\text{sk-m-á:1-a}\text{@a} \rightarrow [i\text{skwä:a}?\text{a}]\hspace{1cm} I shouldn't do it.\)

1SUB-FUT-NEG-do-CLITIC

\(ták+k\text{pak m̪-k-a-t-i}\text{@a} \rightarrow [\text{ták+kpakm̪k:a}t\text{@a}]\)

porpoise-PLUR-some toward-NOM-move-PLUR-DECL

Some porpoises are coming.

The switch-reference marker \(/\text{ma}/\) seems to be optionally cliticized to the verb by some speakers, in which case it undergoes (62); otherwise it does not.

(64) \(t-\text{?ámok(=}\text{ma} \rightarrow [t\text{?ám:o:kwä}] \sim [t\text{?ám:o:kma}]\)

DP-night SCP

when it is night

Rules (59) and (62) are bled by a rule that epenthesizes an \(\text{o}\) when a [-labial] consonant is followed by a nasal and another consonant; for example, \(k\text{-m-ánx}\) (IMP-NEG-run) becomes \(k\text{ompán}\text{x}\ Don't run!.

Moser and Moser caught these changes as they were spreading through the lexicon and the speech community and contrasted forms to which the rules had applied with forms to which the rules had not yet applied; therefore they considered nasalization phonemic, although considerable alternation was noted. Since then, the rules have generalized to the entire lexicon for younger speakers although older speakers continue to not lenite \(m\) in certain words.

4. Process affecting /\text{m}/. An \(\text{m}\) that follows an unstressed vowel assimilates to the general point of articulation of a consonant that follows it.\(^9\) Thus an \(\text{m}\) becomes \(\text{n}\) (dental) before dentals, alveolars and palatais, and \(\text{o}\) before velars and back velars; it remains \(\text{m}\) elsewhere.\(^10\) (When a nasal precedes a glottal stop in a word, the two segments metathesize. When the glottal stop is in the following word, metathesis may occur in casual speech.) Since according to E. Moser (personal communication) the nasal is dental and not palatal before \(\chi\), the rule is somewhat
困难于形式地表达。

(65) \( m \)-Assimilation: \[ \begin{array}{c}
\text{C} + \left[ \begin{array}{l}
\alpha \text{bac} \\
[- \text{cor}]
\end{array} \right] / V \left[ \begin{array}{l}
[- \text{str}] \\
\text{bac}
\end{array} \right] \rightarrow \beta \text{bac} \\
[- \text{cor}]
\end{array} \] (Pause-bound)

The effect of this rule is illustrated by the following data.

(66) \( i-m-\ddot{a}: \rightarrow [\text{im}a:] \) who is not grinding grain
\( i-m-p\ddot{i}: \rightarrow [\text{imp}i:] \) who is not tasting it
\( i-m-\ddot{a}: \rightarrow [\text{ins}i:] \) who is not smelling it
\( i-m-\ddot{a}: \rightarrow [\text{iny}a:] \) who does not own it
\( i-m-\ddot{a}: \rightarrow [\text{in}k\ddot{a}:] \) who is not looking for it

\( \text{kmfke kt\ddot{a}m ik\ddot{a}\ddot{a}: } \text{k-tapo+k-im } \text{ki? y\ddot{o}:fp} \)

person male 3P0SS-boat NOM-[be broken] the PAST-arrive

\[ [\text{k\ddot{w}ik}e: \text{kt\ddot{a}m: ik\ddot{a}\ddot{a}: } \text{k\ddot{a}p:o:ki\ddot{n} } \text{ki? y\ddot{o}:fp}] \]

The man whose boat is broken arrived.

The phoneme /\( n \)/ never assimilates to labial or velar points of articulation.

(67) \( s-\ddot{o}:\text{-men-ka?a} \rightarrow [\text{so:m:e:nka?a}] \) He will winnow.

Some morphemes do not have allomorphs with \( m \); one example is komk\ddot{a}: [komk\ddot{a}k] people; Seris. Old word lists indicate that this word was once pronounced [komk\ddot{a}k]. Pinart (1879) and and Bartlett (1852) both give komkak. McGee (1894), however, gives k\ddot{u}n-kak. For tomkox [k\ddot{w}-k-\ddot{i}:?] seven, Pinart gives tomka\ddot{x}kue, and Pimentel (1875) gives tomku\ddot{uj}k\ddot{c}ui. For komk\ddot{a}: [komk\ddot{a}:] old woman, however, McGee gives k\ddot{u}nk\ddot{a}i\ddot{e} and Pimentel konkabre.

