THE ALVEOPALATAL SHIFT IN COWLITZ SALISH

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1. It has long been the practice to divide Salishan languages into k-languages and č-languages, i.e., those with unlabialized front velar consonants and those which have changed these to alveopalatals. At issue are a plain and a glottalized voiceless stop or affricate and a voiceless fricative: k k x and č č ŝ. For convenience these will be referred to as the "k-series" and the "č-series". This sort of typological classification of Salish has been made by Boas, Voegelin, Swadesh and others.¹ But it is rather irrelevant genetically, since the č-languages are located at both geographical ends of the family separated by most of the k-languages, and any relevant connection between the two sets of č-languages is highly unlikely. Coeur d'Alene and Spokane-Kalispel-Flathead are the easternmost Interior Salishan languages, and are the only č-languages of that subgroup. Tillamook and all but one Coast Salishan language (not including Bella Coola, which is a subgroup by itself, and is a k-language) are č-languages. The one exception is Lower Cowlitz, the southernmost Coast Salishan language.²

But Cowlitz is not that simple. It has both the
k-series and the č-series, both historically related to those in all the other languages. Both series are phonemic, and are even sometimes in morphophonemic alternation. In a sense, here is a case of a sound-shift caught in transit. It must be pointed out that most Coast Salishan languages do have a few morphemes containing phonemes from the k-series (and Mainland Halkomelem regularly retains x, palatalized), whether as recent changes, residue, borrowing, sound-symbolism, or whatever; but these are seldom frequent (for example, Ch has apparently residual kóy grandmother, borrowed čikčik wagon, and a few others). In Cz, both series are frequent. Of a rough count of just over 380 morphemes with a phoneme from one or the other series, roughly one third are in the č-series:

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<td>čk</td>
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<td>82</td>
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<td>čx</td>
<td>25</td>
<td>59</td>
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These figures are approximate and minimal, but the relationships between them can be considered constant. Furthermore, some very common inflectional affixes (e.g., one reflexive, the benefactive, one variant of the collective, and some of the most common lexical suffixes) contain phonemes of the č-series, and these may occur no more frequently than affixes containing k-series phonemes (such as the other reflexive, another variant of the collective, or the independent personal pronominal particles). One gets no impression that either series is uncommon, as is the case with the k-series in other Coast Salishan languages.

1.1. Members of the k-series and the č-series occur in contrasting environments in Cz (e.g., čayšš greaze, fat,
kayx sour, bitter; xæx bad, xæx house; mxch head-louse, mxkæn horns), and so must be considered phonemically distinct. And, as noted above, morphophonemic alternations between the two series may occur. Some of these (e.g., tìnx muscle, sinew, tìniqi his muscle, sinew; sylaxtk brother-in-law, sylaxtači his brother-in-law; -anq side, belly, -nači his side, belly) are predictable in terms of morpheme co-occurrence, but others are not (e.g., mxch head-louse, mxkači his louse; šix cold, qisāšeltawah lip a fan; čîks- five (objects), čîlačx five), and there are also instances where the alternations do not occur where they would be expected by analogy with the first set given (e.g., xæx house, xæxí his house; kælx reed mat, kælxi his mat; čîpqx beard, txaqʷstpqx̌əm shave).

