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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>ṭu:mṭ 'pail'</td>
<td>ṭu:mmṭ 'pails' (ṭu-CV-)</td>
</tr>
<tr>
<td>nahápa ṭu:mṭ 'lid of a pail' (na- POSS, -a CN)</td>
<td></td>
</tr>
<tr>
<td>nahahápá ṭu:mmṭ 'the lids of the pails'</td>
<td></td>
</tr>
<tr>
<td>sǐ:pk 'sick'</td>
<td>səpsí:pk '(plural subjects) sick' (səp-CVC-)</td>
</tr>
<tr>
<td>nan sǐ:pkʷənu 'I was sick.' (na PAST, -n 1SG, -ənu 1SG.Sbj)</td>
<td></td>
</tr>
<tr>
<td>səpsí:pkʷa qəsəsiːt 'Her legs are sore.' (-ə CN, qəsəsiː: 'leg, foot (PL)', -t 3POSS)</td>
<td></td>
</tr>
<tr>
<td>k'1:mmkt 'to wipe'</td>
<td>lɪ:mmkt 'to wipe (plural patients)'</td>
</tr>
<tr>
<td>(lə- an affix to form plurals)</td>
<td></td>
</tr>
<tr>
<td>k'1:mmktʷu halixó:xk 'I wipe the table.' (-u 1SG.Ag, halixó: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>
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</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])

or have different meanings, many of which are nouns for body parts or kinship terms, as in

tamkti: '(woman's) brother, (man's) sister'

<table>
<thead>
<tr>
<th>PL</th>
</tr>
</thead>
</table>
| qamkti: (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 [ə] 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.
   \[ \text{ṭaxřaxsə tū:sa haliṭa: 'The cat is scratching the chair.'} \]
   \( (\text{ṭax- CVC-, } \text{řax 'to scratch', } -a \ CN, \ tū:s 'cat', -a \ CN, \ haliṭa: 'chair') \)
   \[ \text{saksəwənə sawənsək 'I blow a piece of paper repeatedly.'} \]
   \( (\text{sak- CVC-, sawən 'to blow, -u 1SG.Ag, sawənsək 'paper'}) \)

2. emphasis
   \[ \text{səməhəwəhəwu 'What I say is really true.'} \]
   \( (\text{səməhəw 'to tell the truth', haw- CVC-, -ju 1SG.Sbj}) \)

3. word formation (derivation): reduplication is used to form words. In this process, vowels other than [ə] are sometimes used.
   \[ ?aŋʔon (CVC-*ʔonə) 'hand, arm' \]
   \[ kʰəskʷə:s (CVC-*kʰə:š) 'steller's jay, bluejay' \]
   \[ kʰikʰə:ks (CV-*kʰə:ks) 'to float' \]
   \[ məməmό:məq (CV-*mό:q-CVC) 'to smile' \]

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)\(^4\)

This is one of the commonest processes to make plurals. CVC- is reduplicated before the stem.\(^5\)\(^6\)

The reduplication formula is:
\[ {\{(\ldots-)C}_1\text{VC}_{2}C_{1m}(C)\text{VC}_{2m}(\ldots)} \]

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 C₂-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 {a}, which appears as
/i/, /a/, or /ə/ on the surface after the morphophonemic rules are
applied.⁹ Examples are below.

\[
\begin{align*}
\text{k'f:s} & \quad \text{g'f:s} & \quad \text{g'isg'f:s} & \quad \text{"wrong"} \\
\text{jål}k & \quad \text{jijljá}k & \quad \text{jijljélik} & \quad \text{"smooth"} \\
\text{gáks} & \quad \text{gák} & \quad \text{gák} & \quad \text{"wet"} \\
\text{xól}k & \quad \text{xalxól}k & \quad \text{xalxól}k & \quad \text{"crispy"} \\
\text{táx} & \quad \text{táx} & \quad \text{táx} & \quad \text{"to scratch"} \\
\text{qásk} & \quad \text{qásk} & \quad \text{qásk} & \quad \text{"unripe"} \\
\text{tål}j & \quad \text{tål} & \quad \text{tål} & \quad \text{"lazy"} \\
\text{mák} & \quad \text{mák} & \quad \text{mák} & \quad \text{"to catch (on a net)"} \\
\text{sáksk} & \quad \text{sáksk} & \quad \text{sáksk} & \quad \text{"clean"} \\
\text{kánks} & \quad \text{g\"a\nk\"a:ns} & \quad \text{g\"ong\"a:ns} & \quad \text{"cooked/faded"}
\end{align*}
\]

