Coast Tsimshian Plural Formation

Fumiko Sasama

0. Introduction

Coast Tsimshian is a language spoken on the coast of northern British Columbia, Canada, and southern Alaska. The number of the speakers is around 500 (Krauss 1994). Genetically, it belongs to the Tsimshianic language family, which consists of three languages, Coast Tsimshian (hereafter cited as CT), Southern Tsimshian, and Nass-Gitksan, which consists of two dialects, Nass and Gitksan.

CT has some processes for plural formation. Previous descriptions on CT plural formation are in Boas (1911) and Dunn (1979a, 1979b, 1981). In this paper, I attempt to describe these processes in more detail, according to their types. The nouns and verbs make use of one or more than one of them to form their plurals. These processes are reduplication, affixation, suppletives, and isomorphics. Of these four processes, reduplication is the most common way to make plurals. There are, though, a few words which cannot be explained by any one of them.

The phonemic inventory of this language is shown in the appendix.

1. Meaning and use

The nouns and the verbs form the plural in the same way. The plural forms of verbs are generally used when the subject of an intransitive verb or the object of a transitive verb, the patient, is more than one.

<table>
<thead>
<tr>
<th>SG</th>
<th>PL</th>
</tr>
</thead>
<tbody>
<tr>
<td>háp 'lid'</td>
<td>hapháp 'lids' (hap- CVC-)</td>
</tr>
<tr>
<td>ū:m: 'pail'</td>
<td>ū:ū:m: 'pails' (ū- CV-)</td>
</tr>
<tr>
<td>nahāpa ū:m: 'lid of a pail' (na- POSS, -a CN)</td>
<td></td>
</tr>
<tr>
<td>nahaphāpa ū:ū:m: 'the lids of the pails'</td>
<td></td>
</tr>
<tr>
<td>sī:pk 'sick'</td>
<td>ṣapsī:pk 'plural subjects) sick' (sap- CVC-)</td>
</tr>
<tr>
<td>nan sī:pkənũ 'I was sick.' (na PAST, -n 1SG, -nũ 1SG.Sbj)</td>
<td></td>
</tr>
<tr>
<td>ṣapsī:pgaqasisi:t 'Her legs are sore.' (-a CN, qasasi: 'leg, foot (PL)', -t 3POSS)</td>
<td></td>
</tr>
<tr>
<td>kľ:mk 'to wipe'</td>
<td>lǐ:mk 'to wipe (plural patients)' (lē- an affix to form plurals)</td>
</tr>
<tr>
<td>kľ:mk'u halitxō:xk 'I wipe the table.' (-u 1SG.Ag, halitxō:xk 'table (SG)')</td>
<td></td>
</tr>
</tbody>
</table>
The plural forms are not always made by only one process, but there are words which make use of more than one process at the same time. In the following example, reduplication is used together with the affixation of \{qa-\}.

<table>
<thead>
<tr>
<th>SG</th>
<th>PL</th>
</tr>
</thead>
<tbody>
<tr>
<td>pān 'belly'</td>
<td>qapānpān 'bellies (of several people)'</td>
</tr>
</tbody>
</table>

There are words which have two plurals formed by two different processes. These plurals could be of the same meaning as in hāpās 'lid' | hakhāpās 'lids' (hak- CVC-[R1-k]) | haphāpās 'lids' (hap- CVC-[R1-C])
or have different meanings, many of which are nouns for body parts or kinship terms, as in țomktī: '(woman's) brother, (man's) sister' țakțomktī: (țak- CVC-) qarțomktī: (qa-) Of the two plurals, the former formed by reduplication means 'brothers/sisters of a single person,' and the latter formed by prefixation of \{qa-\} means 'brother(s)/sister(s) of plural people.'

2. Processes for Plural Formation

2.1. Reduplication (R)

As mentioned already, reduplication is the most common way to make plurals. In this section, reduplication is classified into four major types according to the structure of the reduplicated syllable and the position where it is attached, i.e., whether the reduplicated syllable is closed or open and whether it is prefixed or suffixed. Rules to determine the consonant/consonants in the reduplicated syllables are stated in each section. The vowel of the reduplicated syllable could be explained by underlying \{a\} with a few exceptions.

Hereafter in this paper, the first consonant of the reduplicated syllable is called C₁ and the one which closes that syllable, if any, is called C₂. The original consonant, from which C₁ is copied, is called
C₁-model and the one, from which C₂ is copied, is called C₂-model. While C₁ is the same as C₁-model in a great many examples, there are a number of words where is added some change on the process to copy C₂ from C₂-model, such as deglottalization. C₁-model and C₂-model are abbreviated to C₁m and C₂m respectively in the reduplication formula.

Reduplication can have other functions than indicating plurality. Dunn (1979a:27) writes that reduplicated derivations function to express repeated activity or state of being (iterative), intensification, natural species, and body parts.

1. repetition: it is indicated by the reduplication that the activity is performed repeatedly.

\[ \text{tú:sa halitá: 'The cat is scratching the chair.'} \]
\[ \text{CVC-, 'to scratch', -a CN, tů: 'cat', -a CN, halitá: 'chair'} \]

\[ \text{sawansk 'I blow a piece of paper repeatedly.'} \]
\[ \text{CVC-, səwán 'to blow, -u 1SG.Ag, səwənsk 'paper'} \]

2. emphasis

\[ \text{samhawhawju 'What I say is really true.'} \]
\[ \text{CVC-, haw- 'to tell the truth', -ju 1SG.Sbj} \]

3. word formation (derivation): reduplication is used to form words. In this process, vowels other than \{ə\} are sometimes used.

\[ \text{?an?bn (CVC-*?6n2) 'hand, arm'} \]
\[ \text{kwaskwa:s (CVC-*kwA:s) 'steller's jay, bluejay'} \]
\[ \text{kIikIó:ks (CV-*kIó:ks) 'to float'} \]
\[ \text{mamb:m4 (CV-*m6:4-CVC) 'to smile'} \]

For some more examples of the words using the process of CVC-, CV- or -CVC reduplication, see each section of 2.1.1 - 2.1.3. No examples were found using -CV reduplication as a means of word formation, which are not found in Dunn (1979a), either.

2.1.1. Reduplication 1 (R1): CVC- Reduplication

2.1.1.1. Reduplication 1-C (R1-C)

This is one of the commonest processes to make plurals. CVC- is reduplicated before the stem. The reduplication formula is:

\[ \{(\ldots )CVC_{1m}(C)VC_{2m}(\ldots )\} \]

The first consonant of the stem is used as C₁-model. If the stem begins with a consonant cluster, the first consonant is used. The first consonant after the stem-initial vowel is used as C₂-model, i.e., if the initial syllable of the stem is closed with a consonant/consonant
cluster, that consonant/the first consonant is used as C₁-model, and if it is open, the first consonant of the following syllable is used as C₂-model.⁷

There is a hiatus between C₂ and the following consonant (C₁-model) and even when C₂ is a stop⁸ and C₁-model is a glottal stop, it never happens that C₂ merges with the following sound and is pronounced as an ejective. C₂ is generally pronounced unreleased, although it could be aspirated in deliberate speech.