2. These alternations lead one to expect regular relationships between the two series. And there are several clear causes for the shift of some of the č-series, but I can account historically for only a little more than half (59 percent) of all the morphemes with č-series phonemes. These fall into three groups: (a) There are 15 or so cases of known borrowing from Chinook Jargon, French, English, or Sahaptin. These are (from Chinook Jargon) šūšukli God, Jesus, angel, šò·kʷəmən sugar bowl, kʷuʃū pig, pîspiš cat, lapišmu saddle-blanket, lašimni chimney, lapyo's hoe, (from French) ?ašel personal name, (from English) čáyini Chinese, wáč clock, watch, šípiči? mutton, məšín automobile, and (from Sahaptin) qašqáš strawberry roan. (There are also a few borrowings with k: from Chinook Jargon are kíkʷəlikʷut skirt, lisiš sack, bag, pocket, wəmšmuski cow, číkkik wagon, kapù coat, likʷo'k rooster; from English are kás train, skáw ferry, qisástaken yarn for making socks, and probably wáks go, walk; and from
Sahaptin sawîtk wild carrot and yâkîma Yakima, Sahaptin.) Some of these borrowings have been further derived by Cz affixes. It is also probable that a number of the unexplained forms are also borrowings (for example, ?âyayâš clumsy, stupid, likây spotted horse, and čînûkʷšitôm owl, ogre are probably borrowed forms), predominantly from the only Salishan neighbor of the Cz, the Upper Chehalis. But because of the close similarity between these two languages, identification of such borrowings is virtually impossible. (b) There are at least a dozen instances of shifts from alveolars c č s to alveopalatals: čayâš fat, grease (Ch scâyâš), šâ?š liver (Ch sâ?š), čûšakâ always (Ch čûsača), čâmûyâ? snail (Chinook čemô·ikxan). Most of these are intramorphemic assimilations to alveopalatals which are derived from front velars, but the reason why these front velars shifted in the first place is unclear. A late rule can account for this assimilation; it must follow the k to č rules (1 and 2, below): Rule 3. c č s > č ĉ s in a morpheme with č č s or y (or, if you prefer, ĉ ĉ s). I will return to the relationship between alveolars and the k- and č-series shortly. (c) Most explainable occurrences of č-series phonemes are conditioned sound-shifts of two types. The largest group of these occurs before a high front vowel: Rule 1. k k x > č ĉ s before i (or are so few cases of a k-series phoneme before i that this must be considered a regular shift. Examples are čîlîk widow, čê·taq- argue, tûlŝîls- hint. Unlike other similar matters in Cz, this shift even applies across certain
morpheme boundaries, i.e., before the third person possessive suffix -i or before a lexical suffix beginning with i, and possibly in a few other places. The minor pattern consists of nine occurrences of č-series phonemes which appear to be instances of a regular dissimilation of a k-series phone and a following back velar within the same morpheme: Rule 2. k k x > č č x before a back consonant in the same morpheme (or

\[
\begin{align*}
\text{-Sonorant} & \rightarrow \text{-Back} \\
\text{+High} & \quad \overline{\text{+Consonantal}} \\
\text{+Back} & \quad \text{-High} \\
\text{-Round} & \quad \text{+Back}
\end{align*}
\]

Examples of this are sčeqwén hip joint, čččččččččč suggest, kwawq pop. The intramorphemic environment is an important restriction; there are eight instances of a k-series phoneme occurring before a back velar, but in all these cases the latter is in a different morpheme, e.g., ĭśk-iq fall over, kōm-asyq fall out, tip over, kāw-yaqwumx settle down (to live), kāt-čiqwimitéń stirrups, čśk-iyq ant, tks-śiq upper-class person, ĭśk-stq take in, ĭńń-śq startle. There is one exception: sʔāxaqwen it is snowing. Dissimilation may be an unusual source of regular sound change, and these Cz instances are few in number; it does appear to be a consistent characteristic, however, that a k-series phoneme may not precede a back velar within a morpheme.

But how does one account for all the other occurrences of č-series phonemes? Or, if this was a general shift, then how does one account for all the unshifted k-series phonemes, which, after all, outnumber those of the č-series by more than two to one? I cannot answer these questions, but simply give here several examples from both series, and offer a few speculations which might eventually explain
a few more forms. (a) c-series: ṭuyukʷ- bend, wetáł
bracken roots, čá'kt waist, tāčənmann attached to, šáw? bone, ḫiši have a cold, ščsnó? money. (b) k-series:
ḵayāxʷ sour, lós full, kási? star, sxʷāyks rabbit, xəmímíx
mourning dove.