When C₂-model is a back velar stop,⁹ a morphophonemic rule (back
velar fricativization) is applied and the stop is changed to
the corresponding fricative, /x/ (after C₂-deglottalization, if C₂-model is
glottalized).¹¹

\[
\begin{align*}
\text{c\"e} & \quad \text{c\"ax\"e} & \quad \text{c\"ax\"e} & \quad \text{"to lick"} \\
\text{c\"ò} & \quad \text{c\"ac\"ò} & \quad \text{c\"ac\"ò} & \quad \text{"to live"} \\
\text{w\"a} & \quad \text{w\"ax\"a} & \quad \text{w\"ax\"a} & \quad \text{"to dig"} \\
\text{luk's} & \quad \text{lug's} & \quad \text{lug's} & \quad \text{"wrong" (lu- 'really')} \\
\text{k\"n\"i'ôksk} & \quad \text{k\"n\"i'ôksk} & \quad \text{k\"n\"i'ôksk} & \quad \text{"to fall down"} \\
\text{k\"i'st\"i'mi:s} & \quad \text{k\"i'st\"i'mi:s} & \quad \text{k\"i'st\"i'mi:s} & \quad \text{"to copy (writing)"} \\
\text{g\"i'st\"i'mi:s} & \quad \text{g\"i'st\"i'mi:s} & \quad \text{g\"i'st\"i'mi:s} & \quad \text{"away to another place"}
\end{align*}
\]

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

\[
\begin{align*}
\text{kst\"ax\"o} & \quad \text{ksat'axt'ó} & \quad \text{"orange"} & \quad \text{(< t\'o:q 'to suck')(ks\"o- 'fluid')} \\
\text{hamhóm} & \quad \text{hamhóm-} & \quad \text{"ankle"} & \quad \text{(<?)} \\
\text{k\"osk\"á} & \quad \text{g\"osg\"á} & \quad \text{"steller's jay, bluejay"} & \quad \text{(<?)}
\end{align*}
\]
k'isik-walkalk [g'isig-alg'alk] '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 C₂-model.

gāwsk. [gāu·sk] qasgāwsk [gāsgāu·sk] 'narrow'
qāwn [gōw·n] qangāwn [gāngāw·n] 'to chew'

But when the semivowel is the only consonant after the stem-initial vowel, it is used as C₂-model.


Examples using R₁-C for word formation with a semivowel as C₂-model:

qāwqā:w [q'awq'a:w] 'crow' (<q)
hawhāw [hawhāu·] 'lion' (<hāw 'to say')

C₂-deglottalization

When C₂-model is a glottalized consonant, deglottalization occurs and its corresponding plain sound is used as C₂.

kāmāl [k'āmāl] kōmkāmāl [k'ēmk'āmāl] 'to pinch'
wā:q [wāq] waxwā:q [waxwāq] 'to dig'
qō:jōks [qō:jōks] qatqō:jōks 'to arrive'

Examples of R₁-C with C₂-deglottalization used for word formation:

hathōtaxk [hathōtt'axk] 'to boil' (<q)
hathāwōtōsk [hathāwtt'ōsk] 'whistle' (<q)

C₂-deaspiration

There is one example which has a voiceless aspirated stop as its C₂-model.

<table>
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<tr>
<th>SG</th>
<th>PL</th>
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<tbody>
<tr>
<td>[tē:p'ēn]</td>
<td>[tapē:p'ēn]</td>
</tr>
</tbody>
</table>

'light'

Its C₂, i.e., the [p] in the plural is pronounced voiceless and generally unreleased, being followed by a glottal stop (C₁-model), though it could be aspirated in deliberate speech. This C₂ 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, \( C_2 \)-deglootalization, 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.\(^3\)

2.1.1.1. R1-C irregulars

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

\[ \text{naksuni:sk} \quad \text{ñaksuni:sk} \quad \text{'window'} \]
\[ \text{n+ksuni:sk} \quad \text{ñn+kksuni:sk} \]

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

\[ \text{mó:ksk} \quad \text{møksmø:ksk} \quad \text{m+nksmø:ksk} \quad \text{'white'} \]

2.1.1.1.2. R1-C+A

A few plurals are found in which R1-C is used together with A (affixation).

R1-C+A1

\[ \text{čál} \quad \text{qacálčál} \quad \text{cats'ílts'ál} \quad \text{'face'} \]
\[ \text{pán} \quad \text{qapənpán} \quad \text{gobínbán} \quad \text{'belly'} \]

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

R1-C+A2

\[ \text{tasläplá:paq} \quad \text{taspəplá:paq} \quad \text{'talkative'} \]
\[ \text{tasgə:baχ} \quad \text{tasliplə:baχ} \]

2.1.1.2. Reduplication 1-k (R1-k)

In this CVC-reduplication, \( C_2 \) is always /k/. This process might be considered to have spread from R1-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,sk-\} is attached word-initially, wherever the stem lies. There are words in R1-k which have only one open syllable, that are not found in R1-C. When the word has a proclitic, \{C,sk-\} is attached before the proclitic. The reduplication formula is:
The (a) in the reduplicated syllable appears as /i/, /a/, or /ə/ phonemically.\textsuperscript{15}

qajá:k [qajá:k] qakqajá:k [qakqajá:k] 'grey'
\textsuperscript{16}tê:sk [tê:sk] tákê:sk [tákê:sk] 'to promise'
\textsuperscript{17}pó: [pó:] ðək pó: [p+ɪk pó:] 'broken'
\textsuperscript{18}təmqáws [təmqáws] taktəmqáws [taktəmqáws] 'head'

