The Representation of Glottalization in Shuswap Sonorants[1]

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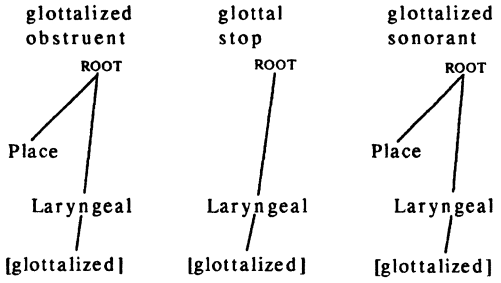
1. THE REPRESENTATION OF GLOTTALIZATION IN SHUSWAP SONORANTS. The following diagrams are typical autosegmental representations for glottalized obstruents (ejectives), glottalized sonorants, and glottal stops—such as those found in Shuswap. I include only those parts of the representations that will be of relevance in this paper.[2]

(1)



Following Lombardi (1994), I use [glottalized], a privative feature, in place of the more common [+constricted glottis]. Based on a cross-linguistic survey of neutralization patterns, Lombardi argues that the feature value [-constricted glottis] is never phonologically active and that, hence, a privative feature is called for.

There is, in Shuswap, a process that has implications for the way that Shuswap glottalization is represented autosegmentally—a process that focuses on glottalization exclusively in sonorants. In §2 the process in question—called GLOTTAL MIGRATION—is described and illustrated. In §3 a specific analysis of glottal migration is proposed, assuming the representation for glottalized sonorants that is given above. Finally, in §4, that representation is evaluated, in terms of its suitability for describing glottal migration.

Before exploring the implications of glottal migration for the representation of glottalized sonorants in Shuswap, it is necessary to clarify which segments count as sonorants in Shuswap phonology. In addition to the nasals (/m/, /m'/, /n/, /n'/), liquids (/l/, /l'/), and glides (/y/, /y'/, /w/, /w'/), the voiced fricatives /ɣ/, /ɣ'/, /ʁ/, /ʁ'/, /ʁʷ/, and /ʁʷ'/ function as sonorants in Shuswap. One piece of evidence that shows that these segments are phonologically sonorants is the following: a process of vocalization that applies to Shuswap glides affects voiced fricatives, as well. According to this process, a non-initial glide or voiced fricative that is not adjacent to a vowel is vocalized. Application of vocalization to glides is shown in (2). This may be compared to the application of vocalization to voiced fricatives in (3).[3]

(2) Vocalization of Glides
- a. /pw-mín/ --> [pu-mín] 'drum' (Kuipers 1974a: 143)
  Cf. [pw-úm] 'to beat a drum'.
- b. /tétyt-kn/ --> [tétit-kən] 'I am hungry'
  (Kuipers 1974a: 159)
  Cf. [tey-t] 'hungry'.
- c. /χʷéχʷy'-t/ --> [χʷéχʷiʔ-t]
  'to be in bad shape (PLURAL)', to have a shortage of (PLURAL
  (Kuipers 1974a: 257)
  Cf. /χwéy-t/ 'to perish (PLURAL)'.
- d. /cwex-ésəɬ/ --> cwx-ésəɬ --> [cux-ésəɬ]
  'Jackspring salmon' (Kuipers 1974a: 176)
  Cf. [cwex] 'creek'.
- e. /xéxy-xit-en/ --> [xéxi-xt-ən]
  (with diminutive form /xexy/ of root /xey/)
  'I wave with the hand, make a sign'
  (Kuipers 1974a: 227)
  Cf. [xéy-əm] 'to wave with the hand, make a sign'.
- f. /c-q'ey'-st-és/ --> c-q'y-st-és --> [c-q'iʔ-st-és]
  '(s)he writes, draws regularly' (Kuipers 1974a: 241)
  Cf. [c-q'ey'] 'written'

(3) Vocalization of Voiced Fricatives
- a. /s-ceɣ-st-és/ --> s-cɣ-st-és --> [s-cə-st-és]
  '(s)he burns it regularly' (Kuipers 1974a: 173)
  Cf. /ceɣ-ém/ --> [cɣ-ém].

[1] This paper is excerpted, with modifications, from my forthcoming dissertation *Shuswap Glottal Dissimilation and Locality Conditions in Phonology.*

[2] See McCarthy (1988) or Clements and Hume (1995) for summary and evaluation of proposals concerning the hierarchical arrangement of features.

[3] Glide vocalization and vocalization of voiced fricatives must take place after the rule that reduces unstressed vowels to schwa, as the vowels derived through vocalization are never reduced.

b. /c-ʁχ-st-és/ --> [c-aχ-st-és]
'(s)he regularly strings up (a hide)'
(Kuipers1974a: 258)
Cf. /ʁχ-ém/ --> [ʁaχ-ém] 'to string up (a hide)'.

c. /c-ɬʁʷ-st-és/ --> [c-ɬo-st-és]
'(s)he loses it regularly' (Kuipers 1974a: 200)
Cf. [ɬʁʷ-um] 'to lose'.

d. /c-lɣ-st-és/ --> [c-lə-st-és]
'(s)he regularly puts or sticks into'
(Kuipers 1974a: 202)
Cf. /lɣ-ém/ --> [ləɣ-ém] 'to put, stick into'

e. /s-t'ʁʷ-st-és/ --> [s-t'o-st-és]
'(s)he makes it hard regularly' (Kuipers 1974a: 166)
Cf. [t'ʁʷ-um] 'to make something hard'

Another piece of evidence that voiced fricatives are phonologically sonorants in Shuswap is the fact that voiced fricatives are subject to the same phonotactic restriction that applies to true sonorants: glottalized true sonorants do not occur morpheme-initially and neither do glottalized voiced fricatives. The fact that voiced fricatives are phonologically sonorants in Shuswap indicates that the laryngeal component of their representations should be like the laryngeal component for true sonorants, rather than the laryngeal component for obstruents.

2. GLOTTAL MIGRATION IN SHUSWAP SONORANTS. The location of sonorant glottalization (i.e. glottalization of a sonorant) in a Shuswap word is predictable to a large extent. There are three types of underlying sources for glottalization in Shuswap sonorants: prefixes (e.g. /x-/ 'in, all over, all around', /pəl'-/ 'along'), roots (e.g. /p'um'/ 'to smoke, smoke-color', /qey'/ 'curious', /χʷel'/ 'ashamed') and suffixes (e.g. /-ɬníw't/ 'side'; /-ul'əxʷ/ 'land, ground, soil'; /-qin'/ 'head, top').[4] Although some of prefixes (such as /x-/) are not glottalized themselves, they impart glottalization to a sonorant consonant elsewhere in the word. The most general rule for determining the location of sonorant glottalization in a Shuswap word is that glottalization—from a prefix, from a root, or from a suffix—associates with the first sonorant consonant after a stressed vowel (of which there is only one in a Shuswap word). The words in (4) show that the target for glottal migration may be a sonorant that follows the stressed vowel immediately.

[4] For convenience at this point, I use underlying representations that show particular sonorants as being glottalized underlyingly. However, later I will argue that glottalization, for sonorants, is generally a floating feature in underlying representations.