2.1. Noted above was the shift of alveolars c č s
to corresponding alveopalatals in assimilation to alveo-
alpalatals previously derived from the k-series (Rule 3).
This appears to be the result of an antipathy in Cz between
alveolars and alveopalatals; I know of only one morpheme
in which both occur: mésčəm muskrat. But the intramor-
phemic occurrence of these alveolars and a k-series pho-
neme is quite common: kásc- hide, čók- all gone, čół-
enter, ride, čůk-čawǒk- cut, xącxc- trot, čąpξ creek.
It may be that an alveolar-alveopalatal antipathy has
served to block the shift of the k-series to the c-series.
This could be described as a sound-shift blocked by dis-
simulation of the two series. Furthermore, this could
serve to explain four instances of a k-series phoneme
before a front vowel (whether or not this front vowel is
in the same morpheme): ke'č little, sók-i its splitting,
s-ciki-t-n he's crumpling it, čsk-iyq ant. This is not
a new notion, but certainly an obscure one. Posner calls
this phenomenon "conservative dissimilation", but does
not discuss it. I have found it discussed in only two
places: Grammont, who calls it "la dissimilation préven-
tive", and in Hashimoto in a discussion of Ancient Chinese. 6
If this is a valid concept for Cz, Rule 1 will have to be
modified as follows: Rule 1a. k k x > č č ś before i
except when c č ś occurs in the same morpheme. However,
an explanation is still required of how a few forms managed
to get by this dissimilation restriction (see Section 2(b)),
resulting in the ensuing assimilation of the alveolars. This restriction is purely intramorphemic: the absolutive (or nominalizer) s- prefix, the stative aspect ?ac- prefix, and various suffixes with alveolars co-occur freely with roots containing alveopalatals, and suffixes with alveopalatals co-occur freely with roots containing alveolars. But note that the simple form of the word for five, čilačš, is treated as a single morpheme in this respect, even though it can be analyzed into two morphemes, although this division may be pre-Cz (see Section 2.2).

Note the parallels between the two dissimilatory phenomena, the shift of k-series to č-series phones before back velars and the non-shift of the k-series in the presence of the alveolar series (c ć s). Both are intramorphemic, as contrasted with the shift before front vowels. And both involve the dissimilation of articulatorily adjacent consonant series. Given c č k q, c and k may co-occur, and č and q may co-occur, but c and č or k and q may not. This double dissimilation is not directly reflected in the rules. But č and k may co-occur: měxčen head-lice, čákt waist, káyčči sleepy, čílk widow. No morphemes have been found containing back velars and alveolars together with either front velars or alveopalatals (i.e., q-k-c or q-č-c). Thus so far nothing indicates that ordering is necessary between the two dissimilatory phenomena.

Because all instances of č-series phonemes (except in borrowings) are ultimately derived either from the c-series (by assimilation) or from the k-series (by regular sound-shifts, even though all the circumstances cannot yet be accounted for--comparative evidence indicates that this regularity must be so), it is reasonable to assume that
č and k were at one time only allophones of a single phoneme. They became distinctive when borrowings and assimilations of c brought them into contrast. Thus the obstruent series given above was earlier /c [č k] q/.

The problem is to determine all the environments in which the č allophone occurred.

2.2. The word for five leads to another speculation which complicates the whole problem considerably. Comparative evidence suggests a probable reconstruction of PS *cil-akis five. This *ki sequence accounts easily for Cz čílačš (by Rule 1 with subsequent application of Rule 3) and could also suggest that many other instances of the č-series phonemes derive from forms that formerly had an i following them, now lost. But there is no evidence for this in most cases. Besides the example just discussed (five), I know only of pānačš ten from PS *pan-akis, čwāćwšcpqsom shave from čıpqs beard, -š/-ši- benefactive, and -č/-či reflexive. Further difficulty is added by the forms with morphophonemic alternations between the two series (see Section 1.1). For example, although Cz čílačš is explainable by PS *cil-akis, Cz cilks- (which occurs with various suffixes, e.g., cilksitumx fifty, cilksiqw five days, cilksiušen five times) is not. One possible explanation would be a PS alternation of forms with and without the *i in the suffix, and there is some evidence that this was the case in five. But such evidence is lacking as yet for the other pairs (except insofar as these Cz forms provide the evidence, but that is circular), and the problem must be left for now at the speculative stage.