The vowel in the reduplicated syllable is {ə}, which appears as /i/, /a/, or /o/ on the surface after the morphophonemic rules are applied.⁹ Examples are below.

k’ti:s [g’i:s]  k’tisk’i:s [g’isg’i:s] 'wrong'
jačk [jěčk] jiřjáčk [jějěčk] 'smooth'
ţăks [ţăks] ţakţăks [ţakţăks] 'wet'
xólk [xól’k] xalxólk [xalxól’k] 'crispy'
ţăxs [ţăxs] ţaxţăxs [ţaxţăxs] 'to scratch'
čāskj’i [q’āskj’i] časćōskj’i [q’asq’āskj’i] 'unripe'
ţalá:js [ţalá’js] ţalţalá:js [ţalţalá’js] 'lazy'
mák [ţmák] mēkţmák [ţmēk’mák] 'to catch (on a net)'
sāksk [sāksk] sēksāksk [sēksāksk] 'clean'
kwa:nks [g’wä:nks] k’wēk’wā:nks [g’wēg’wā:nks] 'cooked/faded'

When C₂-model is a back velar stop,¹⁰ a morphophonemic rule (back velar fricativization) is applied and the stop is changed to corresponding fricative, /x/ (after C₂-deglottalization, if C₂-model is glottalized).¹¹

cē:q [ts’ē:x]  čaxčē:q [ts’axts’ē:x] 'to lick'
cq [dz’q] caqčəq [dzaxdz’q] 'to live'
wā:q [wą’q] waxwā:q [waxwą’q] 'to dig'
lukj’i:s [lug’i:s] lukjisk’i:s [lugjisg’i:s] 'wrong' (lu- 'really')
k’n’iţóksk [k’n’iţak’ošk] 'to fall down'
k’istámí:s [k’ist’amt’əmí:s] 'to copy (writing)'
g’ist’émí:s [g’ist’emt’emí:s] (k’is- 'away to another place')

There are some examples where R₁-C is used as the process for word formation.

ksatxó:q [ksat’axt’ó:x] 'orange' (< tó:q 'to suck')(ksa- 'fluid')
hamhóm [hamhón] 'ankle' (<?)
k’ogsk’á:s [g’ogsk’á:s] 'steller’s jay, bluejay' (<?)

—40—
k'isik-walkalk [g'sig-wałk] 'northern light'
(kwalk 'to burn, burnt, fire') (k'isi- 'down river, downstream')
If there is a semivowel (/j, w/) after the stem-initial vowel and it is followed by another consonant, not the semivowel but the following consonant is used as C$_2$-model.
qáwsk [gau-sk] qasqáwsk [gasqáu-sk] 'narrow'
gáwn [gów'n] qangáwn [qangáw'n] 'to chew'
But when the semivowel is the only consonant after the stem-initial vowel, it is used as C$_2$-model.
?ôj [?ôj] ?ajôj [?ajôj] 'to throw'
Examples using R1-C for word formation with a semivowel as C$_2$-model:
qawqów:w [q'awq'a:w] 'crow' (<)
hawháw [hawháu-] 'lion' (< háw 'to say')

C$_2$-deglossalization

When C$_2$-model is a glottalized consonant, deglossalization occurs and its corresponding plain sound is used as C$_2$.

kâmol [k'âml] kômâmol [k'mkâml] 'to pinch'
wâ:q [wâq] waxwâ:q [waxwâq] 'to dig'
qô:jtôks qatôqô:jtôks 'to arrive'

Examples of R1-C with C$_2$-deglossalization used for word formation:
hathótxk [hathôt'oxk] 'to boil' (<)
hathawtôsk [hathawt'esk] 'whistle' (<)

C$_2$-deaspiration

There is one example which has a voiceless aspirated stop as its C$_2$-model.

SG PL
[tê:p'ân] [tapê:p'ân] 'light'
Its C$_2$, i.e., the [p] in the plural is pronounced voiceless and generally unreleased, being followed by a glottal stop (C$_1$-model), though it could be aspirated in deliberate speech. This C$_2$ is considered as a plain stop, /p/, because aspirated stop, /pʰ/, appears only before vowels or word boundary and is always pronounced aspirated, never being unreleased. The word above could be written phonemically:

Though this is the only example, we might be able to postulate another rule, i.e.,
when \( C_2 \)-model is an aspirated consonant, \( C_2 \) is the corresponding plain sound.

Now it might be possible to unite this rule together with the preceding one, \( C_2 \)-degloptalization, into a single rule, which might be called "\( C_2 \)-neutralization." If \( C_2 \)-model is aspirated or glottalized, it is changed to a corresponding plain consonant in \( C_2 \)-position, no matter whether \( C_2 \) is an obstruent or a sonorant. Thus, there could appear in \( C_2 \)-position only the most unmarked series, i.e., the plain series, and not the aspirated or glottalized ones.\(^1\)

2.1.1.1.1. \( R_1 \)-C irregulars

The following example has its \( C_1 \) glottalized, although \( C_1 \)-model is not a glottalized sound.

\[
\text{nàksuni:sk}^1 \quad \text{ñàkn̪ksuni:sk} \quad \text{'window'}
\]

The following is the only example that has two consonants in \( C_2 \)-position, i.e., the reduplicated syllable has a form CVCC-.

\[
\text{mò:ksk} \quad \text{møksmò:ksk} \quad \text{[møksmø:ksk]} \quad \text{'white'}
\]

2.1.1.1.2. \( R_1 \)-C+A

A few plurals are found in which \( R_1 \)-C is used together with A (affixation).

\( R_1 \)-C+A1

\[
\text{cá1 \quad qàc̩l̩á1} \quad \text{qàts'̩l̩ts'å1} \quad \text{'face'}
\]

\[
\text{pà̱n \quad qàp̩n̪pà̱n} \quad \text{qàḇínbà̱n} \quad \text{'belly'}
\]

Both examples above could be used without \{qa-\} with no differences in the meaning.

\( R_1 \)-C+A2

\[
\text{ʔasg'̩á:paq} \quad \text{ʔasl̩pl̩á:paq} \quad \text{‘talkative’}
\]

2.1.1.2. Reduplication 1-k (\( R_1 \)-k)

In this CVC-reduplication, \( C_2 \) is always /k/. This process might be considered to have spread from \( R_1 \)-C words which have a simple velar \( C_2 \)-model. There are, however, also words which make use of this process, though not having a simple velar as \( C_2 \)-model. \{\( C_1 \kappa \)-\} is attached word-initially, wherever the stem lies. There are words in \( R_1 \)-k which have only one open syllable, that are not found in \( R_1 \)-C. When the word has a proclitic, \{\( C_1 \kappa \)-\} is attached before the proclitic. The reduplication formula is:
The \(a\) in the reduplicated syllable appears as /i/, /a/, or /\(\theta\)/ phonemically.\(^{15}\)

\[\text{jú:task [júːt'ışk]} \rightarrow \text{jikjú:task [jikjúːt'ışk]} \:	ext{scarf, necklace}\]

\[\text{qajá:k [qajá:k]} \rightarrow \text{qakqajá:k [qakqajá:k]} \:	ext{grey}\]

\[\text{tè:sk [tè:sk]} \rightarrow \text{takè:sk [takè:sk]} \:	ext{to promise}\]

\[\text{ pó: [p'ò:]} \rightarrow \text{pèk pó: [p'èk pó:]} \:	ext{broken}\]

\[\text{tuː:k [dùːk]} \rightarrow \text{taktuː:k [daktuː:k]} \:	ext{basket}\]

\[\text{tæmgáws [t'æmgáus]} \rightarrow \text{taktæmgáws [t'akt'æmgáus]} \:	ext{head}\]

\((\text{tæm-},\text{16 qáws 'hair')}\]

\[\text{mæwáca [mætwáts'a]} \rightarrow \text{makmæwáca [mækmætwáts'a]} \:	ext{crazy}\]

\((\text{mæ- 'like', wáca 'land otter'})\]

\[\text{haxsámi [haxsámi]} \rightarrow \text{hakhaxsámi [hakhaxsámi]} \:	ext{steakknife}\]

\((\text{hæ- INSTR, x- 'to eat', sámi 'meat'})\]

\[\text{k'æmshøpála [k'ækkwæmshøpála]} \:	ext{button blanket}\]

\[\text{[g'æs?nøp?ła]} \rightarrow \text{[g'ækk'æs?nøp?ła]}\]