(4) Shuswap Glottal Migration, to a Sonorant Consonant That Immediately Follows the Stressed Vowel

FROM A PREFIX

a. / x-k'él-min/ --> [x-k'él'-mən]
'sawmill' (Kuipers 1974a: 215)
Cf. [c-k'el] 'board'.

b. / x-kʷ'én-xen-em/ --> [x-kʷ'én'-xn-əm]
'to look for tracks' (Kuipers 1974a: 221)
Cf. [c-kʷ'én-əm] 'to check up. inspect'.

c. / x-ptínəs-ten/ --> [x-ptín'əs-tən]
'opinion' (Kuipers 1974a: 136)
Cf. [ptínəs-əm] 'to think (of)'.

d. / t-qém-elqʷ/ --> [t-qém'-əlqʷ]
'to hit and remain stuck in a tree (of arrow)'
(Kuipers 1974a: 234)
Cf. [qém-ən-s] '(s)he hits, shoots'.

e. /t-pál-ews-em/ --> [t-pál'-us-əm]
'to make a mess on the table'
(Kuipers 1974a: 139)
Cf. [pál-t] 'smudged'.

f. / ʔəs-t-kín/ --> [ʔəs-t-kín']
'to touch accidentally' (Kuipers 1974a: 208)
Cf. /c-kin-st-és/ --> [c-kən-st-és] '(s)he touches it continually'.

FROM A ROOT

g. / qʷ'mímw's/ --> [qʷ'mím'us]
(diminutive form of /qʷ'miw's/ 'wild animal')
'colt' (Kuipers 1974a: 248)

h. /ɣə-n-s-qlélw'/ --> [ɣə-n-s-əqlél'u]
(with diminutive form of /s-qlew'/ 'beaver, money')
'my money' (Kuipers 1974a: 237)

i. /q'ey'-ém/ --> [q'ɣ-ém'][5]
'to write, draw' (Kuipers 1974a: 241)
Cf. /qʷíc'-em/ --> [qʷíc'-əm] 'to wash (laundry)'.

[5] In this form, the vowel of the root /q'ey'/ (cf. [c-q'ey'] 'written') is elided according to a rule that deletes an unstressed vowel in an open, non-final syllable. (This deletion rule has both regular and irregular exceptions.)

FROM A SUFFIX

j. / qʷúy-en'st/ --> [qʷúy'-ənst]
'dust-smudge (as made by horses, deer, etc., when they move the body to chase away flies)
(Kuipers 1974a: 247)
Cf. [qʷuy-t] 'to make dust'; [s-k'ʷm-én'st] 'edge'.

k. / séy-íl'əp/ --> [séy'-ləp]
'soft foundation of boughs in a tent or sweathouse (to sit on)' (Kuipers 1974a: 149)
Cf. [séy-əm] 'to spread a soft foundation of boughs, hay, etc.; [c'əlxʷ-íl'əp] 'chair'.

l. / qəc'wéwy'ə/ --> [qəc'wéw'yə]
(diminutive form of /qəc'w-éy'ə/)
'chipmunk' (Kuipers 1974a: 235)
Cf. [c'əqʷ-éy'ə] 'light-hearted, jolly'

m. / s-ʁʷúy-em-qin'/ --> [s-ʁʷúy'-əm-qən]
'a dandelion-type withered flower'
(Kuipers 1974a: 260)
Cf. [ʁʷuy-t] 'withered, tired'; [səp-qín'-əm] 'to club salmon'.

n. / púl-cin'-es/ --> [púl'-cən-s]
'to overturn a car' (Kuipers 1974a: 140)
Cf. /pul-cín'/ --> [pəl-cín']
'to lie close to the edge (e.g. of a fire)'.

o. / tkéy-min'/ --> [tkéy'-mən]
'bladder' (Kuipers 1974a: 155)
Cf. [tkey] 'urine'; [c'əχ-mín'] 'mirror'

p. / wewéwk-em-en'st/ --> [wuwéw'k-əm-ənst]
(affective form of /wék-em-en'st/)
'(there is an) electric storm' (Kuipers 1974a: 265)
Cf. /s-wék-em-en'st/ --> [s-wék-m-ən'st] 'lightning'.

If an obstruent, instead of a sonorant, occupies the position immediately following the stressed vowel, sonorant glottalization still migrates to the first sonorant that follows the stressed vowel, skipping over any intervening obstruents.

(5) Shuswap Glottal Migration, to a Sonorant Consonant That Does Not Immediately Follow the Stressed Vowel

a. / x-téx-ekn-ten/ --> [x-téx-kən'-tən]
'sack for packing things on back'
(Kuipers 1974a: 156)
Cf. [téx-kən] 'to carry on the back'

b. /x-p'éɬ-ews/ --> x-p'éɬ-w's [x-p'éɬ-u's]
'exhausted, dead-tired' (literally 'laid out')
(Kuipers 1974a: 145)
Cf. /x-kʷ'úy-ews-em/ --> x-kʷ'úy'-ws-əm [x-kʷ'úy'-us-əm] 'to put a log across (e.g. a brook)'

c. / t-wík-em/ --> [t-wík-əm']
'to see something on something (e.g. berries on bushes') (Kuipers 1974a: 265)
Cf. [wík-əm]'to see'.

d. /t-ʔíqʷ'-elqʷ-em/ --> [t-ʔíqʷ'-əl'qʷ-əm]
'to extract sap of jackpine' (Kuipers 1974a: 279)
Cf. [kʷ'ənx-élqʷ] 'how many (logs, needles, etc.)'.

e. / s-t-mut-mút-elqʷ/ --> [s-t-əmt-mút-əl'qʷ]
'a fungus which grows on fir trees'
(Kuipers 1974a: 147)
Cf. [c-níʁʷ-əlqʷ] 'bent (of long objects: needle, tree)'

What if no sonorant consonant follows the stressed vowel? In such cases, the rule is that sonorant glottalization associates with the first sonorant consonant in a word, even though that sonorant consonant is pre-accentual.

(6) Shuswap Glottal Migration, to the First Sonorant in a Word

FROM A PREFIX

a. /s-t-yel-ép/ --> s-t-y'l-ép [s-t-i'l-ép]
'to swing around foot of tree' (Kuipers 1974a: 269)
Cf. [c-yél] 'wound around'.

b. /ʔəs-t-kin-st-és/ --> [ʔəs-t-kən'-st-és]
'(s)he touches it continually' (Kuipers 1974a: 208)
Cf. /kin-ét/ --> [kn-ét] 'to touch'.

c. /t-qəp-ews-sqéχəʔ/ --> t-qp-w's-qéχəʔ [t-qp-u's-qéχəʔ]
'saddle blanket' (Kuipers 1974a: 233)
Cf. [səp-éws] 'be hit on (the middle of) the back'.

d. /x-teqʷ'-enk-xen-sqéχəʔ/ --> [x-təqʷ'-ən'k-xən-sqéχəʔ]
'to shoe a horse' (Kuipers 1974a: 158)
Cf. /χyum-énk/ --> χym-énk [χim-énk] 'pot-bellied'.

e. /x-kiɬ-nt-és/ --> [x-kɬ-ən't-és]
'(s)he takes out' (Kuipers 1974a: 209)
Cf. /xet'-nt-és/ --> [xt'-ənt-és] '(s)he puts something in the way'.