This process, R\textsubscript{1-k}, is the most productive one. Many borrowings belong to this type.
pó:t [bó:t] pək pó:t [b+ɪkbó:t] 'boat'

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 R\textsubscript{1-k}.
huk\textsuperscript{19}á:t [huk\textsuperscript{19}á:t] huk\textsuperscript{20}ak\textsuperscript{19}á:t [huk\textsuperscript{20}ak\textsuperscript{19}á:t] 'fisherman'
(huk- nomen actoris)
cf. t\textsuperscript{21}á:t [t\textsuperscript{21}á:t] tək\textsuperscript{21}á:t [tək\textsuperscript{21}á:t] 'to fish (with a net), net'
\textsuperscript{22}čəms\textsuperscript{23}awæsk čəmsəks\textsuperscript{24}awæsk 'paper bag'
[təms\textsuperscript{23}awæsk] [təmsəks\textsuperscript{24}awæsk] (čəm- 'in')
cf. sɔwæsk səks\textsuperscript{25}awæsk [sɪks\textsuperscript{25}awæsk] 'paper'

2.1.1.3. Reduplication 1-x (R\textsubscript{1-x})

In this CVC-reduplication, C\textsubscript{2} is always /x/. As the case of R\textsubscript{1-k}, this process might be considered to have spread from R\textsubscript{1-C} for words which have a back velar C\textsubscript{2}-model.\textsuperscript{17} There are, however, also words which make use of this process, though not having a back velar C\textsubscript{2}-model. /C\textsubscript{1}ax-/ is reduplicated before the stem. The reduplication formula is:

\(/(...-)C\textsubscript{1}ax-C\textsubscript{1}im.../\)

2.1.1.3.1. R1-x irregulars

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

\[
\text{txó: } \rightarrow \text{taxtxó: }
\]

'to answer'

\[
\text{t'ó: } \rightarrow \text{t'ó: }
\]

'to suck'

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. \{C₁-et-\} is attached to the stem. The reduplication formula is:

\[
\{(\ldots-)C₁et-C₁m\ldots\}
\]

\[
\text{A: } \rightarrow \text{atwa: }
\]

'to find'

\[
\text{lwd:ii } \rightarrow \text{kw'atkw' a?an}
\]

'to lose'

\[
\text{ga17at76 } \rightarrow \text{cal?at26}
\]

'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:

\[
\{(\ldots-)C₁V-C₁m\ldots\}
\]

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

\[
\text{k'át } \rightarrow \text{g'é t}
\]

'person'

\[
\text{sájp } \rightarrow \text{sájp}
\]

'bone'

\[
\text{wá:p } \rightarrow \text{wu:p}
\]

'house'

\[
\text{lo:ks } \rightarrow \text{lo:ks}
\]

'to float'

\[
\text{q'álk' aq } \rightarrow \text{q'álk' aq}
\]

'to speak, to talk'

\[
\text{q'à: } \rightarrow \text{q'à:}
\]

'wound'

\[
\text{k'ú: } \rightarrow \text{k'ú:}
\]

'to shoot'

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

\[
\text{tátó:ls } \rightarrow \text{tátó:ls}
\]

'alive'²¹ (cf?)
memő:mq [mmő:mmx] 'to smile' (<?)
kʷukʷálks [gʷugʷál·ks] 'shiny' (< kʷálk 'to burn, burnt, fire')
tetálpk [dədál·pk] 'soon' (< tálpk 'short')

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 [ə]. In the following two examples are used short vowels which have the same quality as the long stem vowel.

\[
\begin{align*}
ti: & \ [di:] \\
titi: & \ [diːdi:] \\
\gamma:μl & \ [γμ:l] \\
\gammaμ:μl & \ [γμμ:μl] \\
\end{align*}
\]

'/a/' is used in the next two examples.

\[
\begin{align*}
lutό: & \ [luːdό:] \\
lutatό: & \ [luːdandό:] \\
lutήό: & \ [luːθήό:] \\
lutήαtήό: & \ [luːθαθήό:] \\
\end{align*}
\]

2.1.2.2. R2+A

R2 is used together with A1 (affixation 1 → 2.2.1.1.) in the following example.

\[
\begin{align*}
sάjp & \ [sά·p/sέ·p] \\
qasasάjp & \\
\end{align*}
\]

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 C₂-model. C₁-model and C₂-model are the consonants flanking the stem vowel which carries stress. Thus, when the stem vowel is followed by only one consonant, which is C₂-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:

\[
{\ldots}C_{1m}{\hat{C}}_{2m}{C}_1{C}_2{\ldots}\]

C₂-model is a simple or back velar, stop or fricative, plain or glottalized.

\[
\begin{align*}
sάq & \ [sάx] \\
sά:saq & \ [sά:sάx] \\
xpάq & \ [xpόx] \\
xpά:paq & \ [xpά:bax] \\
lάxs & \ [lάxς] \\
lά:iaxs & \ [lά:laxς] \\
\end{align*}
\]

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 C₂-model, as seen in R₁-C formation, and the reduplicated syllable is suffixed to the
stop.
sæk [sárık] sák [sá:sık] ’to pull’
(from {sajk-sëk})

C2-model deletion and compensatory lengthening

After \(-C_1\theta C_2\) 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.