\((\text{k'æs- 'blanket', øpála 'button'})\]

This process, \(R1-k\), is the most productive one. Many borrowings belong to this type.

\[\text{pø:t [bø:t]} \rightarrow \text{pøkpø:t [bøkpø:t]} \:	ext{boat}\]

\[\text{sí:c [sí:ts]} \rightarrow \text{søksí:c [søksí:ts]} \:	ext{sheet}\]

There are a few examples of compounds which have the reduplicated syllable after the proclitic. These words have a stem whose plural is also formed with \(R1-k\).

\[\text{hukrät [hukrät]} \rightarrow \text{hukrakrät [hukrakrät]} \:	ext{fisherman}\]

\((\text{huk- nomen actoris})\]

\[\text{cěmsawansk} \rightarrow \text{čěmsaksawansk} \:	ext{paper bag}\]

\[\text{[ts'čmsawansk]} \rightarrow \text{[ts'čmsaksawansk]}\]

\((\text{čem- 'in'})\]

\[\text{cфsawansk} \rightarrow \text{søksawansk} \rightarrow \text{[søksawansk]} \:	ext{paper}\]

\((\text{cawansk})\]

2.1.1.3. Reduplication 1-x (R1-x).

In this CVC-reduplication, \(C_2\) is always /x/. As the case of \(R1-k\), this process might be considered to have spread from \(R1-C\) for words which have a back velar \(C_2\)-model.\(^{17}\) There are, however, also words which make use of this process, though not having a back velar \(C_2\)-model.

\(/\text{C}_1\text{ax-}/\) is reduplicated before the stem. The reduplication formula is:

\[/(\ldots-)\text{C}_1\text{ax-C}_1\text{m...}/\]

\[\text{tø:jaxs [dø:jaxs]} \rightarrow \text{tæxtø:jaxs [daødø:jaxs]} \:	ext{strong}\]

\(-43-\)
2.1.1.3.1. R1-x irregulars

In the following example, C₁ is glottalized, although C₁-model is not.

tʃo:[tʃo:]  taxtʃo:[t'axtʃo:]  'wide'

2.1.1.4. Reduplication 1-t (R1-t)

A few examples were found where C₂ is /t/. This process is not reported in Dunn (1979a, 1979b, 1981) but Boas (1911:371) has a brief description of it. {Ciet-} is attached to the stem. The reduplication formula is:

\{(...-)Ciat-Cim...\}

\*A: [?wa:]  *atwa: [2wat2wa:]  'to find'

lwd:ii [kw'fi,2an]  kwatkwa:h [kw'atkw'a?an]  'to lose'

gatAT [Gain.]  gatAT [cal?at26]  'to drop'

As in the cases of R1-C and R1-k, there is a hiatus after the reduplicated syllable and the [t] is never pronounced as an ejective even when followed by [ʔ]. The C₂, /t/, is generally pronounced with no audible release.

2.1.2. Reduplication 2 (R2): CV- Reduplication

R2 is formed by prefixing C₁V- to the stem. The reduplication formula is:

\{(...-)C₁V-Cim...\}

V is generally /æ/. As the morphophonemic rules are applied after CV-reduplication, the /æ/ appears as /i/, /a/, /u/ or /a/ phonemically.¹⁹

k'at [g'et]  k'ik'at [g'ig'at]  'person'


ló:ks [ló:ks]  lwló:ks [lló:ks]  'to float'

†ák'əaq  †aták'əaq  'to speak, to talk'

[†álq'ox/†áljəx]  †atálq'ox/†atáljəx

†á: [q'á:]  †aqa: [q'a?q'á:]²⁰  'wound'

k'ú: [g'ú:]  k'uk'ú: [g'u'g'ú:]  'to shoot'

There are a few examples of R2 used for word formation. The following examples indicate singular except /tatalpk/.

tatú:ls [dadú:ls]  'alive'²¹  (<?)
2.1.2.1. R2 irregulars

There are some plurals made by R2 in which the vowels in the reduplicated syllable could not be explained by underlying {a}. In the following two examples are used short vowels which have the same quality as the long stem vowel.

\[
\begin{align*}
tī: & \quad [dī:] \\
tītī: & \quad [dīdī:] \\
\text{tīlī:} & \quad [dīlī:] \\
\end{align*}
\]

These forms are: 'hill'

\[
\begin{align*}
tū: & \quad [tū:] \\
tūtū: & \quad [tūtū:] \\
\text{tūlū:} & \quad [tūlū:] \\
\end{align*}
\]

/a/ is used in the next two examples.

\[
\begin{align*}
lūtō: & \quad [lūdō:] \\
lūtātō: & \quad [lūdādō:] \\
\text{lūtīthō:} & \quad [lūtīthō:] \\
\end{align*}
\]

These forms are: 'to put in, to pack'

2.1.2.2. R2+A

R2 is used together with Al (affixation 1 \(\rightarrow\) 2.2.1.1.) in the following example.

\[
\begin{align*}
sājp & \quad [sā·p/sə·p] \\
\text{qās}sājp & \quad \{qās+sā·p/qās+sə·p\} \\
\end{align*}
\]

These forms are: 'bone'

2.1.3. Reduplication 3 (R3): -CVC Reduplication

In R3, -CVC Reduplication, the reduplicated syllable is not prefixed to the stem, or word-initially, but attached right after C\(_1\)-model and C\(_2\)-model are the consonants flanking the stem vowel which carries stress. Thus, when the stem vowel is followed by only one consonant, which is C\(_2\)-model, -CVC is suffixed to that and when the stem vowel is followed by more than one consonant, the reduplicated syllable is inserted right after the first one of them. There is no word in this type whose stem ends in a vowel.

The reduplication formula is:

\[
\{(...)\text{C}_1\text{m}_1\text{C}_2\text{m}_2\text{C}_1\{...\}\}^{22}
\]

C\(_2\)-model is a simple or back velar, stop or fricative, plain or glottalized.

\[
\begin{align*}
sāq & \quad [sāx] \\
sā:saq & \quad [sā:sāx] \\
\text{x}pāq & \quad [x̂ōx] \\
xpā:paq & \quad [x̂ā:x̂ōx] \\
lāxs & \quad [lāx̂s] \\
lā:laqs & \quad [lā:lāx̂s]
\end{align*}
\]

These forms are: 'sharp'

When there is a semivowel after the stem vowel which is in turn followed by a stop, not the semivowel but the stop is used as C\(_2\)-model, as seen in R1-C formation, and the reduplicated syllable is suffixed to the
C₂-model deletion and compensatory lengthening

After \(-C₁C₂\) is reduplicated, C₂-model is deleted and the stem vowel, if it is short, is lengthened. When the stem vowel is originally long, it does not change its length.

\[
\begin{align*}
\text{såq-såq} & \quad \text{xpå-påq} & \quad \text{låx-låx-s} \\
\text{OUTPUT} & \quad [\text{så:såx}] & \quad [\text{xpå:paq}] & \quad [\text{lå:laaxs}]
\end{align*}
\]

\(\text{a-deletion}\)

[\(\text{a}\)] in the reduplicated syllable is deleted when preceded by a sonorant and followed by a stop which is in turn followed by a vowel or a word boundary.

\[
\begin{align*}
\text{låq} & \quad \text{lå:q} \ [\text{lå:laax}] & \quad \text{‘rotten’} \\
\text{låqaksk} & \quad \text{lå:laqaksk} \ [\text{lå:laaksk}] & \quad \text{‘wet’} \\
\text{hanå:q} & \quad \text{hanå:nq} \ [\text{hanå:naax}] & \quad \text{‘girl, woman’}
\end{align*}
\]