Word (6d) shows that, when there are no post-accentual sonorants in a word, it is the first sonorant in the word to which sonorant glottalization migrates—not just the first

sonorant[5] to the left of the stressed vowel. Thus, there are two rules governing the migration of sonorant glottalization. The second rule applies only when the first is unable to apply because there is no target that satisfies its structural description.[6]

The positioning of sonorant glottalization in a Shuswap word is affected by an ANTI-GLOTTALIZATION constraint that prohibits glottalization of a sonorant in the onset of a syllable unless the sonorant also follows a vowel. Observe how, in the following examples, glottalization avoids a sonorant onset in post-consonantal position. The examples show that, if the first sonorant after the stressed vowel occupies an onset but follows a consonant, sonorant glottalization migrates from that position to another sonorant that is farther to the right in the word.[7]

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[6] There are also cases where there is more than one underlying source of sonorant glottalization in a word. In some of these cases, only one glottalized sonorant surfaces in the phonetic form of the word, as the following examples illustrate. (Two underlying sources of sonorant glottalization are underlined in each of the following words.)

a. /t-pəlit-él'k'/ --> [t-pəlt-él'k']
'to lie on a blanket' (Kuipers 1974a: 139)
Cf. [c-pətk^{w}-él'k'] 'hole in a skin'

b. /x-c'əm-qín'-ten/ --> [x-c'əm-qín'-tən]
'skull' (Kuipers 1974a: 177)
Cf. [ɬəx^{w}-qín'-tən] 'cover for pot'.

c. /x-ɬux^{w}-qín'-ekst/ --> [x-ɬəx^{w}-qín'-kst]
'thimble' (Kuipers 1974a: 198)
Cf. [ɬəx^{w}-qín'-tən] 'cover for pot'.

However, in at least one case where a word has two underlying sources of sonorant glottalization, two glottalized sonorants appear phonetically.

d. /x-tkéy-min'/ --> [x-tkéy'-mən']
'pissoir' (Kuipers 1974a: 155)
Cf. [tkey] 'urine'; [cəχ-mín'] 'mirror'.

It is unclear to me at this point what general rules, if any, govern the positioning and phonetic survival of sonorant glottalization in these cases.

[7] Below I will propose that, rather than migrating from an anti-glottalization position (onset following a consonant), the sonorant glottalization in these forms starts out as a floating feature and skips the anti-glottalization position in its left-to-right association.

(7) Shuswap Glottal Migration, Avoiding Sonorant Onsets in Post-consonantal Position

FROM A ROOT

a. / c'íc'l'm-st-en/ --> [cíc'ləm'-st-ən]
(with diminutive form of /c'il'm/ 'all, whole')
'I took it all' (Kuipers 1974a: 178)
Cf. [c'íl'əm-st-s] '(s)he takes all'

FROM A SUFFIX

b. / c'lux^{w}-íkn'-em/ --> [c'əlx^{w}-íkn-əm']
'to saddle' (Kuipers 1974a: 179)
Cf. [c'əlx^{w}-íkən'] 'saddle'; [cq'-em] 'to throw, to hit'.

c. / cq^{w}éq^{w}y'əmx/ --> [cq^{w}éq^{w}yəm'x]
(diminutive form of /cq^{w}-éy'ə-mx/)
'red pigment' (Kuipers 1974a: 174)
Cf. [ləχ-éy'ə-m] 'to tell a story, bring news'; /χlít-mx/ --> [χlít-əmx] 'to invite guests'.

d. /t'iq^{w}-ésxn'-em/ --> [t'əq^{w}-ésxn-əm']
'to tread water, to swim' (Kuipers 1974a: 165)
Cf. [pq-ésxən'] 'white rock'; /χíl-em/ --> [χíl-əm] 'act thus'.

e. /s-cíq^{w}-qin'-em/ --> [s-cíq^{w}-qn-əm']
'to have water on top of the ice (of creek)'
(Kuipers 1974a: 175)
Cf. [k'əm-qín'] 'roof'; /k'ép-em/ --> [k'ép-əm] 'to tan a hide'.

Thus, the anti-glottalization constraint modifies the application of the rule for post-accentual glottal migration (the rule that says that sonorant glottalization associates with the first sonorant after stress), by blocking its application to its primary target.

The examples do not demonstrate that glottalization of a sonorant onset is permitted only following a vowel, since they don't indicate anything about whether a word-initial sonorant onset can be glottalized. In fact, however, word-initial sonorant onsets are never glottalized in Shuswap. Therefore, the anti-glottalization constraint may be stated generally, saying that glottalization of a sonorant onset is permitted only following a vowel.

Henceforth, this constraint will be referred to as the Onset Anti-glottalization Constraint.

3. ANALYSIS OF SHUSWAP GLOTTAL MIGRATION. My analysis of Shuswap glottal migration will show how sonorant glottalization is autosegmentally quite different from obstruent glottalization in Shuswap. Since the analysis relies crucially on the notion of PLANAR SEGREGATION (see, for example, Archangeli 1985; Cole 1991; McCarthy 1981, 1982, 1986, & 1989), I offer a brief explanation of what planar segregation is and how it is implemented, before proceeding with the analysis.

3.1. THEORETICAL BACKGROUND: PLANAR SEGREGATION. Planar segregation is the subdivision of a single autosegmental plane into two planes. For example, in the

typical templatic analysis of Arabic verb stems (cf. (1 1), page 1 1), the plane consisting of the melodic tier (for autosegments) and the syllable structure of the stem is subdivided into two planes. One plane consists of a vowel-melody tier and the stem's syllable structure; the other consists of a consonant-melody tier and the stem's syllable structure, which it shares with the first plane. The syllable structure of the stem supplies syllable nodes and mora nodes as anchors for autosegments on both planes. McCarthy (1989) hypothesizes that planar segregation applies, not just in cases where root-and-pattern morphology is involved (as in Arabic), but in ALL cases where the linear ordering of different types of autosegmental elements with respect to each other is predictable. Let us refer to this hypothesis as the GENERALIZED PLANAR SEGREGATION HYPOTHESIS.

An early version of this hypothesis (McCarthy 1979, 1981, 1982) was the Morphemic Plane Hypothesis.

(8) Morphemic Plane Hypothesis (McCarthy 1989: 72)
If separate morphemes, then separate planes.[8]

McCarthy used the Morphemic Plane Hypothesis to explain the different patterns in the formation of Arabic words. Although in his early work on the templatic morphology of Arabic, McCarthy did not use prosodic constituents (mora, syllable, foot, phonological word) in his templates, the Morphemic Plane Hypothesis can be illustrated with templates that consist of prosodic constituents. As an example of an analysis involving the Morphemic Plane Hypothesis, consider a derivation of Arabic /kaatab/, the perfect active form of the participative stem for the verb radical /ktb/ 'to write'. The verb /ktb/, contributing lexical meaning, is a separate morpheme and therefore, according to the Morphemic Plane Hypothesis, occupies its own plane (see (1 1a)). The vowel segment /a/, which marks perfect active forms, is also a separate morpheme and therefore also occupies its own plane. The CVVCVC pattern of forms like /kaatab/ is analyzed by McCarthy and Prince (1990b) as a sequence of a heavy-syllable base followed by a light-syllable suffix and then an extrametrical syllable (shown in (1 1a)). The extrametrical syllable is represented as '(σ)', with the parentheses indicating extrametricality.[9] The template satisfies the requirement of

[8] McCarthy (1989) argues that the weak version of the Morphemic Plane Hypothesis is deducible from the Generalized Planar Segregation Hypothesis. ('Generalized Planar Segregation Hypothesis' is the name that I use for the more general hypothesis; McCarthy doesn't give it a name.) The weak version of the Morphemic Plane Hypothesis is the hypothesis as it is stated in (8). The strong version, on the other hand, claims that plane separation occurs if AND ONLY IF distinct morphemes are involved.

[9] Why does the template include an extrametrical syllable? The answer to this question is somewhat surprising. The extrametrical syllable represents nothing more than an extrametrical consonant. Stem-final consonants are extrametrical in Arabic in that they are nonmoraic—they do not contribute to the weight of a preceding syllable

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the Prosodic Morphology Hypothesis (that the template consist of a prosodic constituent), since the sequence of heavy syllable plus light syllable can be parsed into a quantitative trochaic foot (excluding, of course, the extrametrical syllable).

Association of the consonant and vowel melodies to the template is governed by the following principles, from McCarthy and Prince (1990b: 41, 48),[10] as well as the Template Satisfaction Condition.