2.3. Another environment which may condition the shift to alveopalatals is a following u. This would
generalize the earlier rule (1) that k before a high front vowel becomes č to Rule 1b. k k x > č č s before a high vowel except when c č s occurs in the same morpheme. But the evidence for this is extremely slight, perhaps unexpectedly so; I have only three morphemes that qualify: čuš- in čušaka always and čo·šom always (the š is an assimilated s by Rule 3; cf. Ch čús always), čuyuk'w- bend, and šuš- stick, get stuck. PS *k was presumably not common before *u; even so, there is at least one counterexample to the formulation just made: k'uípa? grandfather (cf. Ch čúpa?). There seems to be no contrast in Cz between k and k'w before u--only k'w occurs. But PS did have such a contrast, or sequences of ču could not arise, and some Interior Salishan languages still make this contrast. The history of forms with *ku is rather irregular, some languages generally converting these to k'w, others converting only some. Perhaps Cz converted only a few, grandfather among them. This form is reconstructable as PS *kúpa?; the initial sequence becomes k'w in Sliammon k'wúk'pa, Bella Coola k'wük'pi, Lillooet and Thompson k'wúk'pi? (where it means boss), as well as Cz, and it becomes ču in Ch and Quinault čúpa?. Another reflex of PS *ku turns up in Cz káši? star, with an unexpected ā as first vowel; the PS form is reconstructable as something like *kusimt (cf. Sliammon and Nooksack k'úsən, Lummi k'ósən, Halkomelem k'ósən, Thompson nk'ək'úsən, Kalispel tk'k'úsəm, etc., but Puget čúsəd). A pre-Olympic change of *u to *a would be necessary to account for this form if Rule 1b is applicable, and such a rule would have to precede Rule 1b. Other instances of Cz {ku} (phonemically /k'w/) derive from the merging of o and a following w to u, and would not be affected by Rule 1b, which would be ordered before
this merger: Rule 4. əw > u. Examples of this are 

xwúi road (with automatic rounding of the x; cf. xawáli his road), k'wúi wife (cf. kawálaní his wife), sxwú?úmiten he is crying (compare with these the Ch cognates šówi, čówi, šó?úmiten).

3. Several other speculations to account for the shift of k k x to č š are suggestive, but do not hold up because of the counterexamples. I have suggested that following i, u, or a back consonant conditioned the shift. It seems reasonable to expect that one of these same sounds preceding a k-series phone might have a similar effect. But there are only seven occurrences of i (or y) before č or š (a suffix -ič, perhaps reflexive, on yelvic go clear around and talič- help, the lexical suffix -ičen back, bag, basket, a probable suffix -iš on počuš down to the river and čanumíš awkward, ?iši clumsy, kwaš part in hair, iši- have a cold, and qisišetawai a fan). But contrary to these are eleven instances of a k-series phoneme following i, one of them the usual form of cold, iš, occurring as the root in fan (above; this word cannot, incidentally, be a borrowing; the affixes are typical only of Cz). Five of these may retain k by preventive dissimilation from a c-series phoneme: ciks bee, cik- rub, qiscítikaném mountain pass, čikus- frown, and sikelsayu? snake. In two other cases, an x may derive from PS *x or *w: šix cold and ?ix go after. Similarly, the k of bee and rub may derive from *q (see Section 4). But this still leaves four forms, not many less than the examples of i before č: sxwáys rabbit, tikáʔka? revolver, xikelsen peel, and nix this.

A preceding u or w is even rarer than a following one and tells us nothing. The only instance before a č-series
phoneme is *ušamən- sorry, and the only intramorphemic instance before a k-series phoneme is sqiyux prop. Two more instances occur, one of which is across a morpheme boundary, but, as has been shown, the conditioning factors for this sound shift are usually intramorphemic: ıw-x he took it off (furthermore, this x is derived from *xʷ; cf. Ch ıw-xʷ). The other instance arises from a stress shift, vowel deletion, and application of Rule 4: čuk- from čawək- cut (which has an underlying form *cəwək-).