These processes are illustrated as follows:

\[
\begin{align*}
\text{låq-laq} & \quad \text{låq-laq-aksk} & \quad \text{hanå:q-naq} \\
\text{OUTPUT} & \quad [\text{lå:laax}] & \quad [\text{lå:laaksk}] & \quad [\text{hanå:naax}]
\end{align*}
\]

Below are examples where \(\text{a-deletion}\) does not occur between a sonorant and a stop. In the first one, it does not occur because the stop, i.e., C₂, is followed by a consonant:

\[
\begin{align*}
\text{jó:ks} & \quad \text{jó:iks} \ [\text{jó:jiks}] & \quad \text{‘to wash’} \\
\text{jåq} & \quad \text{[fjó:χ]} & \quad \text{‘to hang’}
\end{align*}
\]

The question remains why the \(\text{a}\) is not deleted in the second example. It might have something to do with the fact that its C₁-model is glottalized. Its C₁ might have been glottalized, or, still might be pronounced glottalized by some speakers, and the \(\text{a-deletion}\) might occur only after unglottalized sonorants. To make it sure, more data should be collected in the future.
There are a few words in which C2-deglottalization occurs, while it does not occur in some words such as /haná:q/:/haná:nq/ 'girl, woman (SG:PL)'.

<table>
<thead>
<tr>
<th>C2-deglottalization</th>
<th>/tá:q/ [tá:ʊx]</th>
<th>/tá:q/ [tá:ʊx]</th>
<th>'to bite'</th>
</tr>
</thead>
<tbody>
<tr>
<td>C2-model deletion</td>
<td>/tá:q/ [tá:ʊx]</td>
<td>/tá:q/ [tá:ʊx]</td>
<td>'to pull'</td>
</tr>
<tr>
<td>a-variation</td>
<td>/tá:q/ [tá:ʊx]</td>
<td>/tá:q/ [tá:ʊx]</td>
<td></td>
</tr>
<tr>
<td>OUTPUT</td>
<td>[tá:ʊx]</td>
<td>[sɪ::stɪk]</td>
<td></td>
</tr>
</tbody>
</table>

There occurs in R3 ak>i: or aj>i: alternation, which are seen also in A2 (affixation 2 → 2.2.1.2.).

<table>
<thead>
<tr>
<th>ak&gt;i:/ aj&gt;i: alternation</th>
<th>/qanı:naksk/</th>
<th>/sɪ::stɪk/</th>
<th>'spouse, married'</th>
</tr>
</thead>
</table>

If the ak>i: alternation is applied after C2-model deletion and compensatory lengthening, it would derive a wrong plural form:

qaná:naksk

The following example uses R3 for word formation together with R2.

<table>
<thead>
<tr>
<th>memó:mq [mmpō:ʔmʊΧ]</th>
<th>'to smile'</th>
<th>(&lt;?)</th>
</tr>
</thead>
</table>

2.1.3.1. R3 irregulars

In the following example, C1 is deglottalized.
In the next example, /a/ is added word-finally.

wáːq [wáʔax]   wáːwqa [wáʔwʔa]  'to dig'

2.1.3.2. R3+A

There are some plurals where R3 is used together with A (affixation).

R3+A1

náːq [náʔax]   qanáːnq [qanáʔnq]  'dress'
náks [náks]   qaniːnaksk  'spouse, married'

xpaq [xbáx]   qaxpáːpaq [qaxbáːbáx]  'to fold'
láxs [láxs]   qaláːlaxs [qaláːláxs]  'branch'

These processes are illustrated as follows:

qa-náːq-nóq qanák-náːq-sk qa-xpaq-paq qaláx-lóx-s

ak>i: alternation

C₄-model deletion & compensatory lengthening

= qanáːnq qaxpáːpaq qaláːlaxs

= qaniːnaksk

= qaxbáːbáx = qaláːláxs

OUTPUT [qanáʔnq] [qanínaksk] [qaxbáʔbáx] [qaláʔláxs]

R3+A2

kʷták [kʷdák]   ləkʷtíːtok [ləkʷdíːdák]  'to shoot'
kʷtáxs [kʷdáxs]   ləkʷtáːtaxs  'to leave'

ak>i: alternation

C₄-model deletion and compensatory lengthening

= lə-kʷtáːtok = lə-kʷtáːtáːtok-s

= ləkʷtíːtok

= ləkʷtáːtaxs

OUTPUT [ləkʷdíːdák] [ləkʷdáːdáxs]

2.1.3.3. R3+S

In the following plural, the plurality is indicated by R3 and S (suppletives). Though '/máxsk/ is already a suppletive plural of /hájtk/, it is not used by itself, but always with R3. There are words, however, containing a proclitic and /hájtk/, which make their plural either with or without R3, examples of which will be listed in 2.2.2.1.
2.1.4. Reduplication 4 (R4): -CV Reduplication

There are some, though not many, words which form their plurals by suffixing -CV to the stem.

The reduplication formula is:
{(. )C J-C18(-...)}
(in this formula, "" indicates either stress, fading or unfading)

The {e} in the reduplicated syllable is changed to /a/ by a morphophonemic rule.  

<table>
<thead>
<tr>
<th>Word</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>tô: [ tô:]</td>
<td>(fish) to swim, (boat) to go</td>
</tr>
<tr>
<td>kʷaːrː tô: tk</td>
<td>'to crawl'</td>
</tr>
</tbody>
</table>

stress change

The fading stress in the singular becomes unfading in the plural as in the examples above.

2.1.4.1. R4 irregular

In the following example, /kʰ/ is attached word-finally after ø-variation.

<table>
<thead>
<tr>
<th>Word</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>nô: [ nô:]</td>
<td>qanô: nakʷ [qanô: nak]</td>
</tr>
</tbody>
</table>

2.1.4.2. R4+A

There are a few examples where R4 and A (affixation) are used at the same time.

<table>
<thead>
<tr>
<th>Word</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>nô: [ nô:]</td>
<td>qanô: nakʷ [qanô: nak]</td>
</tr>
<tr>
<td>kʷ tíː [ kʷː t̪ː]</td>
<td>lākʷtíː ta [lākʷtíː da]</td>
</tr>
</tbody>
</table>

The next example takes {-tə} at the same time (→ 2.2.1.3.1.).

<table>
<thead>
<tr>
<th>Word</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>júː [ júː]</td>
<td>lejúː jta [lejúː jda]</td>
</tr>
</tbody>
</table>

In this example, the same ø-deletion rule as seen in R3 occurs, i.e., {ø} in the reduplicated syllable is deleted when preceded by an
(unglottalized?) sonorant and followed by a stop which is followed in turn by a vowel or word boundary.

2.2. Non-reduplicative processes

2.2.1. Affixation (A)

One of the processes to make plurals is affixation. There are two prefixes used to make plurals, {qa-} and {la-}. In most cases they are prefixed word-initially, but there are also some cases where they are prefixed right before the stems but after proclitics.

2.2.1.1. Affixation 1 (A1): {qa-}

There are a number of words which make their plurals by prefixing {qa-} stem-initially. The plurals made by means of this prefix are called "distributives" (Dunn 1979a:21) and are to be translated 'each one his/her own ___.' Nouns indicating something such as body parts or kinship terms generally make their plural with this prefix. Some other nouns, of which every individual is considered to possess only one piece, seem to use this prefix, too, and also many intransitive verbs seem to use it.