Backing. Another rule generating \( n \) is characteristic of younger speakers. By this rule an \( m \) following an unstressed vowel becomes \( n \) when it occurs before pause. This rule could be stated as (68). It does not apply to \( n \).

(68) Backing: \[ \begin{array}{c}
\text{C} + \left[ \begin{array}{l}
[+\text{bac}] \\
[- \text{cor}]
\end{array} \right] / V \left[ \begin{array}{l}
[+ \text{hi}] \\
[- \text{stress}]
\end{array} \right] \rightarrow \beta \text{bac} \\
[- \text{cor}]
\end{array} \]

Thus k-\( \ddot{a}:\text{-tim do (ag. iter., nom.)} \) is often pronounced [k\ddot{a}iti\ddot{n}].

Influence of secondary stress. The assimilation and backing rules are blocked by secondary stress which is assigned by two rules. The first rule assigns secondary stress to a vowel following a vowel with primary stress. (I will discuss primary stress placement later.)
Therefore s-á:om-ka?a becomes [sá:omka?a]; m-Assimilation (65) does not apply. Secondary stress does not condition Consonant or Vowel Lengthening: ká:om-i?a + [ká:omi?a]. (Therefore these rules need to be rewritten with [1 stress] as the feature on the stressed vowel.)

Secondary stress is also generated during compound word formation. In compound words the stress on the first member of the compound is reduced. (The loss of vowel length will be discussed later.)

There are many other words that obviously are compound words although they may have undergone further phonological change, most notably a loss of consonant or vowel in a cluster.

It should be noted that in words such as xpanàmsákw+ in (71) the m follows a vowel with secondary stress and so does not assimilate to the following consonant. It is expected that as the internal structure of compound words becomes more opaque, the m-Assimilation rule will apply. A possible example pointed out to me by M. Moser is the initial unanalyzable sequence in the words in (72).

The last word in (72) has a variant in the idiolect of at least one speaker: moχéšiš.
Exceptions to m-Assimilation. There are a few interesting exceptions to the assimilation rule. Phrases that serve as demonstratives are composed of a locative plus an article. The underlying form of there is seen in the data in (73).

(73) ?ím i-t-ákata ma leaving it there
    there TR-DP-leave SCP

This locative combines with the definite articles (which are derived historically from various verbs (cf. Moser 1977) to form demonstrative adjectives and pronouns; these demonstratives are stressed on the locative morpheme.

(74) ?ím-intika tok ko-ntí-k-a + [?ímintikatokontík:a] [that one] there 3R-away-NOM-move
    There he goes.
    ktám ?ím-kop + [ktám?íŋkop] man [that]
    that man (standing)

Obviously the problem is that the m has assimilated to the velar point of articulation even though the preceding vowel is strongly stressed. These demonstratives are also unusual in that they are exceptions to Consonant and Vowel Lengthening: the form ?ím-intika is phonetically [?ímintika]. The aberrant pattern of these forms might be accounted for by positing a special late (phrase?) stress rule for them.

Special m-Assimilation. A final rule that applies uniquely to the commonly used verb -o:m lie, be prone is given as (75).

(75) Special m-Assimilation: C + [abac]/_- C (Pause-bounded)
    [+nas] [-αnt] [abac]
    [-cor] [-αcor] [βant]
    [-bac] [βcor]

Condition: This rule applies only to the verb -o:m lie, be prone.

(This verb cannot be interpreted as having a vowel cluster as its nucleus since it undergoes Consonant and Vowel Lengthening.) Compare the following forms.

(76) lie swallow (intr.)
    -o:m -o-am
    lie INTR-swallow
    [kó:m:i:a] [kó:m:i:a] He is ....
    [kó:nya] [kó:mya] Is he ...
    [só:ŋka?a] [só:mka?a] He will ....
Alternatively, the verb -o:m lie, be prone could be marked as a positive exception to m-Assimilation (65).

There are two remaining occurrences of [ŋ] that cannot or should not be handled by any of the above rules: the verb to speak wrong [k-ŋa?it], [k-ŋa?it-tax] (plural) and the name of a certain species of duck [któ:nk], which is obviously onomatopoetic.

5. The chameleon consonant. There are approximately twenty verbs which exhibit a peculiar variety of allomorphy. In order to effectively demonstrate the superficially irregular behavior of these verbs, I will briefly sketch the more typical morphophonemic changes that occur with prefixation in Seri.