A č-series phoneme has been found following a back consonant in only three forms, and two of these are probably across morpheme boundaries, although I cannot analyze the forms: qāičem beaver, xaičən roots, and (s)qasīšən driftwood. On the other hand, there are seven morphemes with k or x following a back consonant: sxʷayks rabbit (Ch sxʷaycs), qélk- crawl (Ch q'il(a)č-), xax house (Ch xəš), qənx mouth (Ch qənš; but this x derives from PS *xʷ), sqwəmx sweathouse, sqaxapən he is telling a lie (probably an error for x; cf. Lower Chehalis qəχəp), and sqiyux prop. So none of these three possible explanations is substantiated.

A little more profitable, but less convincing, speculation stems from the fact that a non-pronominal word-final nasal has been found preceded frequently by č-series phonemes, but only once or twice convincingly by k-series phonemes. But this seems intuitively to be an unlikely environment; furthermore, most of these final nasals constitute a separate morpheme, violating the general pattern of the palatal shifts being intramorphemic (the notable exception being before i). And whenever anything else is added to the form, this pattern collapses, and members of the č-series or the k-series occur freely. Only two things
argue in favor of this being a condition for the sound-shift, and neither is very convincing. One is simply that the pattern exists. The other is that nasals are known to develop to front vowels in a few Salishan languages (e.g., in Spokane, post-consonantal n before s- absolutive becomes i, as in čn I; or the suffix sequence -nūn-t-s becomes [-nüys]; a development of n to i is also reported to be a probable occurrence in Tillamook). Since this is so, there may be a special relationship between nasals and front vowels that would allow both to cause a shift of k to č. The following are all the instances of this which I have recorded: qāičəm beaver, bələčəm inside-out, měscəm muskrat, swaqéčəm frog, móxčəm head-lice, xalíičəm roots, xáynəčəm backwards, yáx'načəm wiggle, -ičəm back, bag, basket, stō'lšən fruit, berries, taxwálšən blend work in a basket, pə?tmışəm down to the river, iə?k'ixəsəm clear around, k'upáməpšən palm, (s)xasíšən driftwood, ?acyásaŋ a pack, -šən foot, leg, -šən times. The only certain form with k is cútšən maybe. Another may be kən I, but this is a pronominal, and I excluded pronominals above; however, all the other examples before pronominal suffixes are third person, either the continuative aspect subject or the completive aspect object: tākiłəken it is aching, ?it yalšəken he twisted it, ?it ləšəken he filled it, ?it pəlšəken he turned it over, ?it cawšəken he cut it off, ?it cɪkən he rubbed it. I have recorded four other instances with a k-series phoneme, but there are reasons to doubt their accuracy: səxšən scratched on the back and sqiwxən track both involve the lexical suffixes back and foot that normally occur in this position (and without a following third person possessive -i) as -ičən and -šən,
respectively (sqíwxən may be a back formation from sqíwxanən he is smelling a track, from qiw- smell). qʷalítkən skin probably also involves the suffix for back, but otherwise I cannot analyze the form, and it looks improbable. səkwəm swim has an unexpected stress pattern; I would expect *səkwəm, and the stressed vowel would exempt the form from this hypothesized rule (the ə that occurs in the other forms is epenthetic, and is added by a very low-level rule, not relevant here).