C2-model deletion and compensatory lengthening

<table>
<thead>
<tr>
<th>S2-model deletion and</th>
<th>S2-model deletion and</th>
</tr>
</thead>
<tbody>
<tr>
<td>saq-saq</td>
<td>xpå-paq</td>
</tr>
<tr>
<td>[så:sax]</td>
<td>[xpa:bx]</td>
</tr>
<tr>
<td>[lå:la:sx]</td>
<td>[så:sax]</td>
</tr>
<tr>
<td>[xpa:bx]</td>
<td>[lå:la:sx]</td>
</tr>
</tbody>
</table>

a-deletion

\(\theta\) 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.

<table>
<thead>
<tr>
<th>àq [âq]</th>
<th>làq-x [lâ:la:x]</th>
</tr>
</thead>
<tbody>
<tr>
<td>lâqaksk</td>
<td>’wet’</td>
</tr>
<tr>
<td>[låqaksk/lâqaksk]</td>
<td></td>
</tr>
<tr>
<td>hanâ:q [hanâ:2q]</td>
<td>hanâ:naq [hanâ:2naq]</td>
</tr>
<tr>
<td>’girl, woman’</td>
<td></td>
</tr>
</tbody>
</table>

These processes are illustrated as follows:

\[\theta\] 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.

\(\theta\) 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.

Below are examples where 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:

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>’to wash’</td>
<td></td>
</tr>
<tr>
<td>’to hang’</td>
<td></td>
</tr>
</tbody>
</table>

The question remains why the \(\theta\) 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 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 /hanáːq/ : /haná:nq/ 'girl, woman (SG:PL)'.

<table>
<thead>
<tr>
<th>ŋ̟ːq [ŋ̟ːox]</th>
<th>ŋ̟ːaq [ŋ̟ːox]</th>
<th>'to bite'</th>
</tr>
</thead>
<tbody>
<tr>
<td>sájak [sájik]</td>
<td>s1:sk [s1:st̂k]</td>
<td>'to pull'</td>
</tr>
<tr>
<td>aj&gt;i: alternation</td>
<td>s1:sk</td>
<td>sák-sək</td>
</tr>
<tr>
<td>C₂-model deletion</td>
<td>ŋ̟ːaq</td>
<td>s1:sk</td>
</tr>
<tr>
<td>e-variation</td>
<td>ŋ̟ːaq</td>
<td></td>
</tr>
<tr>
<td>OUTPUT</td>
<td>ŋ̟ːox</td>
<td>s1:st̂k</td>
</tr>
</tbody>
</table>

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

qa-nák-nák-sk

C₂-model deletion and compensatory lengthening

ak>i: alternation

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

mém̟ːm̟ė [m̟ėm̟ːʔm̟̂x] 'to smile' (<?)
In the next example, /a/ is added word-finally.

2.1.3.2. R3+A

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

R3+A1

<table>
<thead>
<tr>
<th>Noun</th>
<th>Plural</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>nákS [nákS]</td>
<td>qañi:näksk</td>
<td>'spouse, married'</td>
</tr>
<tr>
<td>xpa:q [xpa:q]</td>
<td>qaxpä:paq [qaxpä:paq]</td>
<td>'to fold'</td>
</tr>
</tbody>
</table>

These processes are illustrated as follows:

- ak>i: alternation
- C2-model deletion & compensatory lengthening
- e-deletion
- e-variation

OUTPUT: [qaná:nä] [qanî:näksk] [qaxpä:paq] [qalâ:lâ:xS]

R3+A2

<table>
<thead>
<tr>
<th>Noun</th>
<th>Plural</th>
<th>Meaning</th>
</tr>
</thead>
</table>

These processes are illustrated as follows:

- ak>i: alternation
- C2-model deletion and compensatory lengthening
- e-variation

OUTPUT: [ló:k:tí:tok] [ló:k:tá:taxs]

2.1.3.3. R3+S

In the following plural, the plurality is indicated by R3 and S (suppletives). Though */mäxsk/ is already a suppletive plural of */hajtk/, it is not used by itself, but always with R3. There are words, however, containing a proclitic and */hajtk/, 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 -CIV to the stem.