<table>
<thead>
<tr>
<th>SG</th>
<th>PL</th>
<th>'Meaning'</th>
</tr>
</thead>
<tbody>
<tr>
<td>mō:s [mjːs]</td>
<td>qamō:s28 [γamjːs]</td>
<td>thumb</td>
</tr>
<tr>
<td>ċomū: [témuː]</td>
<td>qačomū:28 [gats'ímuː]</td>
<td>ear</td>
</tr>
<tr>
<td>təmkti: [tɪmktiː]</td>
<td>qatəmkti:29 [gatəmktiː]</td>
<td>(woman's) brother, (man's) sister</td>
</tr>
<tr>
<td>nakta: [nIktaː]</td>
<td>qanakta:29 [ganIktaː]</td>
<td>aunt</td>
</tr>
<tr>
<td>xsō: [xIsōː]</td>
<td>qaxsō: [gaxsōː]</td>
<td>canoe</td>
</tr>
<tr>
<td>miːlk [miːlk]</td>
<td>qamiːlk [γamiːlk]</td>
<td>'to dance'</td>
</tr>
<tr>
<td>piːk [piːk]</td>
<td>qapíːk [gapiːk]</td>
<td>'to tell a lie'</td>
</tr>
<tr>
<td>čåː [ts'áː]</td>
<td>qačåː [gats'áː]</td>
<td>'guts'</td>
</tr>
<tr>
<td>čoːq [dzóː]</td>
<td>qacóːq [gdzóː]</td>
<td>'ashamed'</td>
</tr>
</tbody>
</table>

There are only very few transitive verbs which make use of {qa-}.

xliːwən [xliːwən] qaxliːwən [gaxliːwən] 'to squeeze'
ksqāchas [ksqats'áː] ksaqáchas [ksaqats'áː] 'to gut (fish)' (ksə-/ksa- 'fluid')
saqóːq [sIdzóː] sagaqóːq [sgaIdzóː] 'to embarrass' (sa-/-sa- 'to make')

As already mentioned, {qa-} is prefixed stem-initially in many cases but there are also cases where it is attached before the proclitic, as in the following example.

hak-ták [hak-táːk] qahak-ták [gahak-táːk] 'bow'
2.2.1.1. Al irregular

In the following example, the glottal stop in the singular alternates with /s/ in the plural and the vowel /a/ is weakened to /a/. 
\[?asi: [?asi:] \quad qasasi: [gasasi:] \quad \text{'leg, foot'}\]

In the next example, the /q/ is glottalized.
\[?uks\text{at}:\text{w} [?uks\text{at}:\text{w}] \quad ?uks\text{at}:\text{w} [?uks\text{at}:\text{w}] \quad \text{'to fall overboard'}\]

2.2.1.2. Affixation 2 (A2): \{la-\}

There is another prefix to make plurals, which is \{la-\}.\cite{boas1911} As Boas (1911:380) says, plurals formed by this prefix are preeminently verbal plurals. It is attached stem-initially.
\[
\begin{align*}
\text{på:s} \ [bå:s] & \quad \text{låpå:s} \ [låbå:s] \quad \text{'scared'} \\
\text{spåm} \ [spåm] & \quad \text{låspåm} \ [låspåm] \quad \text{'to cough'} \\
lå:ntk \ [lå:ntk] & \quad \text{lå:ntk} \ [lå:ntk] \quad \text{'to growl'} \\
hukpå:s \ [hukpå:s] & \quad \text{huklåpå:s} \ [huklåpå:s] \quad \text{'scary'} \quad \text{(huk- nomen actoris)}
\end{align*}
\]

In the formation of plurals by this prefix, following rules are applied:

**velar deletion and a-deletion**

There are some words which have a stem-initial velar stop that alternates with /l/ in their plurals.
\[
\begin{align*}
k'\dot{a}m\text{k} \ [g'\dot{a}m\cdot k] & \quad \text{låm\text{k}} \ [låm\cdot k] \quad \text{'hot, warm'}
\end{align*}
\]

It is considered that there occur intervocalic velar deletion and a-deletion in these words.

velar deletion: stem-initial velar stop is deleted when preceded by \{la-\} and followed by a vowel.
a-deletion: a is deleted when it lies adjacent to a vowel.
a-deletion is applied after velar deletion.

Here are some more examples:
\[
\begin{align*}
k'\dot{a}\text{ps} \ [g'\dot{a}\text{ps}] & \quad \text{låps} \ [låps] \quad \text{'high'} \\
k'\dot{f}\text{m}k \ [g'\dot{f}\text{m}k] & \quad \text{låf\text{mk}} \ [låf\text{mk}] \quad \text{'to wipe'} \\
k'\dot{o}\text{ks} \ [g'\dot{o}\text{ks}] & \quad \text{låöks} \ [låöks] \quad \text{'(plane) to land'}
\end{align*}
\]

These processes are illustrated as follows:
\[
\begin{align*}
\text{lå-}k'\dot{a}\text{ps} & \quad \text{lå-}k'\dot{f}\text{m}k \quad \text{lå-}k'\dot{o}\text{ks} \\
\text{velar deletion} & \quad \text{lååps} \quad \text{låf\text{mk}} \quad \text{låöks} \\
\text{a-deletion} & \quad \text{låps} \quad \text{låf\text{mk}} \quad \text{låöks} \\
\text{OUTPUT} & \quad \text{låps} \quad \text{låf\text{mk}} \quad \text{låöks}
\end{align*}
\]

The velar deletion is not applied if the velar stop is followed by a
consonant.

k't1: [k'd1:] latak't1:ta [lak'd1:da] 'hungry'

Most of the examples involve a front velar as the examples above. There are, however, found also cases having a simple velar or a back velar. Though the following is a quite irregular and the only example which involves a rounded velar, it might show that the deletion is not applied to rounded velar.

k'álk [g'álk] læk'ú:la [lég'ú:le] 'to burn'

I have found so far no glottalized velars in these cases.

ak>i: aj>i:/ w:>u: alternation

There are some words which have different vowels in the singular and the plural. When the stem begins with a velar followed by /ak/, /aj/, or /w:/, these /ak/, /aj/, and /w:/ alternate with /i:/, /i:/, and /u:/ respectively.

káksk [gáksk] lítaksk [lí:d4sk] 'to wake up, to be awake'
qájna [gájna] lí:na [lí:na] 'to fall down'
kú:nks [gú:nks] lú:nks [lú:nks] 'dry, to dry'

In the first example, it is considered that there occurs an alternation, ak>i:. See 2.2.1.3.1 for the illustration of the process to form /lítaksk/. In the second and the third example, aj>i: and w:>u: alternations occur, which would be illustrated as follows:

velar deletion løjájna løj-kú:nks
aj>i:/w:>u: løj:na løj:nks
ə-deletion lí:na lú:nks
OUTPUT [lí:na] [lú:nks]

2.2.1.2.1. A2 irregulars

In the following example, /o/ is lengthened and some sounds are added.

$xstóq [xst'óx]$ laxstó:jaq [laxst'ó:jox] 'to sleep'

In the next example, short /a/ alternates with long /e:/.

hátsks [hád4ks] lahé:taks [lahé:d4ks] 'to swim'

2.2.1.3. A+A

After velar deletion and ə-deletion are applied, the existence of [løy] becomes blurred and pleonastic {løy} is re-added.

k'fı:mk [g'fı:mk] løyfı:mk [løyfı:m] 'to wipe'

"-52-"
k'6:ks [g'6:ks]  ləl6:ks [lkl6:ks]  'to float'

These processes are illustrated as follows:

<table>
<thead>
<tr>
<th>Process</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>velar deletion</td>
<td>ləl6:ks</td>
</tr>
<tr>
<td>e-deletion</td>
<td>ləl6:ks</td>
</tr>
<tr>
<td>OUTPUT</td>
<td>[ləl6:ks]</td>
</tr>
</tbody>
</table>

Though this pleonastic /lə/ could also be considered as the reduplicated syllable of R2, not as {lə-}, there is no way to decide which. They are treated here as A+A just because the examples I collected so far are all verbal plurals and, as already mentioned, plurals formed by {lə-} are preeminently verbal plurals.