Consonant-initial stems are relatively straightforward. (Finite verb forms are cited with third person subject, unmarked in Seri, and third person object (where applicable), also unmarked. Singular punctiliar stems will be used throughout.)

(77) Subject Nominalized Interrogative Future Past
k- t- si- yo-
-meke k-méke t-méke s-méke yo-méke
be lukewarm

The i of the future prefix /si-/ (and certain other morphemes) deletes by an early rule that is irrelevant here.

Vowel-initial verb stems may be divided into the following types based primarily on the quality and length of the vowel: those beginning with (a) a short low vowel, (b) a high back vowel and the verb is intransitive, (c) any other vowel. The forms below illustrate type (a).

(78) k- t- si- yo-
-anx k-ánx t-ánx sí:-nx yó:-nx
roar

Notice that the stem vowel deletes and the prefix vowel, which now carries the stress in the future and past forms, is lengthened. The following forms illustrate type (b).

(79) k- t- si- yo-
-otx k-ótx t-ótx s-ótx yátx
arise
-ô:ta k-ô:ta t-ô:ta s-ô:ta yá:ta
cry

Notice that the prefix vowel i deletes, but the prefix vowel o coalesces with the stem vowel to yield short a. The following forms illustrate
verbs of type (c). (The prefix /-i-/ is a transitive marker.)

(80)  

\[
\begin{array}{cccc}
  k- & t- & si- & yo- \\
  -a:npx & k-a:npx & t-a:npx & s-a:npx & y-a:npx \\
\end{array}
\]

return home

\[
\begin{array}{cccc}
  k-\bar{o}:n & i-t-\bar{o}:n & i-s-\bar{o}:n & i-y-\bar{o}:n \\
\end{array}
\]

carry

be seated

be seated

\[
\begin{array}{cccc}
  -i:\bar{t}x^+ & k-\bar{t}x^+ & t-\bar{t}x^+ & s-\bar{t}x^+ & y-\bar{t}x^+ \\
\end{array}
\]

become pieces

As with previous data, rules are formulable to express the alternations and deletions seen in these forms, but these are not germane to our discussion. It is only important to notice the types of changes that occur with vowel-initial stems.

Many verbs may be used transitively or intransitively, in which case the intransitive form requires the intransitive marker /-o-/. This morpheme occurs directly before the stem and often coalesces with the stem vowel to yield yet additional allomorphs, some of which are given in (81). The transitive forms require the transitive marker (as do all transitive verbs in Seri); this marker follows the subject nominalizer, usually deleting by one of various rules, and otherwise occurs only preceding a finite verb that has third person subject and object, as do the forms in (81).

(81)  

\[
\begin{array}{cccc}
  k- & t- & si- & yo- \\
  -sanx & k-sánx & i-t-sánx & i-s-sánx & i-yo-sánx \\
\end{array}
\]

carry child

\[
\begin{array}{cccc}
  k-\bar{o}:sánx & t-o-sánx & s-o-sánx & ya-sánx \\
\end{array}
\]

swallow

\[
\begin{array}{cccc}
  k-\bar{o}:m & i-t-\bar{o}:m & i-s-\bar{o}:m & i-yo-\bar{o}:m \\
\end{array}
\]

\[
\begin{array}{cccc}
  -i:p & k-\bar{i}:p & i-t-\bar{i}:p & i-s-\bar{i}:p & i-y-\bar{i}:p \\
\end{array}
\]

carry on head

I will now present some forms of verbs that do not at all pattern like the majority of the verbs in Seri.

(82)  

\[
\begin{array}{cccc}
  k- & t- & si- & yo- \\
  play violin & k-\bar{k}:nx & i-t-\bar{t}:nx & i-s-sé:nx & i-yo-\bar{e}:nx \\
\end{array}
\]

\[
\begin{array}{cccc}
  k-o-\bar{e}:nx & t-o-\bar{e}:nx & s-o-\bar{e}:nx & yo-\bar{e}:nx \\
\end{array}
\]

be shiny

\[
\begin{array}{cccc}
  k-\bar{k}:oWx & t-\bar{t}amWx & s-s\bar{a}mWx & yo-\bar{o}mWx \\
\end{array}
\]

The allomorphs of verbs such as those in (82) are not predicted by any rule that has been posited above.
An abstract analysis. An abstract analysis of these stems would posit an abstract 'chameleon' consonant as the initial segment of the verb stems in (82); I will use the symbol q for this segment. Only two simple rules would be needed; these are given as (83) and (84). An illustrative derivation is given in (85).