The reduplication formula is:

\{(. )C I-C18(-...}\}

(in this formula, "·" indicates either stress, fading or unfading)

The \{e\} in the reduplicated syllable is changed to /a/ by a morphophonemic rule.27

\[\text{\textquotedblleft to bleed\textquotedblright} \]

\[\text{\textquotedblleft (fish) to swim, (boat) to go\textquotedblright} \]

\[\text{\textquotedblleft to crawl\textquotedblright} \]

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 α-variation.

\[\text{nó: [nó:]} \quad \text{qanó:nak\textquoteright} [\text{qanó:nak}] \quad \text{\textquotesingle mother\textquotesingle} \]

2.1.4.2. R4+A

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

\[\text{nó: [nó:]} \quad \text{qanó:nak\textquoteright} [\text{qanó:nak}] \quad \text{\textquotesingle mother\textquotesingle} \quad \text{(R4+A1)} \]

\[\text{kʰtí: [kʰdí:]} \quad \text{lakʰtí:ta [lakʰdí:da]} \quad \text{\textquotesingle hungry\textquotesingle} \quad \text{(R4+A2)} \]

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

\[\text{jú: [jú:]} \quad \text{lejú:jtä [lejú:jdä]} \quad \text{\textquotesingle to hide\textquotesingle} \quad \text{(R4+A2)} \]

In this example, the same α-deletion rule as seen in R3 occurs, i.e., {e} 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>
</tr>
</thead>
</table>
| mō:s [mō:s] | qamō:s² eight 'thumb'
| čōmū: [ts'ımū:] | qačōmū:² 'ear'
| ţamktī: [t'ımkdī:] | qaţamktī:² 'woman\'s) brother, (man\'s) sister'
| nōktā: [n'ktdā:] | qanōktā:² 'aunt'
| xsō: [xso:] | qaxsō: [gaxsō:] 'canoe'
| pū:kk [bū:kk] | qaṗū:kk [gāṗū:kk] 'to tell a lie'
| čā:w [ts'ā:w] | qačā:w [gats'ā:w] 'guts'

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

<table>
<thead>
<tr>
<th>SG</th>
<th>PL</th>
</tr>
</thead>
</table>
| ksōčā:w [ksōts'ā:w] | ksaqačā:w [ksōqaćats'ā:w] 'to gut (fish)' (ksa-/ksa- 'fluid')
| sačō:q [s̱dzō:χ] | saqačō:q [s̱gadzō:χ] 'to embarrass' (se-/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.²⁰

hak-tāk [hak-dák] qahak-tāk [qahak-dák] '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 /ə/.

\[\text{?asi:} \rightarrow \text{qasasi:} \] 'leg, foot'

In the next example, the /q/ is glottalized.

\[\text{?uksstå:wł} \rightarrow \text{?uksqątą:wł} \] 'to fall overboard'

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

There is another prefix to make plurals, which is {la-}.31 As Boas (1911:380) says, plurals formed by this prefix are preeminently verbal plurals. It is attached stem-initially.

\[\text{på:s} \rightarrow \text{låpå:s} \] 'scared'
\[\text{spåm} \rightarrow \text{låspåm} \] 'to cough'
\[\text{lå:ntk} \rightarrow \text{lålå:ntk} \] 'to growl'
\[\text{hukpå:s} \rightarrow \text{huklåpå:s} \] 'scary'

(huk- nomen actoris)

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.

\[\text{kå:mk} \rightarrow \text{låmk} \] 'hot, warm'

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:

\[\text{kå:ps} \rightarrow \text{låps} \] 'high'
\[\text{kå:f:mk} \rightarrow \text{låf:mk} \] 'to wipe'
\[\text{kå:ks} \rightarrow \text{låks} \] '(plane) to land'

These processes are illustrated as follows:

\[\text{la-ka:ps} \rightarrow \text{la-ka:f:mk} \rightarrow \text{la-ka:ks} \]

velar deletion

\[\text{la:ps} \rightarrow \text{la:mk} \rightarrow \text{la:ks} \]
a-deletion

\[\text{låps} \rightarrow \text{lå:mk} \rightarrow \text{lå:ks} \]

OUTPUT

\[\text{[låps]} \rightarrow \text{[lå:mk]} \rightarrow \text{[lå:ks]} \]

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

\[ k'\text{t}1: [k\text{d}1:] \quad \text{lak'\text{t}1:ta} \ [\text{lak}\text{d}1:da] \quad \text{‘hungry’} \quad (\text{‘l\text{t}1:ta}) \]

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.

\[ k\text{\’á}k [g\text{\’ál}k] \quad \text{lak\’\text{U}:la} \ [\text{lag\’U}:le] \quad \text{‘to burn’} \]

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

ak\text{\textgreater}i:/ aj\text{\textgreater}i:/ w\text{\textgreater}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/ alter with /i/, /i/, and /u/ respectively.

\[ \text{kaksk} \ [gaksk] \quad \text{l1:teksk} \ [\text{l1:d4ksk}] \quad \text{‘to wake up, to be awake’} \]
\[ \text{qa\’jna} \ [g\’a\’jna] \quad \text{l1:na} \ [\text{l1:na}] \quad \text{‘to fall down’} \]
\[ \text{ku\’:nks} \ [g\’u\’:nks] \quad \text{l\’u:nks} \ [\text{l\’u:nks}] \quad \text{‘dry, to dry’} \]

In the first example, it is considered that there occurs an alternation, ak\text{\textgreater}i:. See 2.2.1.3.1. for the illustration of the process to form /l1:teksk/. In the second and the third example, aj\text{\textgreater}i: and w\text{\textgreater}u: alternations occur, which would be illustrated as follows:

\begin{align*}
\text{velar deletion} & \quad \text{l\’o-qa\’jna} \quad \text{l\’o-ku\’:nks} \\
\text{aj\textgreater}i:/w\textgreater u: & \quad \text{l\’a:na} \quad \text{l\’a:u:nks} \\
\text{\textgamma-deletion} & \quad \text{l\’1:na} \quad \text{l\’u:nks} \\
\text{OUTPUT} & \quad [\text{l1:na}] \quad [\text{l\’u:nks}] \\
\end{align*}