4. My final speculation involves the origin of the Cz k-series. Several instances of Cz x derive from PS *xʷ, e.g., təmx earth, land (cf. Thompson təmixʷ), qənx mouth (cf. Skagit qədxʷ), -x completive third person object (cf. Ch -xʷ). The only analogous evidence that some instances of Cz k or Ɂ derive from *kʷ or *kʷ is nks- always (cf. Ch nkʷ-s-), but the possibility remains open that some other forms can be explained with this type of origin. There is also fragmentary evidence that a few instances of Cz k k x may derive from PS back velars, e.g., čiks bee (cf. Squamish cɨq- stab), cɨk- rub (cf. Thompson cɨq-pat, tame), Ɂiš- have a cold (cf. Thompson Ɂəxi cold, Tillamook ɉəʔəi cold), Ɂix cold (cf. Skagit Ɂəx, Nooksack ɉəyə), sxʷʔúmitən cry (cf. Ch ɉəʔúm-, Skagit ɉəˈb, Halkomelem ɉəˈm, Squamish ɉəh-m), sək- split (cf. Columbian səq- split, but both Thompson səq- and sək- crack; sound symbolism may be involved in this q/Ɂ pair). It may be that k-series phonemes derived from these two sources developed too late to undergo the further shift to the Ɂ-series; I know of no certain instances of PS *xʷ ending up as Cz Ɂ (but it does develop to Ɂ in Ch), and Ɂiš- have a cold is the only possible instance of Cz Ɂ from PS *x that I can cite. However, even if these sources
could account for retentions of some of the k-series phonemes, they do not explain the problematic shifts to č-series phonemes, because there are numerous instances of k-series phonemes which clearly derive from PS *k *k *x (e.g., kālx hand). But a profitable line of investigation would be to determine the PS origin of all instances of k-series and č-series phonemes. If the č-series derive only from the PS k-series, then it might shed light on the problem to eliminate all instances of Cz k k x derived from other PS series from further consideration, and look for patterns among those derived from *k *k *x, assuming that only this set was susceptible to the shift to č č ș in Cz. Unfortunately such a procedure is not possible. I have compared Cz forms with extensive vocabularies available to me in Columbian (from my own field notes) and in Squamish (from Kuipers' The Squamish Language), but find no cognates for a large number of forms.

5. In spite of the difficulties in explaining the Cz palatal shift, the data may be instructive to general historical linguistic theory. The notion that sound change is a gradual process seems to be in general disfavor among linguists today. But one must distinguish at least three types of gradual change: (1) a gradual shift in the point or manner of articulation; (2) a gradual shift through the vocabulary; and (3) a gradual shift among the speakers. This third type cannot be considered here because the only two remaining speakers were sisters (who were, besides, less than fluent in the language). Their sole use of the language was with their mother, who died in 1963 at age 105, and they should be considered continuations of her idiolect. In any case, since there are no other speakers, there is no way to check variations
within the language.

Most attention has been given to the first-mentioned type of sound change—a gradual shift in articulation. Although such a gradual shift is possible for some kinds of phonetic change, it is impossible for others, and has frequently been shown not to be the case at all. It seems to me that the existing morphophonemic alternations make it unlikely that there was a gradual shift in articulation in Cz. A complete rejection of this type of change can be found in a review by Halle and Keyser. They prefer, rather, that sound change be a "discrete phenomenon" which is the result of "adding, subtracting, or modifying one rule" in the grammar, but say that such a change diffuses gradually through a language community. Granting that the change is abrupt within an idiolect, and diffuses through the language community, I do not see how the Cz shift can be described in terms of "adding, subtracting, or modifying one rule" or many rules. Unless all instances of the shift can be explained, rules will not work. The remaining option is that sound change may be lexically gradual. Wang suggests this possibility in Competing changes as a cause of residue, but his explanation that one change may be blocked by another competing for the same part of the lexicon does not seem to apply to Cz. Instead, Cz may have one change blocked by another competing for the same part of the phonology—i.e., *q *q *ı and *k* *k* *x* changing to Cz k k x and overlapping the shift of that series to c c s in progress; the assimilation of c c s to c c s would overlap and compete from the opposite direction. Unless and until explanations can be found to account for the many still unexplained instances of the Cz -series, a gradual spread of the sound change through the vocabulary is the only solution I can offer.
FOOTNOTES


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2. Boas and Haeberlin did classify Cowlitz as a k-language, but recognized that it was not exclusively so: "Cowl has usually, and UCh 2 very often k and x where the
tc dialects have tc and c" (read k, x, č, č, š, respectively). Since there remain only two speakers of Cowlitz and three or four of Upper Chehalis, it is no longer possible to verify Boas' Upper Chehalis 2 dialect—no trace of it remains.