\[(83) \quad q + C_i / \quad C_i \quad [+\text{cns}] \quad \]

\[(85) \quad q + \emptyset / \quad [\text{-cns}] \quad \]

\[(86) \quad t-Q\text{á}mWx \quad yo-Q\text{á}mWx\]

\[(83) \quad tt\text{á}mWx \quad \text{------}\]

\[(84) \quad ---- \quad yo\text{á}mWx\]

\[(85) \quad \text{q} \quad \emptyset / \quad \text{[-cns]} \quad \]

The imperative forms of Q-verbs illustrate the reason why rule (85) deletes q after non-consonantal segments rather than after vowels alone.

\[(87) \quad i?-\text{é}:nx \quad \text{Play it (violin)!} \quad < \quad ?-\text{Q}:nx\]

Negative forms of Q-verbs, as well as other forms, are consistent with this analysis.

\[(88) \quad yo-m-m\text{á}mWx \quad \text{It wasn't shiny.}\]

\[\text{PAST-NEG-[be shiny]}\]

These verbs must be marked [Label Preceding Morpheme -Coalescence (54)] to prevent the application of the rule of coalescence that applies in the derivation of yasánx from underlying /yo-o-sánx/ (see (81)). From underlying /yo-o-qé:nx/, the surface form yoé:nx results rather than yae:nx or yee:nx as would otherwise be expected. Additional evidence for claiming that these verbs are consonant-initial will be presented below.

Causative prefix. The causative prefix in Seri has several suppletive allomorphs whose distribution is determined primarily by the phonological shape of the following morpheme. (There are a few additional data that do not correlate with the following characterization of the distribution but which do not affect the argument presented below.)

The causative prefix is /-a-/ when followed by a consonant as in (89).

\[(89) \quad -pokt \quad \text{be full} \quad \quad \quad -a-pokt \quad \text{fill}\]

The prefix is /-ak-/ when followed by a short low vowel or the intransitive morpheme as in (90).

\[(90) \quad -anox \quad \text{burn (intr.)} \quad \quad \quad -ak-anox \quad \text{burn (tr.)}\]

\[\quad \quad \quad -o-am\text{x} \ (>-o:mx) \quad \text{say (intr.)} \quad \quad \quad -ak-o-am\text{x} \ (>-ak6:mx) \quad \text{denounce, accuse}\]
The prefix is /-a?-/ when followed by a stem vowel that is not a short low vowel as in (91).

(91) -i:pe be good -a?-i:pe-t fix
    -a?:npx return home -a?-a:npx return (something)
    -i:npxax quiver -a?-i:npxax shake (tr.)

The allomorph /-a-/ is also used with a small set of verbs that are not consonant-initial and which must therefore be specially marked to take this form of the causative morpheme.

(92) -a?it eat -a-a?it feed; fish

There are two more allomorphs that occur with a small number of verbs: /-k-/ as in (93) and /-k-/ plus an ablaut rule (an abstract analysis of this allomorph is also possible) as in (94).

(93) -a?kx be torn -k-a?kx tear
(94) -i:txk drip -k-e:txk cause to drip

What is important to note is that the allomorph that occurs with consonant stems is /-a-/; although this allomorph also occurs with a few other verbs, as stated above. This allomorph is the one that occurs with a verbs, which fact would follow unsurprisingly from the analysis of these verbs as having consonant-initial stems.

(95) -qiwx be red (as in k-k?Wx)
    -a-qiw make red (as in k-a-i-qiw)

Infinitive. The infinitive prefix in Seri also has several suppletive allomorphs. The infinitive morpheme is /ika-/ when the verb is intransitive, the a often deleting by regular phonological rules.

(96) ikanéke to be lukewarm (< ika-méke)
    iké:χʷ to jump (intr.) (< ika-o-χʷ)

The allomorph /i?-/ plus an ablaut rule occurs when this morpheme is followed directly by a transitive verb that begins with a high vowel. (Again, an abstract analysis of this allomorph is possible.)

(97) i?é:χʷ to jump across (< i?-fχʷ)
    i?ákta to look at (< i?-ó:kta)
    i?é: to hear (< i?-i:)

The allomorph /i?a-/ occurs elsewhere.
The allomorph that occurs with consonant-initial transitive verbs, therefore, is /i?ə-/ or /i?ə-/, which also occurs with Q-verbs that are transitive, such as (99)

(99) -qí: feel i?ái: to feel

Note that if this verb began with a high vowel, it would have been expected to take the /i?-/ plus ablaut allomorph of the infinitive.

i-Epenthesis. There is a late phonological rule that inserts i as follows (simplified slightly).

$$\emptyset \rightarrow i / \begin{cases} C \end{cases} / C \begin{cases} \ominus \end{cases} C$$

Condition: Word-bounded.