(9) Principles Governing Association of Melodies.
a. Final Incompleteness [specific to Arabic—TMT]: 'the requirement that all stems end in an incomplete syllable (that is a consonant, by the Onset Rule)'.
b. The Onset Rule: 'the requirement that all syllables begin with a consonant'.
c. Melodic Conservation: the requirement that all melodic units be linked.
d. Left-to-right Association.

(1 0) TEMPLATE SATISFACTION CONDITION
Satisfaction of templatic constraints is obligatory and is determined by the principles of prosody, both universal and language-specific. (McCarthy and Prince 1990a: 209)

The derivation of /kaatab/ proceeds as follows. First, the relevant parts of the stem are segregated into morphemic planes (1 1a). Consonant association and vowel association, each on its own plane, take place next. Impelled by Melodic Conservation (9c), consonant segments associate to syllable nodes (1 1b). Association of consonants to syllable nodes, rather than to mora nodes is required by the Onset Rule (9b), and left-to-right association is required by (9d). The presence of the third syllable-node anchor—the anchor to which the segment /b/ associates—is guaranteed by Final

FOOTNOTES, CONTINUED

or foot. (This can be seen, for example, in the fact that they do not contribute weight for the purpose of satisfying Arabic's minimal word requirement, which says that Arabic words must contain at least a quantitative trochaic foot—minimally a two-mora foot.)

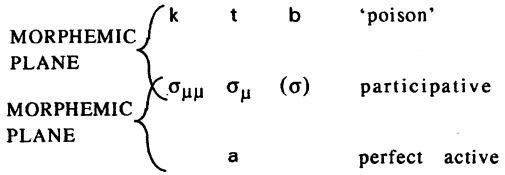
It is to capture the fact that a stem-final extrametrical consonant is nonmoraic (i.e. weightless) that McCarthy and Prince analyze the position to which it associates as an extrametrical syllable. This makes sense, given McCarthy and Prince's assumption that onset consonants link directly to the syllable node. Since onset consonants are weightless, direct linking of a consonant to a syllable node becomes, in effect, a marker of weightlessness. McCarthy and Prince stipulate that, for Arabic, an extrametrical syllable must be vowel-less.

[10] McCarthy and Prince (1990b) list more principles which govern melody-to-template association in Arabic. I have included only those principles which are relevant for the derivation presented here. My rendition of Melodic Conservation is based on McCarthy and Prince's description of the principle on page 41.

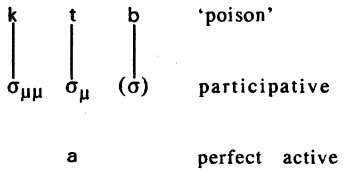
Incompleteness (9a). On the other plane, the vowel segment fills empty mora nodes. Impelled by Melodic Conservation, the vowel /a/ associates to an empty mora node—which, by left-to-right association, must be the leftmost empty mora node; see (1 1c). Finally, the vowel /a/ spreads, following the Template Satisfaction Condition, to fill the remaining empty mora nodes. (This also is shown in (1 1c)—with broken lines.)

(1 1) Derivation of /kaatab/

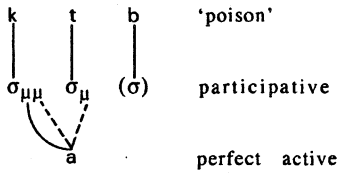
a. Segregate morphemic planes.



b. Associate consonant segments to template.



c. Associate vowel segment to template and spread to empty mora nodes.



By 1989, McCarthy (1989) was pointing out that the Morphemic Plane Hypothesis is derivable from the broader hypothesis that I have labeled the 'Generalized Planar Segregation Hypothesis'. As an example of an application of the Generalized Planar Segregation Hypothesis that does not involve separate morphemes, consider a cooccurrence restriction that is found in a number of Mayan languages. CVC roots in the Mayan languages Tsotsil, Chontal, Yucatec, and Tzutujil are subject to the following condition (McCarthy 1989: 81).

(1 2) In C_1VC_2 roots, if C_1 and C_2 are both glottalized, then they must be identical in all respects.

A CVC root is the type of root, McCarthy notes, which normally occurs in these languages. Since, in a CVC root, the ordering of the two consonants with respect to the

vowel is predictable, the Generalized Planar Segregation Hypothesis requires that the vowel and consonant melodies of Mayan CVC roots be assigned to separate planes.

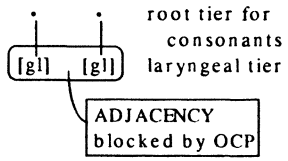
McCarthy derives condition (1 2) as follows. The Obligatory Contour Principle (1 3) prevents the occurrence of adjacent identical laryngeal nodes in a root; cf. (1 4a). Furthermore, there is a language-particular condition that blocks the sharing of a laryngeal node by two root nodes; cf. (1 4b). Therefore, the only way to obtain a morphological root with two glottalized consonants is to let two consonants share a root node that has the feature [glottalized] as a dependent; see the representation in (1 4c). It follows from this analysis, since root-node sharing is an expression of identity, that the only way that two consonants in a root can both be glottalized is if they are identical.

(1 3) Obligatory Contour Principle (McCarthy 1986: 208)[11]
At the melodic level, adjacent identical elements are prohibited.

(1 4) Prediction of Mayan Glottalization Restriction

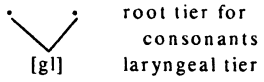
a. impossible representation, blocked by OCP

e.g. *p' a t'



b. impossible representation, blocked by language-particular stipulation

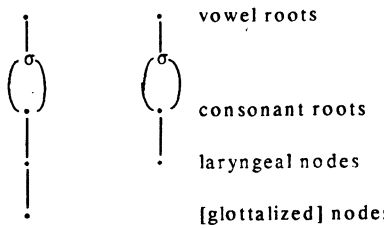
e.g. *p' a t'



[11] Originally proposed by Leben (1973) to explain tonal phenomena, the OCP has been extended in numerous studies to explain phenomena involving non-tonal autosegments. (See, for example, McCarthy 1979, 1981, 1986; Hayes 1986a, 1986b; Mester 1986; Schein and Steriade 1986; Yip 1988, 1989; Paradis and Prunet 1990.) McCarthy (1986: 208) states the OCP for non-tonal autosegments as in (13).

c. identical C_1 and C_2, made possible by planar segregation

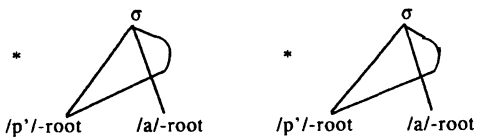
e.g. p' a p' p a p



Invoking planar segregation makes it possible for the two consonants in a CVC root to share a root node. If not for planar segregation, root-node sharing would be prevented by the line-crossing prohibition of autosegmental phonology; cf. (1 5).

(1 5) impossible representations, blocked by line-crossing prohibition

e.g. p' a p' p a p



Thus, the Mayan cooccurrence restriction provides support for the Generalized Planar Segregation Hypothesis.

This concludes my explanation of what planar segregation is and how it is implemented in autosegmental analyses. We are now ready to see how planar segregation plays a role in Shuswap glottal migration.

3.2. PLANAR SEGREGATION IN SHUSWAP GLOTTAL MIGRATION. My purpose above has been to show that the Generalized Planar Segregation Hypothesis has implications for the way that sonorant glottalization is represented in Shuswap. It was shown in §2 that, in cases of glottal migration in Shuswap, the ultimate position of sonorant glottalization in a word is determined to a large extent by general rules. Here it will be shown that, even in cases where sonorant glottalization ends up being associated phonetically with the morpheme that is its underlying source, the position of sonorant glottalization within that morpheme is still predictable from general rules. To facilitate talking about such cases and to distinguish them from cases of glottal migration, I will use the term GLOTTAL RETENTION to refer to them. (Keep in mind that I will be talking about retention of sonorant glottalization only, not retention of obstruent glottalization.)