2.2.1.2.1. A2 irregulars

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

\[ \text{xst\’\text{q}} \ [\text{xst’\text{q}}] \quad \text{laxst\’\text{q}:jaq} \ [\text{laxst’\text{q}:jaq}] \quad \text{‘to sleep’} \]

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

\[ \text{h\’at\’aks} \ [\text{h\’ad\’iks}] \quad \text{lah\’e:taks} \ [\text{lah\’e:diks}] \quad \text{‘to swim’} \]

2.2.1.3. A+A

After velar deletion and \textgamma-deletion are applied, the existence of \{l\’o-\} becomes blurred and pleonastic \{l\’o-\} is re-added.

\[ k\text{\’f}1: \text{mk} \ [g\text{\’f}: \text{mk}] \quad \text{l1:l1:mk} \ [\text{l1:mk}]^{32} \quad \text{‘to wipe’} \]
k'6:ks [g'6:ks]  l6l6:ks [l6l6: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>l6i:mk</td>
</tr>
<tr>
<td>e-deletion</td>
<td>l1:mk</td>
</tr>
<tr>
<td>1a-</td>
<td>lal1:mk</td>
</tr>
<tr>
<td>OUTPUT</td>
<td>[l1l1:mk]</td>
</tr>
</tbody>
</table>

Though this pleonastic /1a/ could also be considered as the reduplicated syllable of R2, not as {1a-}, 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 {1a-} are preeminently verbal plurals.

2.2.1.3.1. A+{-t6}

There is an affix which is used to make plurals together with one of the affixes, {qa-} or {1a-}. It is {-t6}, which cannot make plurals by itself. It is attached stem-finally. The /a/ of {-t6} is realized as /a/ in many cases by a morphophonemic rule.33

Though this pleonastic /1a/ could also be considered as the reduplicated syllable of R2, not as {1a-}, 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 {1a-} are preeminently verbal plurals.

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 [sái·p/séi·p] qasásájp 'bone'
[gaštsái·p/gaštséi·p]

?ask'á:paq ?aslalá:paq 'talkative'
[?asg'á:bax] [?aslá:plá:bax]

kʷták [kʷdák] lakwl:tak [lakwdi:d+k] '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.36

**intransitive verbs**

<table>
<thead>
<tr>
<th>SG</th>
<th>PL</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>nò:kh [nò:k]</td>
<td>lá:tk [lá:tk]</td>
<td>'to lie (down)'</td>
</tr>
<tr>
<td>tá: [t'á:]</td>
<td>wán [wán-]</td>
<td>'to sit'</td>
</tr>
<tr>
<td>já: [já:]</td>
<td>wá:xs/wá:lxs</td>
<td>'to walk'</td>
</tr>
<tr>
<td>pá: [bá:]</td>
<td>qó: [qó:]</td>
<td>'to run'</td>
</tr>
<tr>
<td>páck [bátsk]</td>
<td>máxsk [máxsk]37</td>
<td>'to arrive'</td>
</tr>
<tr>
<td>či:n [ts'í:n]</td>
<td>lámcaq [lámzdax]</td>
<td>'to enter'</td>
</tr>
<tr>
<td>čú:sk [ts'ú:sk]</td>
<td>sísú:s [sísú:s]</td>
<td>'small'</td>
</tr>
<tr>
<td>wí:háwtk</td>
<td>pó:k [bó:k]</td>
<td>'to cry'</td>
</tr>
<tr>
<td>[wí:hóú·tk]</td>
<td>máx [máx]</td>
<td>'to grow'</td>
</tr>
<tr>
<td>pás [p'ás]</td>
<td>máxs [máx]</td>
<td>'to die, dead'</td>
</tr>
<tr>
<td>cák [dzák]</td>
<td>tū: [dū:]</td>
<td></td>
</tr>
</tbody>
</table>

"to come from"
transitive verbs

cak' [dzak'] tǔːń [dówun] 'to kill'
māq [máx] tāt [t'āt] 'to put'
kā: [gā:] tōq [dōx] 'to take'

The next example is either intransitive or transitive:
skū: [sgū:] tō: [dō:] 'to lie, to lay'

nouns

k'wū:k [sgū:k] kǐkū: [kīgū:] 'child (son or daughter)'

k'uwó:młk kąpatkū:młk 'child (the young)'

[k'ugúwó:młk] [k'ab̪tsgū:młk]

proclitics

k'w- [sgu] kąpa- [k'ab̪] 'small'

ks- [ks] t'aa- [t'aa] 'extreme'

as in

k'w-utū:s [sgū-udū:s] kąpatū:s [k'ab̪tudū:s] 'kitten'
k'wuhā:s [sgū-uhā:s] kąpahā:s [k'ab̪tahā:s] 'puppy'

ksqō:q [ksqō:χ] t'aaqō:q [t'aaqō:χ] 'to go first, to be first'