(100) /m-t-á?o/ 2SUB-INTER-see i?ái: to look

Did you see him?

/ktám k? m-t-á?o/ + ktám k? i?ái: to look

Did you see the man?

/áš-ya m-t-á?o/ + ášya i?ái: to look

What did you see?

One allomorph of the imperative morpheme is /?-/ and it often provides the environment for this Epenthesis rule.

(102) ?-f :m Sleep!

i?-pí: Taste it!

Note that this rule has applied in the following forms.

(102) i?áší: to cut (< i?áší:)

i?apí: to taste (< i?apí:)

These forms can be explained by ordering the Q-Deletion rule after i-Epenthesis.

Other evidence. On the basis of the allomorphs of the passive morpheme, the third person referent clitic, and the action nominalizer, other evidence of the type presented in the paragraphs above could be developed. Since the arguments would be essentially identical, however, I will not present this evidence here.
A concrete analysis. A concrete analysis would, of course, claim that the verbs under consideration do not begin with an abstract consonant. One concrete solution would be to choose one of the allomorphs beginning with a consonant, say -tamWx or -kamWx, and mark the stem-initial consonant to undergo special assimilation and deletion rules that unmarked consonants do not undergo. This alternative does not seem to be well-motivated because there is no basis for choosing one consonant over another and rules parallel to those in the abstract solution would be necessary. Also, this solution would 'predict' that should these verbs be regularized in a reanalysis by the speakers of the language, they will emerge as t-initial or k-initial stems. I do not know of any evidence at present in support of this claim.

Another concrete solution would be to posit the vowel-initial allomorph as underlying and mark the verb in the following way: [Label Preceding Morpheme +Special Consonant Lengthening]. Special Consonant Lengthening would be a minor rule, given as (103).


(104) t-ámWx yo-ámWx
(103) ttámWx -------
ttámWx yoámWx

These verbs would also have to be marked in an ad hoc fashion to take the various allomorphs of the morphemes such as causative, imperative, and passive. In the case of the causative prefix, this is not without precedent since it has been seen that there is already at least one ad hoc class that takes the /-a-/ allomorph. There is also a need to distinguish the behavior of these verbs with regard to the prefix vowels from that of the regular verbs shown in (78) - (81). Compare again the forms in (105).

(105) -anx roar yó:-nx
-(Q)amWx be shiny yo-ámWx
-i: hear i-y-1:
-(Q)i: feel i-yo-1:

The 'irregular' verb would have to be marked [Label Preceding Morpheme -Vowel Deletion].

A more difficult problem is presented by the i-Epenthesis rule. The rule would have to be amended to allow epenthesis before long consonants unless of course the lengthening rule (103) were rewritten as a gemination rule. These verbs are still positive exceptions to this rule when the prefix is /-i-/ since the environment for the application of the rule does not exist and yet the rule (seemingly) applied. One might suggest that rule (103) should be revised to say that any consonant lengthens, including
glottal stop; after applying i-Epenthesis one could apply a rule shortening long glottal stops. I do not know whether clusters arising from prefixing the imperative morpheme to Q-initial stems surface as long or short glottal stops; therefore, the crucial data on this question are missing.

Comparing solutions. The abstract analysis is forced to posit an underlying segment to which it can assign no definite phonetic feature except [-syl]. This solution quite neatly explains some otherwise rather bizarre allomorphy. One problem is that it implies that Q-verbs are regular verbs except for this abstract consonant. We have seen that this is not the case, however, since these verbs must be specially marked so that the rule coalescing prefix vowels (rule (54)) does not apply to them. To avoid abstractness the concrete solution must add several ad hoc features to the verbs and it is not certain that it can adequately handle all of the facts. The proposal raises some questions, nevertheless, that will require further research.

Is the chameleon consonant /w/? Although a synchronic analysis of Seri does not give many clues concerning the phonetic nature of the chameleon consonant, the questioning of a sixty-year-old speaker of Seri revealed that the word k-kiʔwx (< k-qìʔwx) used to be pronounced kwíʔwx, and tìʔwx used to be pronounced twíʔwx. This evidence suggests that Q is actually /w/. It should be noted that Seri does not have a phoneme w at the taxonomic level.