Cases of glottal retention in Shuswap morphemes can be divided into two types: cases in which the morpheme is stressed and cases in which it is not. Since cases of the former type are far more numerous, they will be discussed first. Two observations will help explain how the positioning of sonorant glottalization is

generally predictable in these cases. First, no Shuswap morpheme is the underlying source of more than one instance of sonorant glottalization. This means that, in predicting the morpheme-internal position of retained sonorant glottalization, only one position per morpheme has to be predicted. Second, it can generally be predicted which vowel will bear stress in a stressed morpheme, since schwa vowels are never stressed and there is almost never more than a single underlying full vowel in a Shuswap morpheme. This means that if a rule predicts the position of sonorant glottalization relative to stress in a glottalization-retaining morpheme, the prediction doesn't depend on morpheme-specific stress assignment.

Since, as I showed in §2, there is a general rule that locates sonorant glottalization with respect to stress in a Shuswap word, that rule can be applied to predicting the position of retained sonorant glottalization within a stressed morpheme. Recall that the rule in question says that sonorant glottalization migrates to the first sonorant following a stressed vowel. If the rule is interpreted generally as an association rule that can apply in cases of glottal retention, as well as cases of glottal migration, then the rule predicts that sonorant glottalization should associate, within a glottalization-retaining morpheme, to the first sonorant that follows stress. It also follows from this rule, given the observations of the preceding paragraph, that retained sonorant glottalization should be associated with the first sonorant following the only underlying full vowel within the morpheme. Without taking any other rules into consideration, this rule by itself accounts for the morpheme-internal positioning of sonorant glottalization in most cases where sonorant glottalization is retained in a stessed morpheme. The reader can verify that for all of the cases of glottal retention cited in (1 6) and (1 7a-j), sonorant glottalization is aligned, within the glottalization-retaining morpheme, with the first sonorant following the underlying full vowel in the morpheme.

(1 6) Glottal Retention in Stressed Forms of Shuswap Roots (examples from Kuipers 1974a)[12]

WORD WITH STRESSED FORM OF ROOT	KUIPERS' UNDERLYING REPRESENTATION OF ROOT (with gloss)
a. [təlméy'-ən-s] '(s)he baits it'	/ tlmey'/ 'to bait'
b. [c'íl'əm-st-s] '(s)he continually takes all'	/ c'il'm/ 'all, whole'
c. [q^wəm-q^w'míw's] 'herd of wild horses'	/ q^w'miw's/ 'wild animal'
d. [t'néy'-tk^w-ɬp] 'hemlock tree'	/ t'ney'/ 'hemlock'
e. [p'úm'] 'to smoke a hide'	/ p'um'/ 'to smoke, smoke-color'

[12] For roots for which Kuipers supplies no gloss, I have used a gloss that seems to me to capture the root's contribution to the meaning of the words in which it occurs.

f. [séw'-t] 'animal owned'	/ sew'/ 'animal'
g. [t'én'un] 'skin of fish'	/ t'en'wn/ 'skin of fish'
h. [p'ə́lén'] 'bark of tree'	/ p'ə́len'/ 'bark of tree'
i. [pəsnúl'tən] 'rye-grass'	/ pəsnul'tn/ 'rye-grass'
j. [s-mɏéw'] 'lynx'	/ mɏew'/ 'lynx'

(1 7) Glottal Retention in Stressed Forms of Shuswap Suffixes (examples from Kuipers 1974a)

WORD WITH STRESSED FORM OF SUFFIX	KUIPERS' UNDERLYING REPRESENTATION OF SUFFIX (with gloss)
a. [s-qʷl-ésəl'p'] 'ashes'	/ -esl'p'/ 'house- or campfire'
b. [pq-ésxən'] 'white rock'	/ -esxn'/ 'rock'
c. [xʷi-xʷi-sqléw'-əm] 'be stingy with money'	/ -sqlew'/ 'money'
d. [s-k'm-én'st] 'edge'	/ -en'st/ 'side, edge'
e. [pət-pətkʷ-él'k'-əm] 'make holes in skin'	/ -el'k'/ 'skin, blanket'
f. [co-ɬníw't] 'spring salmon' (literally 'striped side')	/ -ɬníw't/ 'side'
g. [səp'-éɬqʷəl't] 'get hit on the front of the neck'	/ -eɬqʷl't/ 'front of neck'
h. [c'əlxʷ-íl'əp] 'chair'	/ -il'əp/ 'foundation, floor'
i. [s-cəq'-qín'-tən] 'hammer'	/ -qin'/ 'head, top'
j. [cəlkst-él'txʷ] 'five (sheets, etc.)	/ -el'txʷ/ 'sheet-like object, skin, bark; book
k. [nəqʷ'-əw'íɬ] 'steal a ride'	/ -əw'iɬ/ 'conveyance, way of making a trip'

The morpheme-internal positioning of sonorant glottalization in the last word (1 7k), cannot be predicted with the rule that covers all of the other examples in (1 6) and (1 7), since there is no post-accentual sonorant in (1 7k). Nevertheless, this positioning is still predictable from a general rule. Recall that in the discussion of glottal migration earlier, a second rule governing glottal migration was described. According to this rule, in words with no post-accentual sonorant, sonorant glottalization migrates instead to the first pre-accentual sonorant in a word (see the examples in (6), page 6.) The rule can be reinterpreted more generally as a rule for

association of the feature [glottalized] to sonorants, covering both cases of glottal migration and cases of glottal retention. As it stands, the rule by itself won't give the correct prediction for [nəqʷ'-əw'íɬ], since [n], the first pre-accentual sonorant in the word, is not glottalized. The Onset Anti-glottalization Constraint, discussed at the end of §2, must be taken into account. The constraint modifies the application of the pre-accentual glottal association rule. As modified by the constraint, the rule requires sonorant glottalization to associate to the first sonorant to which it can associate without violating the constraint. Thus, the second rule, as modified by the Onset Anti-glottalization Constraint, correctly identifies /w/ in the source morpheme as the position where sonorant glottalization must be realized phonetically. It does appear, therefore, that the morpheme-internal positioning of sonorant glottalization is generally predictable when sonorant glottalization is retained within a stressed morpheme that is its underlying source.

Let us see next how the morpheme-internal positioning of sonorant glottalization is predictable in the second situation where sonorant glottalization is retained: in cases where the morpheme that retains sonorant glottalization is unstressed. The reader will have noticed that the lists of glottalization-retaining stressed forms in (1 6) and (1 7) do not include prefixes. There are only five prefixes in Shuswap that are underlying sources of sonorant glottalization. Two of the prefixes, /x-/ and /t-/, which were discussed earlier in connection with glottal migration, are not relevant to the present discussion, since they have no forms in which sonorant glottalization (or obstruent glottalization, for that matter) is retained. For another two of the prefixes, / χəl'/ 'off (as in CARRY OFF, BEAT OFF, WARD OFF, etc.)' and /təl'/ 'during a period in the past', retention of sonorant glottalization within the prefixes is not always predicable from general rules. These two prefixes will be discussed below, with other exceptional cases. The remaining prefix is /pəl'/ 'along (with a notion of passivity)'. Unlike the first two prefixes that are underlying sources of sonorant glottalization, /pəl'/ retains sonorant glottalization in some words where it is unstressed. This prefix, therefore can be discussed with other examples of unstressed morphemes that retain sonorant glottalization.