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.

halinó:k

haliːa:lk [haliːa:lk] 'bed'

[haʔlinó:k] (ha- INSTR, li- 'on', nō:k 'to lie (down)')

halitā: [haʔlit'ā:] haliiwān [haliːwān.] 'chair' (tá: 'to sit')

sopās [sp'ās] sumāx[s [spmāx] 'to grow (vt)'

(sa- 'to make', pās 'to grow')

sapa: [sabā:] saqō[t [səqō] 'to pass away, to get off'

(sa- 'off', pā: 'to run')

txasgū: [ts'asgū:] txatō: [ts'atō:] 'to lay down'

(txa- 'down on', skū: 'to lie, to lay')

mankā: [mangā:] mantōq [mandōx] 'to pick up'

(man- 'upwards', kā: 'to take')

čenscāk [ts'nsdzāk] čensṭū: [ts'nsdū:] 'widow, widower'

(čens- 'away', cāk 'to die, dead')

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.

halitā: [haʔlit'ā:] hakhaliiwān [hakhaʔliwān.] 'chair'

In the next example, S is used together with R2.
lekstá: [lɪkstˈaː] lekswwan [lɪksuˈwən] 'island'

There is also a plural form in which S and R3 are used at the same time. It is /mā:mxsk/, which is a reduplicated form of /māxsk/. Though */māxsk/ is originally a suppletive plural of /hajtk/, it is not used by itself, but always with R3, as /mā:mxsk/. There are words, though, containing a proclitic and /hajtk/ which make their plural either with or without R3.

hājtk [hájˈtk] *māxsk [mōxsk] 'to stand'
ma:mxsk [mɑːmxsk]
qalksahājtk qalksəmāxsk⁴² 'to have diarrhea, (galksah-/galksə-)
[galksaháˈtik] [galsimáxsk] to stand through the
qalksəmːáxsk⁴² [galsiˈmɑːxsk] (galksə-/galksə-
'through')

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.

<table>
<thead>
<tr>
<th>SG/PL</th>
</tr>
</thead>
<tbody>
<tr>
<td>sč:l [stsiˈl] 'beaver' qē:n [q̌eːˈn] 'skunk' kš: [kšː] 'shark'</td>
</tr>
<tr>
<td>lî:ck [liːˈtʃk] 'snow goose' tx̌ːw [tʃ̌ːˈuː] 'halibut'</td>
</tr>
<tr>
<td>qap̌ːq [q̌ap̌ːˈʊ] 'cockle' qanaw [qan̂ːˈuː] 'frog'</td>
</tr>
<tr>
<td>ksfːi [ksfːˈi] 'lizard' sǩːt [sǩːˈt] 'spider'</td>
</tr>
<tr>
<td>ēsǩː [tšːˈsǩː] 'louse' jāns [tʃ̌ːn̂ːˈs] 'leaf'</td>
</tr>
<tr>
<td>w̌ːl [w̌ːl] 'yellow cedar' ləxtɑː: [ləxˈtɑːˈ] 'lake'</td>
</tr>
<tr>
<td>pįja:ls [bįjaːˈls] 'star' m̌ːq [m̌ːˈq] 'pine cone'</td>
</tr>
<tr>
<td>x̌ː [x̌ː] 'slave' q̌w̌ːs [q̌w̌ːˈs] 'newborn baby girl'</td>
</tr>
<tr>
<td>p̌ːn [p̌ːn] 'totem pole' ť̌ːf [tʃ̌ːˈʃ] 'ball'</td>
</tr>
<tr>
<td>q̌ːk [q̌ːk] 'basket' p̌ː [p̌ː]⁴⁴ 'to go on a boat'</td>
</tr>
<tr>
<td>w̌ː [Tw̌ː] 'to invite'</td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>SG</th>
<th>PL</th>
</tr>
</thead>
<tbody>
<tr>
<td>wák² [w̌k²/w̌k]</td>
<td>wák²ha [w̌k²ˈhɑː/w̌k²ˈhɑ] '(man's) brother'</td>
</tr>
<tr>
<td>hōj [hōˈj]</td>
<td>hō:ja [hōˈja] 'to use'</td>
</tr>
</tbody>
</table>
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 "C2-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>labial</th>
<th>alveolar</th>
<th>velar</th>
<th>glottal</th>
</tr>
</thead>
<tbody>
<tr>
<td>stops</td>
<td>p t c k' k kʷ q</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>aspirated</td>
<td>pʰ tʰ cʰ kʰ' kʰ kʰʷ</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>glottalized</td>
<td>ṭ t č k' j k kʷ q</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>fricatives</td>
<td>s ɾ x h</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>sonorants</td>
<td>m n ɾ j w w</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>glott.</td>
<td>ɾ ɾ ɾ j ʷ ʷ</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Vowel inventory

<table>
<thead>
<tr>
<th>long</th>
<th>short</th>
</tr>
</thead>
<tbody>
<tr>
<td>i:</td>
<td>i</td>
</tr>
<tr>
<td>u:</td>
<td>u</td>
</tr>
<tr>
<td>e:</td>
<td>e</td>
</tr>
<tr>
<td>o:</td>
<td>o</td>
</tr>
<tr>
<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 [wán•] ('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 advice.