6. Laterals. The segments l and + (voiceless lateral fricative) merit comment. Words with the voiced lateral are rarely found in contemporary Seri (M. Moser, personal communication) and are typically place names or words in which voiced and voiceless l alternate, the variant with + definitely being more common. At this point we would not know if an earlier contrast has been basically neutralized or if the voiceless lateral originated as a variant of the voiced lateral. The old word lists seem to indicate that the voiceless lateral existed in the late 19th century because the transcriptions waver on the manner in which to transcribe it.

<table>
<thead>
<tr>
<th>(106)</th>
<th>Present</th>
<th>McGee</th>
<th>Bartlett</th>
<th>Pinart</th>
<th>Pimentel</th>
</tr>
</thead>
<tbody>
<tr>
<td>blue/green</td>
<td>k-ôî+</td>
<td>kóî</td>
<td>\h</td>
<td>kovilch</td>
<td>kovü̂X'</td>
</tr>
<tr>
<td>yellow</td>
<td>k-máso+</td>
<td>mossol</td>
<td>\t</td>
<td>k'masol</td>
<td>kmaso̊̂X'</td>
</tr>
<tr>
<td>black</td>
<td>k-ôp̥o+</td>
<td>kópol̥t</td>
<td>kopolcht</td>
<td>kopoX'</td>
<td>jikopohl</td>
</tr>
<tr>
<td>head/hair</td>
<td>?a-+ft</td>
<td>aṁleht</td>
<td>ih'lit</td>
<td>ill'it</td>
<td></td>
</tr>
</tbody>
</table>

Therefore there is no evidence that the voiceless lateral is a contemporary innovation. What is true, however, as native speakers have remarked, is that the almost complete replacement of l by + has occurred within the last two generations.
7. Vowels. With respect to the vowel system, I feel that it is necessary to posit underlying long vowels in contrast with short vowels, but this contrast is found almost exclusively in the environment of stress. Likewise, vowel clusters are found almost exclusively in the environment of stress.) I will present evidence that these are long vowels and not geminates.

Prefix vowels delete before long vowels, as shown in (107).

(107) po-á:npx + pá:npx  \textit{if/when he returns home}  
DF-[return home]

Prefix vowels do not delete before short low stem vowels. Instead the stem vowel deletes and the prefix vowel, which takes on the stress of the stem vowel, lengthens.  

(108) po-átax + pó:tax  \textit{if/when he goes}  
DF-go

Certain spell-out rules are sensitive to vowel length. To give but one example, the imperative prefix has an allomorph /k-/ that occurs only before the negative morpheme and before a stem whose initial vowel is a short low vowel, as shown in (109) below.

(109) k-m-ó:ktə  \textit{Don't leave!}  
IMP-NEG-[look at]  
   k-átax  \textit{Go!}  
IMP-go  
   k-émen  \textit{Winnow it!}  
IMP-winnnow

Before long low vowels and certain other types of stems the allomorph /?-/ is used.

(110) ?-á:i  \textit{Do it!}  
IMP-do  
   ?-á:ši  \textit{Carry it away!}  
IMP-[carry away]

Some surface occurrences of long vowels are derived from juxtaposed short vowels. One example is the form ká:pxə+ (he) \textit{who causes to be brittle.} This is a derived form composed of the causative prefix /-a-/ plus the stem -apxə+ \textit{be brittle.}

Long vowels tend to shorten when the primary stress is weakened. Thus pá:npx \textit{if/when he returns home} becomes panpx when the word stress is weakened or lost. Moser and Moser (1965:56) give the example of an idiomatic expression composed of ná:pxə \textit{red-headed buzzard} and -kím \textit{throw at; the expression is ná:pxə k-kím and means to have poor luck begging food.} Note that the loss (or reduction) of stress on ná:pxə results in the
loss of vowel length.

This analysis of the vowels contrasts with that of Moser and Moser (1965: 55) who claimed that "sequences of two and three identical vowels are ... structurally analogous to sequences of diverse vowels" and so did not set up vowel length as phonemic; "long" vowels were analyzed as geminates.