3. The phonemes of Cowlitz are p p t t c č č k k k' k' q q q' q' s s x x x x h m n 1 1 y y w w;
i u a ø; vowel length, and at least two degrees of stress. Vowel length lowers i to [æ'] (written here e'), and u to [ø'] (written here ø'). The morphological process realized as length with i, u, and a converts ø to [æ] (short; written here e). ū before ū is realized as [œ?] (written here ŏ?). To the extent that the symbols e and ø are used, and epenthetic ø is written, the transcriptions are not entirely phonemic. Note that e· is like i in its effect on consonants, but e (short) is not. The following abbreviations will be used: Cz Cowlitz, Ch Upper Chehalis, PS Proto-Salishan. Ch forms cited here will use the same notational conventions I have adopted here for Cz (i.e., i e· u ø· a a· ø e o) rather than that of my earlier writings on Ch (which were, respectively e e· o o· a a· ø ø· o).

4. Distinctive feature terminology is from Noam Chomsky and Morris Halle, Sound Pattern of English (New York, 1968); it is as good—or bad—as any system, and is generally known. This notation is added here for the benefit of those who find it informative. It is used in conformity with Chapter 9 of Sound Patterns.

5. Knud Togeby, in Qu'est que la dissimilation? (Romance Philology 17.642-667 (1964)) rejects dissimilation
as a type of regular sound change, relegating it to an infrequent, sporadic occurrence. He seeks explanations for apparent dissimilations cited by Rebecca R. Posner in her Consonantal Dissimilation in the Romance Languages (Oxford, 1961).

6. Maurice Grammont, Traité de phonétique, 8th ed. (Paris, 1965), p. 329. Grammont cites several examples, one of which is very much like the Cz problem: "en 'Iraq un k, qui sans cela serait devenu ź, reste k devant č (c'est évidemment à la 1re phase, que l'évolution a été arrêtée): ačil "repas", mais akilčen "votre repas"."

Mantaro J. Hashimoto, Internal evidence for Ancient Chinese palatal endings, Lg 46.336-365 (1970). Hashimoto suggests that the presence of palatal consonant endings in Ancient Chinese prevented, through dissimilation, an otherwise regular palatalization of velar and glottal initials, thus leading to the creation of some troublesome doublets in Mandarin and other Northern Chinese dialects.

7. The loss of vowels is regular in Cz. Briefly, and somewhat simplified, a final XVC sequence (where X is any consonant or consonants) is reduced to XC; unstressed vowels are deleted before any CCV sequence (čílačš is an unexplained exception, but cílks- is regular; the second vowel of čílačš may be explained by secondary stress, but the role of secondary stress in Salish is not yet fully understood).

9. Laurence C. Thompson, personal communication.


12. Ibid., p. 779.

APPENDIX

Additional examples are given here. Abbreviations not used in the text are: Cm Columbian, Ka Kalispel, Lo Lower Chehalis, Pg Puget Salish, Qn Quinault, Se Sechelt, Sq Squamish.

1. Additional predictable morphophonemic alternations:
   sṭək jacket, sṭəči his jacket;ʔacwánx doctor, swaṇəši his doctor; -mx people, -m(i)ši his people; -mx plural X, -m(i)ši his plural X.

2. Additional unpredictable morphophonemic alternations:
   ʔołk- , ʔalək-ən turn over, ʔələʔəm inside-out; pänksten, pänəčh ten; sṭəḷəʔən fruit, sṭəḷəxani her fruit;ʔacyáxanii carry on the back, ʔacyášən a pack; -iən back, bag, basket, -kəni his back, bag, basket; -xən- or -xən- foot, leg, -xən foot, leg and -šini his foot, leg.