2.2.1.3.1. A+{-tə}

There is an affix which is used to make plurals together with one of the affixes, {qa-} or {lə-}. It is {-tə}, which cannot make plurals by itself. It is attached stem-finally. The {ə} of {-tə} is realized as /a/ in many cases by a morphophonemic rule.33

The last example seems hard to explain but could be explained easily when the word /káksk/ is supposed to consist of a stem "{kák} and a suffix {-ksk},34 the second {k} of the root being deleted on the surface followed by another {k}.

2.2.1.4. A+S

In the following examples, A (A1/A2) is used together with S (suppletive. → 2.2.2.).
2.2.1.5. A+R

In some cases A and R are used at the same time, though I have not collected all the combinations of A and R. In the first example below, A1 and R2 are used together, in the second, A2 and R1, and in the third, A2 and R3.

sájp [sá.p/séi.p] qašešáoáp 'bone'  
[qašešái.p/qašešái.p]

ʔasl+ką:paq  
ʔasląplái:paq 'talkative'  
[ʔasląplái:bo.x]

kʷtak [kw=dák] ləkʷt1:tek [ləkʷt1:dák] 'to leave'

It seems that A is applied prior to R, as far as seen from the second example above.

2.2.2. Suppletives (S)

There are some words which have phonologically unrelated forms for the singular and the plural, i.e., words which supplet. Most of the words which belong to this category are intransitive verbs. There are suppletive nouns and proclitics, although these are not included in Booker’s (1982) definition and therefore not mentioned by her.35

intransitive verbs

<table>
<thead>
<tr>
<th>SG</th>
<th>PL</th>
</tr>
</thead>
</table>
| nō:kʰ [nō:k] | lāː;k [lāː:k] 'to lie (down)'
| tāː [t’āː] | wán [wán·] 'to sit'
| jāː [jāː] | wāː:xs/wāːː1xś 'to walk'
| pāː [bāː:] | ḥōːṭ [q’ōṭ] 'to run'
| pāck [batsk] | máxsk [máxsk] 'to arrive'
| ʔifːn [ts’ī:n] | lāmdażax 'to enter'
| ʔwāːtk [ʔwāːtk] | ʔamjajːt [ʔamjajːt] 'to come from'
| kʷéːxk [k’éːxk] | ḥúːt [húːt] 'to run away'
| mōxk [móxk] | sāːntk [sāːntk] 'to go aboard'
| ʔčːs [ts’ū:sk] | sēsːs [sēsːs] 'small'
| ʔjāːwxtk [jāːwxtk] | txōːxk [txōːxk] 'to eat’36
| ʔwiːhāwtk | póːkʰ [bóːk] 'to cry'
| [ʔwiːhōːu·tk] | máxs [máxś] 'to grow'
| pāːs [p’āːs] | tūː [dūː] 'to die, dead'
| cāk [dzák] |
transitive verbs

<table>
<thead>
<tr>
<th>verb</th>
<th>meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>cák' [dzák']</td>
<td>'to kill'</td>
</tr>
<tr>
<td>máq [máq]</td>
<td>'to put'</td>
</tr>
<tr>
<td>ká: [gá:]</td>
<td>'to take'</td>
</tr>
</tbody>
</table>

The next example is either intransitive or transitive:

<table>
<thead>
<tr>
<th>verb</th>
<th>meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>skú: [sgú:]</td>
<td>'to lie, to lay'</td>
</tr>
</tbody>
</table>

nouns

<table>
<thead>
<tr>
<th>noun</th>
<th>meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>k'wikú:tk [lgwU:tk] kikm: [k1gt:]</td>
<td>'child (son or daughter)'</td>
</tr>
<tr>
<td>k'uwú:mk [lgwú:mk] k'abítgú:tk</td>
<td>'child (the young)'</td>
</tr>
</tbody>
</table>

proclitics

<table>
<thead>
<tr>
<th>proclitic</th>
<th>meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>kwu- [igwu]</td>
<td>'small'</td>
</tr>
<tr>
<td>ks- [ks]</td>
<td>'extreme'</td>
</tr>
</tbody>
</table>

as in

<table>
<thead>
<tr>
<th>word</th>
<th>meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>kwu:s [igwu:s] kapukís [k'ab+dti:s]</td>
<td>'kitten'</td>
</tr>
<tr>
<td>kwuha:s [igwuha:s] kaphá:s [k'abaha:s]</td>
<td>'puppy'</td>
</tr>
</tbody>
</table>

When a word consists of a proclitic/proclitics and a stem that suppletes, its plural is also formed with S, sometimes together with another process, as written in the following section, 2.2.2.1.

2.2.2.1. S+R

There are some plurals which make use of both S and R. In the following example, S is used together with R1-k.

<table>
<thead>
<tr>
<th>word</th>
<th>meaning</th>
</tr>
</thead>
</table>

halitá: [ha?lit'á:] halíwan [ha?liwan] 'chair' (tá: 'to sit')
sopás [sp'ás] somáxs [si:ma:xs] 'to grow (vt)'

(Se- 'to make', ias 'to grow')
sapá: [sabá:] saqóit [sqóq'] 'to pass away, to get off'

(txaskw: [txasgú:] txató: [txató:] 'to lay down'

(txa- 'down on', skú: 'to lie, to lay')
manká: [mangá:] mantóq [mandóx] 'to pick up'

(man- 'upwards', ká: 'to take')

çenscák [ts'nsdzák] çenstú: [ts'nsdu:] 'widow, widower'

(çens- 'away', cák 'to die, dead')

In the next example, S is used together with R2.
lekstá: [lɪkstˈáː]  lekswawán [lɪksuˈwán•]  'island'
There is also a plural form in which S and R3 are used at the same time. 
It is /má:maxsk/, which is a reduplicated form of /máxsk/. Though *
*/máxsk/ is originally a suppletive plural of /hajtk/, it is not used by
itself,41 but always with R3, as /má:maxsk/. There are words, though, containing a proclitic and /hajtk/ which make their plural either with
or without R3.

hájtk [háː.i- tk]  
má:maxsk [máxsk]  
qalksahájtk [galksahái.- tk]  
qalksámáxsk42 [galksáxsk]  

to stand' 
're to have diarrhea,
'to stand through the
'doorway'

2.2.3. Isomorphics (I)
There are a number of words which have the same form for the 
singular and the plural. Many of them are nouns referring to natural
species but there are also some other nouns and intransitive/transitive verbs.

SG/PL
lí:ck [liː:tsk] 'snow goose'  txáw [txéu•] 'halibut'
qapóːq [qobóːx] 'cockle'  qanáw [qónau•] 'frog'
ksfːiː [ksfːiː] 'lizard'  skʰát [sgʰét] 'spider'
č́askヴィ [tsʰaskヴィ] 'louse'  jánś [țjən•s] 'leaf'
wáːl [wáːl•] 'yellow cedar'  laxtáː [laxtˈáː] 'lake'
píjáːls [bijáːls] 'star'  méːq [méːx] 'pine cone'
xáː [xáː] 'slave'43  q̲áw̲es [q̲áw̲es] 'newborn baby girl'
póːn [ptoː:n] 'totem pole'  táː:f [ţaːf̲at] 'ball'
qók [gók] 'basket'  páː [báː]44 'to go on a boat'
wóː [Twóː] 'to invite'

2.2.4. Others
There are some words having plurals which seem to have some 
relation to the singular forms and are neither to be called S nor to be
explained either by A or R.

SG  PL
wák² [wék²/ wék]  wákʰa [wékʰa/wékʰa]  '(man’s) brother'
hój [hóːi•]  hóːja [hóːja]  'to use'
3. Final remarks

In this paper, those processes of CT for plural formation have been discussed: reduplication (CVC-, CV-, -CVC and -CV), affixation (qa- and la-), suppletives, and isomorphics. There remain, however, problems as "irregulars" or "C₃-neutralization" in R₁-C. To solve these problems, more data should be collected in the future.