Moser and Moser also claimed that the four vowels "contrast as to high and low and as to front and back (1965:55)." The correctness of this statement has been borne out by the way in which the vowels operate in spell-out and morphophonemic rules. The vowels i, iː, o and oː systematically function as non-low vowels and e, eː, a, and aː as low vowels. An initial study of the acoustic nature of these vowels has yielded the following results (disregarding length):

<table>
<thead>
<tr>
<th>Average formants</th>
<th>F1</th>
<th>F2</th>
</tr>
</thead>
<tbody>
<tr>
<td>i</td>
<td>464</td>
<td>1502</td>
</tr>
<tr>
<td>o</td>
<td>450</td>
<td>843</td>
</tr>
<tr>
<td>a</td>
<td>594</td>
<td>1089</td>
</tr>
<tr>
<td>e</td>
<td>572</td>
<td>1419</td>
</tr>
</tbody>
</table>

8. Stress. Primary stress is predictable to a high degree, stress usually falling on the first vowel of the stem. It may be shifted by later rules to prefix vowels, however, as we have seen in (108) above. Other transitive verbs may be passivized by adding the passive prefix and then nominalized by the prefix /-/; for example, /a-p-a?it (NOM-PASS-eat) that which is eaten, food. The verb -kai+, however, does not have a derived nominalized passive form ?-a?-káːi+ as would be expected. Instead a verb meaning to be lacking is used: -a?káːi+. The nominalized form takes the subject nominalizer /k-/: k-a?káːi+ (that) which is lacking. Although this form cannot be derived synchronically from -kai+, it is obvious that such was the case historically.

Not all verbs with stress on the second syllable of the stem are so easily analyzed. Compare the following forms.

(111) /-mo?ime/  be drunk
/-moképe/  be sick
/-motóman/  be weak

The significance of the sequence mo- is unknown.
There is more surface irregularity with nouns since many were probably compounds or derived nouns historically.

Moser and Moser (1965:56) claimed that stress was phonemic on the basis of the following type of data. My analysis is given on the right.

(112) ?îpχàŋ my nephew /?i-åpχàŋ/ → ?i-åpχàŋ + ?i-åpχàŋ

\[ ?îpχàŋ our flesh /?i-Åpχàŋ/ → ?i-Åpχàŋ \]

9. Summary. In this paper I have attempted to clarify some of the low-level phonological processes operating in Seri. It has been shown that nasalization and \( \eta \) are generated by some of these rules. I have also suggested that a more abstract source can be found for \( \kappa w, \chi k \) and \( W \), and that the chameleon consonant is \( /w/ \). Evidence was given for a set of long vowels and the assignment of word stress was discussed. These revisions in the analysis of Seri should make comparative work between Seri and other Hokan languages more accurate just as they have aided in internal reconstruction.

**FOOTNOTES**

I am deeply indebted to Mary B. Moser and the late Edward W. Moser for their guidance and encouragement, as well as many of the data on which this paper is based. M. Moser read the manuscript at various stages of preparation and prevented me from making many mistaken assertions; those that remain are my responsibility. I also thank Dr. Margaret Langdon for commenting on early drafts of this paper. Many of the data were taken from Moser 1961, Moser and Moser 1965, Moser and Moser 1976, field notes by Edward and Mary Moser, as well as notes from fieldwork that I did under the auspices of the Summer Institute of Linguistics.

The following abbreviations are used:

<table>
<thead>
<tr>
<th>DECL</th>
<th>declarative clitic</th>
<th>PERF</th>
<th>perfect</th>
</tr>
</thead>
<tbody>
<tr>
<td>DF</td>
<td>dependent future</td>
<td>pl,</td>
<td>plural</td>
</tr>
<tr>
<td>FUT</td>
<td>future</td>
<td>poss</td>
<td>possessive</td>
</tr>
<tr>
<td>IMP</td>
<td>imperative</td>
<td>punct</td>
<td>punctiliar</td>
</tr>
<tr>
<td>INTER</td>
<td>interrogative</td>
<td>r</td>
<td>referent clitic</td>
</tr>
<tr>
<td>intr</td>
<td>intransitive</td>
<td>scp</td>
<td>subject-change-past</td>
</tr>
<tr>
<td>INTR</td>
<td>intransitive marker</td>
<td>sub</td>
<td>subject</td>
</tr>
<tr>
<td>iter</td>
<td>iterative</td>
<td>sq,</td>
<td>singular</td>
</tr>
<tr>
<td>NEG</td>
<td>negative</td>
<td>tr</td>
<td>transitive</td>
</tr>
<tr>
<td>nom</td>
<td>nominalizer</td>
<td>tr</td>
<td>transitive marker</td>
</tr>
<tr>
<td>NOM</td>
<td>nominalized</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The following brief characterization of the verb morphology may be helpful:

**Finite verb forms:**

(TR), SUB person, Tense, (NEG), (INTR), (Causative), (Passive), Root, Number/Aspect

**Impersonal nominalized verb forms:**

NOM, TR, (NEG), (INTR), (Causative), (Passive), Root, Number/, (Clitics)Aspect

The transitive marker occurs with all nominalized transitive verbs and with finite transitive verbs that have third person subject and object. The intransitive marker occurs with the (nominalized or finite) intransitive form of transitive/intransitive verb pairs regardless of subject or object person.