The words in the following table each contain an unstressed morpheme that retains an instance of sonorant glottalization for which it is the underlying source. Two words that contain /pəl'/ are included.

(1 8) Glottal Retention in Unstressed Forms of Shuswap Morphemes (examples from Kuipers 1974a)

WORD WITH UNSTRESSED FORM OF MORPHEME	KUIPERS' UNDERLYING REPRESENTATION OF MORPHEME (with gloss)
	PREFIX
a. [pəl'-xʷp'ís-t] 'to fly up with something (e.g. a branch released suddenly)'	/ pəl'-/ 'along' (with a notion of passivity)

b. [pəl'-nés] 'tag along' Cf. [nés] 'go (along)'.	
	ROOT
c. [sc'əl's-áɬp] 'Oregon grape (the shrub)'	/ sc'al's/ 'Oregon grape (the fruit)'
	SUFFIXES
d. [céqʷ-əl'xkən] 'hard pitch on fir tree'	/ -el'xkn/ (meaning uncertain, possibly 'having a quality, having a relation to')
e. [c-pés-kən'] 'there is water on top of the ice'	/ -ikn'/ (/-ikn/) 'upper back; top surface'
f. [téq'-xən'] 'horseshoe-nail'	/ -xen'/ (/-xen/) 'foot, leg, tracks'
g. [cənəmən-éqst-xən'] 'blue jeans' (Cf. [cénəmən] 'Chinaman'.)	
h. [k'é-l'əp] 'cushion, mattress'	/ -il'əp/ 'foundation, floor'

Positioning of sonorant glottalization in the glottalization-retaining prefix /pəl'/ (1 8a-b) and glottalization-retaining root /sc'al's/ (1 8c) is predictable as follows. There is no post-accentual sonorant in any of the three words that can be targeted for the association of sonorant glottalization. (The sonorant /n/ in /pəl-nés/ is ineligible, due to the Onset Anti-glottalization Constraint, since /n/ occupies an onset that is not postvocalic.) Consequently, the rule for pre-accentual association comes into play. To comply with this rule, sonorant glottalization associates, in each of the three words, to the first pre-accentual sonorant in the word—which happens to be /l/ in all three cases. In this way, the precise positioning of sonorant glottalization within the unstressed morphemes that retain it is correctly predicted for all three words.

Correctly predicting the position of sonorant glottalization within the unstressed suffixes that retain it (in (1 8d-h)) works a little differently. For each unstressed suffix that retains sonorant glottalization in these examples, it is the rule for post-accentual association of glottalization that correctly predicts the positioning of sonorant glottalization within the glottalization-retaining suffix. As the rule predicts (and as the reader can verify), sonorant glottalization associates in each case to the first post-accentual sonorant in the word. This manner of association correctly predicts, for each word, the position of sonorant glottalization within the source morpheme. My discussion of these examples thus shows how, in cases where an unstressed morpheme retains sonorant glottalization, the precise position of that sonorant glottalization within the morpheme is generally predictable.

It has now been shown how positioning of sonorant glottalization within glottalization-retaining morphemes is generally predictable—both in cases where the retaining morpheme is stressed and in cases where it is unstressed. Moreover, the earlier discussion of glottal migration (in §2) showed how positioning of sonorant glottalization within an entire word is generally predictable. The general predictability of the positioning of sonorant glottalization within a morpheme and within a word indicates that the positioning of sonorant glottalization is neither a morpheme-specific property nor a word-specific property. In other words, there is generally no inherent linear ordering between sonorant glottalization and the rest of a morpheme or word. This being the case, the Generalized Planar Segregation Hypothesis requires sonorant glottalization to be segregated onto its own plane in autosegmental representations of Shuswap morphemes and words.

I propose, therefore, that sonorant glottalization in Shuswap roots and suffixes be represented as a [glottalized] feature floating on its own plane—which will be referred to as the SONORANT GLOTTALIZATION PLANE. The following are autosegmental representations for a few morphemes that are underlying sources of sonorant glottalization. Only the laryngeal portions of the representations—the parts of interest for the present discussion—are shown.

(1 9) Representations of Morphemes That Are Underlying Sources of Sonorant Glottalization

a. prefixes

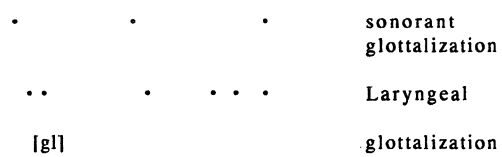
/x-/	/t-/	/pəl-/	
•	•	•	sonorant glottalization
•	•	• •	Laryngeal
(EMPTY)	(EMPTY)	(EMPTY)	glottalization

b. roots

/p'um/	/sew/	/p'əlen/	
•	•	•	sonorant glottalization
• •	•	• • •	Laryngeal
[gl]		[gl]	glottalization

c. suffixes

/-eslp'/ /-esxn/ /-sqlew/



Association of the floating feature is predicted by the rules and the constraint discussed in §2. These are restated in (2 0). The restatements explicitly refer to a floating feature and make precise the role of direction of association in the application of the rules (see condition (2 0c)).

(2 0) GLOTTAL ASSOCIATION (for sonorants only)

a. Post-accentual Glottal Association
Associate floating [glottalized] to the Laryngeal node of a post-accentual sonorant to which it can associate without violating the Onset Anti-Glottalization Constraint.

b. Pre-accentual Glottal Association
If the first rule cannot apply, associate floating [glottalized] to the Laryngeal node of a pre-accentual sonorant to which it can associate without violating the Onset Anti-glottalization Constraint.

c. Direction of Association
left to right

d. Onset Anti-Glottalization Constraint
Glottalization of a sonorant onset is prohibited except following a vowel.

When a morpheme that contains a floating [glottalized] feature is itself contained in a word (even a mono-morphemic word), the floating feature associates to a sonorant somewhere in the word, according to the rules, condition, and constraint of (2 0). (Sometimes a word with a morpheme that is a source of sonorant glottalization has no sonorant—or it has a sonorant, but the sonorant is an ineligible target, due to the Onset Anti-glottalization Constraint. In such cases, the floating feature is unable to associate and must be removed from the representation by Stray Erasure. This is illustrated by [t-kicx] 'to get somewhere with difficulty' and [t-q^{w}əc-nux^{w}] 'to get warm weather' (examples from Kuipers 1974a), where the prefix /t-/ is an underlying source of sonorant glottalization.)

The following derivations illustrate the application of the association rules (2 0a-b), the condition on direction of association (2 0c), and the constraint (2 0d) in cases of glottal migration.

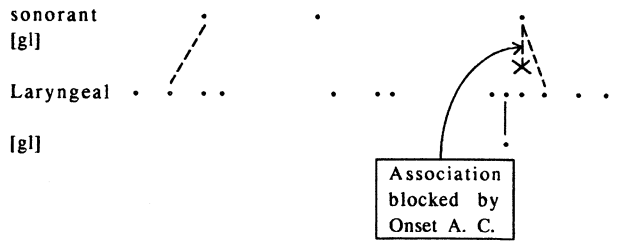
(2 1) Derivations to Illustrate the Application of the Association Rules in Cases of Glottal Migration

a. Source morphemes and input representations for glottal migration. (Floating [glottalized] features are shown as [gl] beneath the relevant morphemes.)

	(4j)	(6e)	(7a)
SOURCE	/ -enst/	/ x- /	/ c'íl'm/
MORPHEMES	[gl]	[gl]	[gl]
INPUT	q^{w}úy-ənst	x-kɬ-ənt-és	cíc'ləm-st-ən
	[gl]	[gl]	[gl]

b. Post-accentual glottal association applies. (Targeted segments are underlined).

q^{w}úy'-ənst x-kɬ-ən t-és cíc'ləm'-st-ən



c. Pre-accentual glottal association applies. (The targeted segment is underlined.)