Appendix

Consonant inventory

<table>
<thead>
<tr>
<th>Obstruents</th>
<th>Bila-</th>
<th>Alve-</th>
<th>Velar</th>
<th>Glot-</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stops</td>
<td>labial</td>
<td>olar</td>
<td>front</td>
<td>simple</td>
</tr>
<tr>
<td>Plain</td>
<td>p</td>
<td>t</td>
<td>k</td>
<td>k'</td>
</tr>
<tr>
<td>Aspirated</td>
<td>pʰ</td>
<td>tʰ</td>
<td>kʰ</td>
<td>kʰ</td>
</tr>
<tr>
<td>Glottalized</td>
<td>p̩</td>
<td>t̩</td>
<td>k̩</td>
<td>k̩</td>
</tr>
<tr>
<td>Fricatives</td>
<td>s</td>
<td>t</td>
<td>x</td>
<td>h</td>
</tr>
<tr>
<td>Sonorants</td>
<td>Plain</td>
<td>m</td>
<td>n</td>
<td>l</td>
</tr>
<tr>
<td>Glott.</td>
<td>m</td>
<td>n̩</td>
<td>l̩</td>
<td>j̩</td>
</tr>
</tbody>
</table>

Vowel inventory

<table>
<thead>
<tr>
<th>Long</th>
<th>Short</th>
<th>Unmarked</th>
</tr>
</thead>
<tbody>
<tr>
<td>i:</td>
<td>u:</td>
<td>i</td>
</tr>
<tr>
<td>e:</td>
<td>o:</td>
<td>e</td>
</tr>
<tr>
<td>a:</td>
<td>a</td>
<td>a</td>
</tr>
</tbody>
</table>

Stress

unfading ['] and fading [']

The vowels which carry fading stress do not stay strong and high in pitch, but become weaker and/or lower. The duration of long vowels with fading stress is often shorter than that of the ones with unfading stress. The short vowels which carry fading stress are always found to be followed by a (plain) sonorant, that is always short, while (plain) sonorants which follow a short vowel with unfading stress are lengthened in the ultima. These "lengthened" sonorants are indicated with [·] in this paper, as [wən̩·] ('to sit (PL)').
Notes

1. This is a slightly abridged and revised version of the latter part of my MA thesis presented to Hokkaido University in January 1995. I thank the people of Hartley Bay, especially Mrs. Mildred Wilson, for sharing their knowledge of "Sm'algyax", literally meaning 'real language' and used for the Coast Tsimshian language. I also thank Dr. Jeff Leer for reading my thesis and giving suggestive advices.

Abbreviations used are: 1/3 (first/third person); A (affixation); Ag (agent); C1m/C2m (C1-model/C2-model); CN (connective); I (isomorphic); INSTR (instrumental); PAST (past tense); PL (plural); POSS (possessive); PRES (present tense); R (reduplication); S (suppletive); Sbj (subject); SG (singular); vt (transitive verb).

The phonetic representation follows the IPA in principle, except the following two: ´1 is used for voiceless lateral sonorant; : is used for :. In the phonemic representation, x is used for back velar fricative, because CT has only one velar fricative.

In this paper, the phonetic representation is put into brackets [] and the morphophonemic representation is put into braces {}. The phonemic representation is put into slash marks // in the text but has no marks in the examples.

2. Though not used by itself, this stem is seen in other words as well:
   jiks?óntk 'to wash hands'
   (jiks- 'to wash', -tk medial or semi-reflexive)
   ma?bn 'elbow' (ma- 'like')
   lo:pa?bn 'muscle' (lò:p 'rock', -a- CN)

3. Dunn (1979a:27-31) gives further examples of these.

4. As explained below, this "C", final consonant of the reduplicated syllable of this type, is selected based on a consonant in the singular form (which is C2-model), while the final consonants of the reduplicated syllables in Ri-k (→ 2.1.1.2.), Ri-x (→ 2.1.1.3.) and Ri-t (→ 2.1.1.4.) (i.e., /k/, /x/ and /t/) are selected regardless of any consonant in the singular.

5. The word "stem" here in this paper refers to the part of words stripped of productive affixes.

6. Dunn (1979a:16) describes this process as:
   the first consonant of the principal syllable (the one with primary stress) + a vowel + the first consonant after the vowel are all prefixed directly to the principal syllable.

This description holds true in many cases, but actually it is not always so. There are examples such as below:
In these words, the reduplicated syllables are prefixed not to the "principal" syllables, but to unstressed ones. Therefore, it would be better simply to say that the reduplicated syllable is prefixed to the stem. CT stems are not always monosyllabic but also could be multisyllabic. When the stem is multisyllabic, the stress does not always fall on the first syllable. If the stem is monosyllabic or multisyllabic with its stress on the first syllable, it is true that the reduplicated syllable is prefixed to the stressed syllable and the first consonant of the stressed syllable is copied to C₁. If, though, the stem is multisyllabic with the stress on another syllable than the first one, the reduplicated syllable is not prefixed directly to the stressed syllable, but to the unstressed first syllable, as in the examples above.

7. There is no word in R₁-C which has only one open syllable.
8. The term "stops" is to be taken to include affricates.
9. [a] becomes /i/ after a front velar and becomes /a/ before/after a back velar or a glottal. These rules about [a] are called hereafter "α-variation".
10. /q/ is normally realized as [χ] in word-final position, where the distinction between /q/ and /χ/ is neutralized. Whether a word-final [χ] is considered to be /q/ or /χ/ is known by attaching a suffix beginning with a vowel.
   /liːːcːq/ [liːːtsχ] 'to read'
   /liːːcqɁ pueblo [liːːtsɁu bʊk] 'I am reading a book.'
   (-u 1SG.A, pʊk 'book')
   /wʊːpːx/ [wʊːpːx] 'forehead'
   /wʊːpːxʊ/ [wʊːpːxʊ] 'my forehead' (-u 1SG.POSS)
11. [q] is fricativized to /x/ before a consonant.
12. Though there might be words which have a /w/ instead of /j/ or /w/ before the C₂-model, I have not collected any example so far.
13. There are also found examples as follows:
   hák'ʃ [hák'ʃ]    hakhák'ʃ [hakhák'ʃ]    'to gaff'
   lák'ʃe [laʔk'ʃe]  ləklək'ʃe [ləklək'ʃe2]  'to wrap up, to cover'
   (ləklək'ʃe2/ləklək'ʃwe2)
   ták'ʃin [ták'ʃin]    ḫək'ʃin [tək'ʃin]    'to bend'
These plurals are considered as R₁-k (→ 2.1.1.2.), but it might be also possible to consider them as R₁-C having a "neutralized" C₂.
If this is true, C2-model, which is a front or rounded velar, is changed to a simple velar in C2 position.

14. I observed another form, /ksəkəksunı:sk/ [ksitəksunı:sk], from another speaker. (ks-') is a proclitic meaning ‘fluid/fresh’ (Boas 1911:331). It is possible that the initial /n/ of /nəksunı:sk/ was glottalized originally.

15. See note 9.

16. {tam-} is a proclitic which is "of very indefinite significance" (Boas 1911:330). Dunn (1979:42) describes it as "(locative, stative, tangent, above, perpendicular)."

17. Considering the fact that all examples of R1-x I have observed so far have a long vowel, however, it is also possible that these words originally contained the form */CVx/, instead of /CV:/, e.g.:
   /tə:jxs/ < */təxjxs/  'strong'
   /tə:lmxk/ < */txlmxk/  'to answer'

According to Hindle and Rigsby (1973), the word for 'strong' in Gitksan is "daxgat" (in Gitksan orthography), whose latter part is considered to come from "gat," meaning 'man.' Also in Nass, the word for 'strong' is /txk'at/ (/x/ represents back velar fricative, same as /x/ in CT, but it contrasts with front velar "/x/" in Nass.) The deletion of a velar obstruent and the compensatory lengthening of the preceding vowel is also found in the process of R3.