2A lengthened consonant is often 150-230 msecs. long in normal speech; lengthened vowels are 250-350 msecs. in length.

3Geminate vowels degeminate when a boundary other than a stem boundary ($) separates them. Sequences of identical vowels, which may occur morpheme internally, are realized as single surface segments, the lengths of which are a total of the individual units.

4This restriction on the stressed syllable nucleus is also required for the Vowel Lengthening rule below and the a-Infixation rule. Other similarities in the environments and conditions of these rules suggest that the lengthening of post-stress segments should be handled by a single process. I will not attempt to formulate such a rule, however.

5It is worthwhile quoting Moser and Moser (1965:54) concerning the phonetic quality of W:

/W/ varies from lightly spirant to vocoid articulation. After /k/ in any position or preceding a vowel or /y/, the lip rounding is released rather than sustained: kwéšáni [kwéšáni] species of plant.... Elsewhere a variant [o] occurs: kaaW [káaoO] species of bush....

Footnote 6 is:

The distribution of /W/ corresponds, in general, to that of both vowels and consonants... Interpretation of this segment of /W/ rather than as /O/ yields simpler, more consistent morphophonemics, in that morphemes following /W/ take the shape which follows consonants and not vowels.

An example of the latter is the fact that the declarative clitic is /-ʔa/ following a vowel and /-ʔiʔa/ following a consonant. Notice the following forms: ká:W seep willow, ká:Wiʔa it is a seep willow. The reader should note that I will be interpreting the "sequence" kW differently than Moser and Moser.

6There is no surface segment xW generated by rule (42) because the sequence xW is apparently never generated by rule (41).
It is obvious that the environment of rule (54) has been written into
the environment of rule (55). The two rules might be collapsed as follows:

\[
\langle x \rangle V + V \Rightarrow \langle +rd \rangle [+lo] \emptyset / __ ] V \text{ intr}
\]

1 2 3

According to M. Moser (personal communication) the glide is non-nasal
in casual speech and so the following vowels are non-nasal also.

I do not know of any evidence for interpreting \( {\text{kw}} \) as the unit \( {\text{kw}} \) as was
done in Moser and Moser 1965.

I am indebted to Bob Reed for making the suggestion that led to this
analysis.

A dental nasal becomes an alveolar before \([\ddash] \) and \([\ddash \ddash] \) according to
Moser and Moser 1965:55. They do not say whether \([\ddash] \) is backed somewhat
before \([x] \) and \([x\ddash] \), but I expect that this is the case.

Syncope (41) applies to the singular punctiliar form in the derived
verb.

The following verbs have similar meanings; all involve the idea of
think, with slight differences perhaps: \(-\text{imo}\ddash,\) (pl. \(-\text{imWk}\); \(-\text{qimo}\ddash,\)
(pl. \(-\text{qimWk}\); \(-\text{amo}\ddash,\) (pl. \(-\text{amWk}\). They are obviously related to \?-\text{amWk}\)
heart. I am not certain what the implications of these
data are.

There are a few unstressed words with long vowels that are exceptions
to this generalization: \(\text{kma:}\ddash x\) now, then, and \(\text{?a:}\ddash \) there are examples.

I do not believe that it is a case of the \(a\) assimilating to the pre­
fix vowel because the nominalized forms of the verb undergo deletion as
described above, but not lengthening.

\(\text{my departure} \)

In order to capture the systematic difference between what is happening
in the verbal forms and the nominalized forms, I have chosen to analyze
these data as examples of vowel deletion in both cases and vowel lengthen­
ing in the verbal forms.

There is a tendency (which I have not studied extensively yet) for \(o\) to
desyllabify before another vowel; if the \(o\) is stressed the stress is
shifted to the following vowel.

\(\text{sweet (sg. punct., nom.)} \)

\(\text{land this} \) on \(\text{NOM-live the} \)

SIL-UND Workpapers 1978
REFERENCES


________. Unpublished field notes.