[q^{w}úy'-ənst] [x-kɬ-ən't-és] [cíc'ləm'-st-ən]

Glottal migration begins with (2 1b). In (2 1b), as required by the rule for post-accentual glottal association (2 0a), the floating feature associates in the first word (4j) to the Laryngeal node of an /n/, which is the first post-accentual sonorant to which it can associate, to the right of stress. In the second word (6e), there is no post-accentual sonorant, so the rule for post-accentual association cannot apply. In the third word (7a), the rule for post-accentual glottal migration can and does apply. However, since associating the floating feature to /l/, the first sonorant to the right of stress, would violate the Onset Anti-glottalization Constraint (2 0d), the floating feature passes over /l/ and associates instead to the Laryngeal node of /m/, the next sonorant to the right.

Finally, step (2 1c) shows that in the second word (6e), where the first rule was unable to apply, the second rule (2 0b), which controls pre-accentual glottal migration, takes over. The floating feature that is part of the /x-/ prefix associates, as indicated with the broken line, to /n/, the first pre-accentual sonorant that is encountered, moving in a right-to-left direction from the beginning of the word.

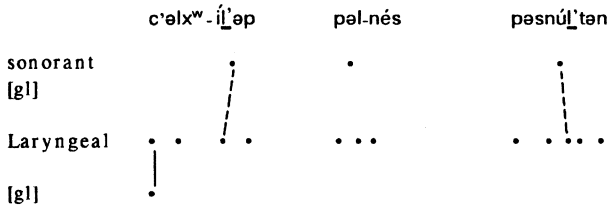
Now here are parallel derivations that illustrate the application of the glottal association rules and the Onset Anti-glottalization Constraint in cases of glottal retention.

(2 2) Derivations to Illustrate the Application of the Association Rules in Cases of Glottal Retention

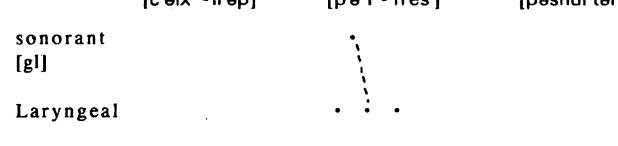
a. Source morphemes and input representations for glottal retention.

	(1 7h)	(1 8b)	(1 6i)
SOURCE	/ -iləp/	/ pəl- /	/ pəsnultn/
MORPHEMES	[gl]	[gl]	[gl]
INPUT	c'əlx^{w}-íləp	pəl-nés	pəsnúltən
	[gl]	[gl]	[gl]

b. Post-accentual glottal association applies. (Targeted segments are underlined).



c. Pre-accentual glottal association applies. (The targeted segment is underlined).



The analysis of glottal retention begins with (2 2b). In (2 2b), the rule for post-accentual glottal association (2 0a) and the left-to-right condition on association (2 0c) predict association of the floating feature to /l/ in the first and third words, since /l/ in both words is the first sonorant to the right of stress. There is no sonorant to the right of stress in the second word, so post-accentual glottal association cannot apply in

that word. In (2 2c), the rule for pre-accentual glottal association applies to the second word. Since /l/ is the first pre-accentual sonorant to the right of the beginning of the word, the rule predicts, correctly, that the floating feature associates to /l/. This association is indicated in (2 2c) with a broken line.

The derivations in (2 1) and (2 2) illustrate how the glottal association rules (2 0a-b) account for the positioning of sonorant glottalization in Shuswap words and morphemes, both in cases of glottal migration and in cases of glottal retention. In effect, the analysis proposed for these two phenomena reduces them to the single phenomenon of glottal association.

Words in which there are two underlying sources of sonorant glottalization provide additional support for this analysis. Some of these words are listed in (2 3). To make it easy to find the sonorant glottalization in these words, morphemes that are an underlying source of sonorant glottalization are underlined. (Otherwise, sonorant glottalization is not indicated in the underlying representations.)

(2 3) Words with Two Underlying Sources of Sonorant Glottalization

WITH A PREFIX AND A ROOT AS SOURCES:

a. / x-p'úm-t-min-es/ --> [x-p'úm'-t-mən-s]
'to smoke out (e.g. bear from den)' (Kuipers 1974a: 144)

b. / x-k^{w}'énɬq-ten/ --> [x-k^{w}'én'ɬq-tən]
'garden' (Kuipers 1974a: 221)

c. / x-qléw-ten/ --> [χ-qléw'-tən]
'purse, wallet' (Kuipers 1974a: 237)

WITH A PREFIX AND A SUFFIX AS SOURCES

d. / x-c'əm-qín-ten/ --> [x-c'əm-qín'-tən]
'skull' (Kuipers 1974a: 177)

e. / t-kət'-em-úyə/ --> [t-kət'-m-úy'ə]
'eyebrow' (Kuipers 1974a: 205)

f. / x-q^{w}ɬin-t-íləˀ/ --> [χ-q^{w}ɬən-t-íl'ə]
'birchbark cradle' (Kuipers 1974a: 245)

g. / t-χey-ésxn-em/ --> [t-χy-ésxn-em']
'to heat stones' (Kuipers 1974a: 255)

h. / x-kiɬ-cín-es/ --> [x-kəɬ-cín'-s]
'(s)he opens something' (Kuipers 1974a: 209)

i. / x-ɬux^{w}-qín-ekst/ --> [x-ɬəx^{w}-qín'-kst]
'thimble' (Kuipers 1974a: 198)

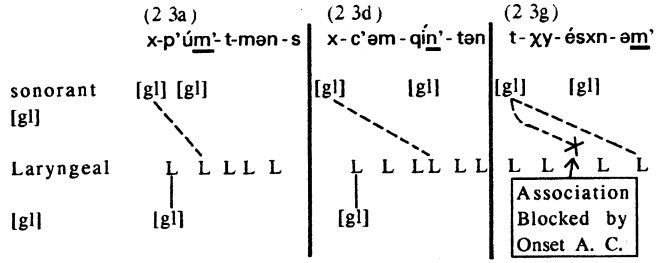
Interestingly, although there are many roots and many suffixes that are underlying sources of sonorant glottalization, I have been unable to find any Shuswap words in which a root that is an underlying source of sonorant glottalization occurs with a suffix that is also an underlying source of sonorant glottalization. As the words in (2 3) illustrate, what typically happens when two underlying sources of sonorant

glottalization combine in a word is that only one instance of that sonorant glottalization surfaces phonetically.

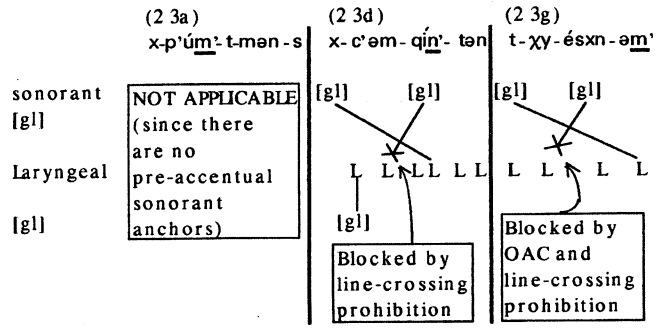
The planar segregation analysis of Shuswap sonorant glottalization, with the association rules proposed in (2 0), readily accounts for this pattern. This can be shown with derivations for a few of the words in (2 3).