Abbreviations used are: 1/3 (first/third person); A (affixation); Ag (agent); C_{1m}/C_{2m} (C_{1}-model/C_{2}-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, x, 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:
   jiksʔontk 'to wash hands'
   (jiks- 'to wash', -tk medial or semi-reflexive)
   maʔon 'elbow' (ma- 'like')
   lo:paʔon 'muscle' (lō: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 C_{2}-model), while the final consonants of the reduplicated syllables in R1-k (→ 2.1.1.2.), R1-x (→ 2.1.1.3.) and R1-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. {o} becomes /i/ after a front velar and becomes /a/ before/after a back velar or a glottal. These rules about {o} are called hereafter "ο-variation".
10. /q/ is normally realized as [x] in word-final position, where the distinction between /q/ and /x/ is neutralized. Whether a word-final [x] is considered to be /q/ or /x/ is known by attaching a suffix beginning with a vowel. 
   /liːcq/ [liːtsx] 'to read'
   /liːcqu pük/ [liːtsçw bük] 'I am reading a book.'
   (-u 1SG.A, pük 'book')
   /wɔːpx/ [wɔːpx] 'forehead'
   /wɔːpxu/ [wɔːpxu] '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'it [hák'it] hakhákw'it [hakhák'vit] 'to gaff'
   lák'el [lák'vit] læklák'el 'to wrap up, to cover'
   [laksalkw'el/l+klátwel]
   ṭák'in [ták'wit] ṭæk[kw]i[n] '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, /ksənksunısk/ [ksıŋksunısk], from another speaker. (ksə-) is a proclitic meaning 'fluid/fresh' (Boas 1911:331). It is possible that the initial /n/ of /nksunısk/ 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.:

/tó:jxs/ < */tó:xjxs/ 'strong'
/tí:lmxk/ < */tíxlmxk/ '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 /ta̱xk'át/ (/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 {(...-C1ωq-C1m...)} underlyingly. (q → x / _ C)

19. (a) becomes /u/ after a rounded velar stop in an open syllable. See also note 9.

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

21. Its plural is /táltú:ls/ formed by R1-C from */tu: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 /sí: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) saqṣaq > sa:sàq > sá:saq
xpáq 'to fold' > (R) xpaqxpáq > xpa:páq > xpá:paq
láxs 'to bathe' > (R) laxláxs > la:láxs > lá:láxs
sájx 'to pull' > (R) saxsájx > sì:sájx > sì:sajx > sì:səx
sí:sək
lóq 'rotten' > (R) loqlóq > ló:loq > ló:lóq > ló:laq > ló:1q

-60-
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 R₃-C.

23. Although not all the short vowels have corresponding long vowels, all short vowels which could carry stress (i, a, o, u and w) have their corresponding long vowels (i:, a:, o:, u: and w:) 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, /jikjósks/. The difference between these two is not clear.

25. /xpósak/, 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, /lásaks/ and /qálaks/, are also used as plural.

27. See note 9.

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

29. /qamaktí:/ means 'brother(s)/sister(s) of plural people'. Its plural is formed by reduplication in the meaning of 'brothers/sisters of one person': /takamktí:/i/. The prefixed form of the next example, /qanaktá:/ 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 /lúkwil/ according to my analysis.) meaning 'very', of which I
am doubtful, because the vowels after /l/ 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 1Vk- (this corresponds to 1ak- in CT).

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

33. [ə] 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 /lóqaksk/ (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.

\[ \text{jakwá já:wxkw } 'I \text{ am eating.}' \quad (\text{jakwá PRES, } -u \text{ 1SG.Sbj}) \]

\[ *\text{jakwá já:wxkw } \text{yaná:j} \quad (\text{yaná:j 'bread'}) \]

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

\[ \text{jakwá xyaná:ju} \quad 'I \text{ am eating bread.}' \]

\[ (\text{jakwá PRES, } x- 'to \text{ eat}', \text{yaná:j 'bread'}, -u \text{ 1SG.Sbj}) \]

\[ \text{jakwá xhó:n } \text{yol} \quad 'A bear is eating a fish.' \]

\[ (\text{jakwá PRES, } x- 'to \text{ eat}', \text{hó:n 'fish'}, \text{yol 'bear'}) \]

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

40. Also /hakhaliwán/.

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 (/qɑː/).
45. Tarpent (1983:171-2) reports that this word makes its plural by R3 in Nass (qɑq - qɑː:x). It might be also possible to consider that the plural is formed by R3 (→ 2.1.3.), where the q is somehow deleted:

qɑqɑq > qɑːq > qɑːːq > qɑːq

References


（聲聞 史子、博士後期課程）
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 {lod-}, the former of which form "distributive" plurals meaning 'each one his/her own\ldots.' 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.