18. On the analogy of R1-k, this reduplication formula might be {(...-)C1əq-C1m...} underlyingly. (q → x / _ C)

19. [ə] becomes /u/ after a rounded velar stop in an open syllable. See also note 9.

20. [xn] offglide is often inserted after short vowels in open syllables.

21. Its plural is /təltu:ls/ formed by R1-C from */tə:ls/.

22. Though the analysis by -CVC seems to be easier to explain the vowel quality in the reduplicated syllable and the deglottalization as in /s1:sək/, it could be also considered an old type of prefixing reduplication with stress shift. When the stem has more than one consonant initially, they are all copied in the plural. The processes to derive the plurals would be, then, as follows:

   sáq  'sharp'  >  (R) saqsáq > sa:sáq > sá:səq
   xpáq  'to fold'  >  (R) xpaxpáq > xpa:páq > xpá:paq
   láxs  'to bathe'  >  (R) laxlaxs > la:laxs > lá:laxs
   sáj k  'to pull'  >  (R) saksáj k > si:sáj k > si:saj k > sī:sək
   lóq  'rotten'  >  (R) loqlóq > lo:lóq > ló:loq > ló:ləq > ló:ləq

-60-
lόqaksk 'wet' > (R) loqloqaksk > lό:lόqaksk > lό:lόqaksk
> lό:lόqaksk > lό:lόqaksk
hanά:q 'girl, woman' > (R) hanagnά:q > hanά:na:q > hanά:na:q
> hanά:na:q > hanά:na:q
jό:ks 'to wash' > (R) jokjό:ks > jό:jό:ks > jό:jό:ks
> jό:jό:ks

The reduplicated syllable in this type is considered to have a vowel which has the same quality as the stem vowel. The vowel which used to carry the stress is reduced to /a/ after the stress shift. In the fourth example above ('to pull'), /k/ is used as C2-model, because the preceding consonant is a semivowel, which is deglottalized in C2-position, just as in R1-C.

23. Although not all the short vowels have corresponding long vowels, all short vowels which could carry stress (i, a, o, u and ω) have their corresponding long vowels (i:, a:, o:, u: and ω:) and there arises no problem about this in R3-formation. Actually there appear only three long vowels in R3-plurals: /i:/, /a:/ and /o:/.

24. This word forms the plural also with R1, /jikjό:ks/. The difference between these two is not clear.

25. /xpά:paq/, without Al, is also used as plural. These two forms are observed to be used in the same context and the strict difference between them is not clear.

26. The other forms, /lά:lάxs/ and /qalάxs/, are also used as plural.

27. See note 9.

28. The first one (/qamό:s/) means 'thumb(s) of plural people'. Its plural is formed by isomorphics in the meaning of 'both thumbs of one person'. The second example (/qačamύ:/) could mean either 'ear(s) of plural people' or 'both ears of one person'.

29. /qačamktl:/ means 'brother(s)/sister(s) of plural people'. Its plural is formed by reduplication in the meaning of 'brothers/sisters of one person': /təktaamktl:/. The prefixed form of the next example, /qanaktά:/ could mean either 'aunt(s) of plural people' or 'aunts of one person'.

30. Though I used the term "proclitics" after former studies, there are cases where the connection between these and the following words is strong and they are rather like prefixes than proclitics. This problem needs further investigation in the future.

31. Dunn (1979a:23) calls this process "intensives" and states that this element is related to "lu'kwil or lu'wil" (he uses CT orthography. it is /lúk'=ə/ according to my analysis.) meaning 'very', of which I
am doubtful, because the vowels after /1/ are different (/u/ and /a/) and the plurals formed by this process have not been observed to have "intensive" meaning at all in my data. Tarpent (1983:162) reports the existence of the same prefix in Nass which she considers originated from lvk- (this corresponds to lɔk- in CT).

32. This form was observed only once. /l1:mk/ is generally used for the plural of /k'f:mk/.

33. [a] becomes /a/ when preceded by a morpheme boundary (there could be a consonant in between) and followed by a word boundary.

34. While *[kák] does not occur by itself, the suffix [-ksk] is observed in other words as well, such as /lɔqaksk/ (see 2.1.3.). Though I am not sure of its meaning at present, Tarpent (1987:700f.) reports the existence of a corresponding suffix, which she further analyzes into a suffix of undetermined meaning ("but seems to be 'incomplete, recurrent, meant to occur whenever the opportunity arises'"), followed by an antipassive suffix.

35. I have not collected enough data to tell the difference between the one with A2 and the one without it.

36. Booker (1982:15) defines the number suppletion as "the replacement of a verb root with a phonologically unrelated form to agree ergatively with the number of the subject of an intransitive and the object of a transitive verb."

37. This plural form is used only to mean 'to arrive on a boat'. When 'arriving by car, plane or other vehicles', isomorphic /páck/ is used.

38. Booker (1982:19) groups it in 'transitive,' but it is an intransitive verb and cannot be used with an object.

jakʷa já:wxkwu 'I am eating.' (jakʷa PRES, -u 1SG.Sbj)

*jakʷa já:wxkwu yənə:j (yənə:j 'bread')

To mean 'to eat' with an object noun, the proclitic, {x-}, is generally used, which transforms nouns into intransitive verbs.

jakʷa yənə:j'u 'I am eating bread.'

(jakʷa PRES, x- 'to eat', yənə:j 'bread', -u 1SG.Sbj)

jakʷa xhó:n ŋəl 'A bear is eating a fish.'

(jakʷa PRES, x- 'to eat', hó:n 'fish', ŋəl 'bear')

39. The form, {[əpo-]}, is an underlying one and the {[ə]} appears on the surface as /ə/ when followed by a glottal.

40. Also /hakxaliwan/. 

41. This form is used, however, as the plural of /páck/ 'to arrive (on a boat), which is already cited in the preceding section.
42. These two forms are used in the same meaning.
43. It might have something to do with the fact that, according to Leer (p.c.), the word for 'slave' is classified as non-human in Tlingit, the neighboring language of CT.
44. This word is also used in the meaning 'to run' and then it forms its plural with S (/qát/).
45. Tarpent (1983:171-2) reports that this word makes its plural by R3 in Nass (qaq - qá:yaq.x). It might be also possible to consider that the plural is formed by R3 (→ 2.1.3.), where the q is somehow deleted:
\[
qáqáaq > qá:qáq > qá:aq > qá:q
\]

References

Coast Tsimshian Plural Formation

Fumiko Sasama

Summary

In Coast Tsimshian, a language spoken in British Columbia, Canada, and Alaska, the nouns and the verbs form the plurals by means of one/more than one process. There are words which have two plurals formed by two different processes. These plurals could be the same meaning or have different meanings. The processes for plural formation are reduplication, affixation, suppletives, and isomorphics, of which reduplication is the most common way. Reduplication is classified into four major types according to the structure of the reduplicated syllable and the position where it is attached. The commonest and the most productive type reduplicates CVC-. Many borrowings form their plural by means of this process. Other types of reduplication reduplicate CV-, -CVC, and -CV. The affixes used for plural formation are {qa-} and {lød-}, the former of which form "distributive" plurals meaning 'each one his/her own...'. Some words have phonologically unrelated forms for the singular and the plural (suppletives). Most of the words which belong to this type are intransitiv verbs. A number of words have the same form for the singular and the plural (isomorphics). Many of them are nouns referring to natural species. There are a few words whose plurals cannot be explained by any one of these processes.