(2 4) Derivations for Words with Two Underlying Sources of Sonorant Glottalization

a. Post-accentual glottal association applies.



b. Pre-accentual glottal association applies.



c. phonetic representations
[x-p'úm'-t-məns], [x-c'əm-qín'-tən], [t-χy-ésxn-əm']

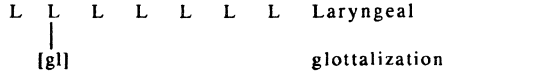
In step (2 4a), a floating [glottalized] feature associates to a post-accentual sonorant in accordance with rule (2 0a) and the Onset Anti-glottalization Condition (2 0d). The association is left-to-right (condition 2 0c), which means that, in each case, the leftmost floating feature associates to the leftmost Laryngeal node that pertains to a sonorant. For word (2 3a), the leftmost Laryngeal node pertaining to a sonorant belongs to the /m/ of /p'um/ and, for word (2 3d), it belongs to the /n/ of /-qin/. For word (2 3g), association to the leftmost Laryngeal node that pertains to a sonorant (the /n/ of /-esxn/) is blocked by the Onset Anti-glottalization Constraint (2 0d), so the floating feature associates instead to the Laryngeal node of the next sonorant (the /m/ of /-əm/).

After the post-accentual association rule has applied once, the second [glottalized] feature on the sonorant glottalization plane is still unassociated to a anchor, in the representations of all three words. The post-accentual glottalization rule is apparently non-iterative, so it cannot apply to this second floating feature. The pre-accentual association rule would apply to the second floating feature, after application of post-accentual association—if it could. However for every one of the words shown, either there is no pre-accentual sonorant anchor (word (2 3a)), or association of the unlinked feature to a pre-accentual anchor is blocked by the line-crossing prohibition (words (2 3d) and (2 3g)); see (2 4b). Hence, the second floating feature cannot associate to an anchor in any of the three words and must be eliminated via Stray Erasure. Thus, it is correctly predicted for all three words that only one instance of underlying sonorant glottalization survives phonetically. The correct predictions for the other words in (2 3) can be derived quite similarly by applying the association rules, as constrained by the left-to-right condition and the Onset Anti-glottalization Constraint.

4. CONCLUSION AND SUMMARY: THE IMPLICATIONS OF GLOTTAL MIGRATION FOR THE REPRESENTATION OF SONORANT GLOTTALIZATION IN SHUSWAP. The process of glottal migration in Shuswap calls for a representation of glottalization in sonorants that is significantly different from the representation of glottalization in other segments—a representation in which sonorant glottalization is segregated onto its own plane, away from obstruent glottalization and glottal-stop glottalization. Words in which sonorant glottalization occurs together with glottal-stop glottalization or obstruent glottalization provide further support for this way of representing sonorant glottalization. It follows from the planar-segregation analysis that if a glottal stop or glottalized obstruent (with its own [glottalized] feature) intervenes between the morpheme that is the source of floating [glottalized] and the sonorant that is targeted by migration—as in (2 5)—then migration of the floating feature is not blocked by the intervening glottal stop. This is the correct prediction.

(2 5) Glottal Migration Across a Glottal Stop (Cf. (2 7a).)

[x - ʔ é l' - k s t - t ə n]



If, on the other hand, it were assumed that [glottalized] for sonorants is not segregated onto its own plane—that it shares the regular glottalization plane with glottal stops and glottalized obstruents—then migration would be incorrectly blocked by an intervening glottal stop, due to the line-crossing prohibition (see (2 6)).

(2 6) Glottal Migration Across a Glottal Stop, Incorrectly Blocked

*[x - ʔ é l - k s t - t ə n]

L L L L L L L Laryngeal

BLOCKED

[gl] [gl] glottalization

More data to show that intervening glottal stops or glottalized obstruents do not block association of the [glottalized] feature for sonorants are given in (2 7) and (2 8). In each word, a glottal stop or glottalized obstruent intervenes between the source morpheme and the sonorant that is targeted by migration. However, in none of the words, does the intervening glottal stop or glottalized obstruent block migration. These data therefore support the claim that, for sonorants, the feature [glottalized] is segregated onto a separate plane.

(2 7) Intervening Glottal Stop Does Not Block Glottal Migration

WITH PREFIX / x- / AS AN UNDERLYING SOURCE OF GLOTTALIZATION:

a. /x-ʔél-ekst-ten/ --> x-ʔél'-ekst-ten [xʔél'kstən]
'handiwork, artifact' (Kuipers 1974a: 277)
Cf. [ʔel-kst] 'to work'.

b. /x-q'éʔ-ews-em/ --> x-q'éʔ-ew's-em [χq'éʔu'səm]
'to stick into' (Kuipers 1974a: 238)
Cf. [səp'-éws] 'be hit on (the middle of) the back'.

WITH PREFIX / t- / AS AN UNDERLYING SOURCE OF GLOTTALIZATION:

c. /t-ʔép'-ews-em/ --> t-ʔép'-ew's-em [tʔép'u'səm]
'to wipe the table' (Kuipers 1974a: 273)
Cf. /t-pál-ews-em/ --> t-pál'-ews-əm [t-pál'-us-əm]
'to make a mess on the table'

d. /t-ʔíqʷ'-elqʷ-em/ --> t-ʔíqʷ'-el'qʷ-em [tʔíqʷ'əl'qʷəm]
'to extract sap of jackpine' (Kuipers 1974a: 279)
Cf. [kʷ'ənx-élqʷ] 'how many (logs, needles, etc.)'.

(2 8) Intervening Glottalized Obstruent Does Not Block Association of Feature [Glottalized]

WITH PREFIX / x- / AS AN UNDERLYING SOURCE OF GLOTTALIZATION:

a. /x-p'éɬ-ews/ --> x-p'éɬ-ew's [x-p'éɬ-u's]
'exhausted, dead-tired' (literally 'laid out')
(Kuipers 1974a: 145)
Cf. /-ews/ in next item.

b. /x-kʷ'úy-ews-em/ --> x-kʷ'úy'-ews-em [x-kʷ'úy'-us-əm]
'to put a log across (e.g. a brook)'
(Kuipers 1974a: 224)
Cf. [c-kʷ'uy] 'to lie (of long objects)'

c. /x-kʷ'úl-ews-em/ --> x-kʷ'úl'-ews-em [x-kʷ'úl'-us-əm]
'to make a trail, road, bridge' (Kuipers 1974a: 222)
Cf. [kʷ'úl-əm] 'to make, to prepare for use (food or materials); to cause'

d. /c-x-knίp'-ews/ --> c-x-knίp'-ew's [cə-x-knίp'-u's]
'narrow road' (Kuipers 1974a: 208)
Cf. /-ews/ in last item.

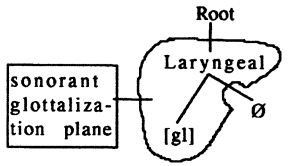
e. /x-q'əq'éy-ten/ --> x-qəq'éy'-ten [χqəq'éy'tən]
(with continuative form of /q'ey-/ 'to set up a structure (e.g. poles for tent, drying rack)'
'dirt-roof structure' (Kuipers 1974a: 241)

WITH PREFIX / t- / AS AN UNDERLYING SOURCE OF GLOTTALIZATION:

f. /t-ʔíqʷ'-elqʷ-em/ --> t-ʔíqʷ'-el'qʷ-em [t-ʔíqʷ'-əl'qʷ-əm]
'to extract sap of jackpine' (Kuipers 1974a: 279)
Cf. [kʷ'ənx-élqʷ] 'how many (logs, needles, etc.)'.

To summarize, the representation of sonorant glottalization that is supported by the facts of glottal migration is the following:

(2 9) Glottalization in Shuswap Sonorants



glottalization tier
sonorant glottalization tier

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