3. Additional unexpected morphophonemic alternations:
   ṣək- split, ṣəki its splitting; sawiťk wild carrot, sawiťaki her carrot; liṣək sack, liṣəki his sack; cîkčik wagon, cîkčiki his wagon; čułk-, čawə̂k- cut, scaẉəki its cutting.
   Note that three of these are borrowings.

4. Shifts from alveolars to alveopalatals:
   čilačh five (Ch čilačs, Lo čıłəč, Qn čilaks, Sq čiačis, Cm čîkst; PS *cil-akis); pänəčš ten (Ch pänəčs, Lo pänəčč, Qn pänaks; PS *pan-akis); č̄oṣ bad (Ch č̄oṣ, Lo č̄oṣ); č̄o-šəm always (Ch č̄uṣ); šyā·q'ī hat. If correct, two others may belong here: číx'ip- iron, press (Ch číxiaʔpi̍mi̍ [sic]); či̍xi- fry (Ch či̍x̣i̍ , Cm či̍x̣; but Pg či̍x(i)).
5. k'x to ֳ€ ֳŠ ֳ³ ֳš before i:
čín-ini- poison (Cm n-kaًh-ćín-); číql'u? tears coming out of the eyes; číw chickadee; ýálx'čí his brother-in-law (cf. syálx'tk; Ch syáx'tč); stőči his jacket (from stők); sxìynači his crab (cf. sxìyəŋk crab, crawfish); stači? island (Ch stačé·?); nəxánči small chipmunk; súpsənči its tail (Ch súpsnč, Lo súpsnč); k'wəntāčic shake hands (Ch sk'wəntačinč); -nači lower part, side, belly (cf. -ənk; Ch -n(a)č); -či reflexive; sčin(?) silver salmon; čínx' pillow (Cm ka'ʔqin pillow, kə'n- up against ?); čípt red elderberry; čípq̌s beard (Ch čepucq̌s, Lo (s)čepucq̌s); čeq̌q- squeak, whine; číls messed-up hair (Ch čísłs); máčiə? flea (Ch máčin?); tiniši his muscles (cf. tínx; Ch tínš, Cm tínx); šq̌'aši her baskets (filled) (Ch šq̌'aš picked berries); swaňsi his doctor (cf. ?acwánx; Ch ?acwánš); ?aítaníši his arteries; -m(i)ši his people (cf. -mx); -umíši his plural -x (cf. -mx; his plural people is -mix'umíši); -ši- benefactive (Ch -ši-, Cm -x(i)-). Exceptions to Rule 1 are: čúkiq fall over (cf. čúkayq; Ch čúčiyq hit with missile); xı'y̌nk- walk backwards and sxìyəŋk crab, crawfish (cf. xáýnačəm or xáýnačəm backwards); xáxi his house (cf. xáx, -modx; Ch xá, Lo xáš); kaláxi his mat (cf. kəlx reed mat; Ch čálš).

6. k'x to ֳ€ ֳŠ ֳ³ ֳš before a back velar consonant:
sčátq̌əm animal (Ch sčátq̌əm? grizzly bear, Pg sčátq̌əb); sčeq̌ sucker; sčaq̌psəm back of neck; ?acč̌le'q̌'i groove (Ch ?acč̌le'q̌'i); šeq̌ cloud (Ch -šq̌); šeq̌ stain a cloth.

7. Additional instances of ֳ€ ֳŠ ֳ³ ֳš (note that not all those previously cited have been explained):
sčótəm black bear (Ch, Lo, Se sčótəm?, Pg sčótəd);
čó?x’ malen sunburned; čahumíš awkward; spónč squirrel;
klčí keep up, never quit (Ch klčí-); ñítšak yás yesterday;
wánácí lost (Ch wánácí); sčó? buttocks; qaí-čašoni dangerous (Ch čáhší); šé? here (Ch šé?, Lo ší?); šók’iyaxchiccough (Ch sók’iyaxc’hiccough); túlšalsón guessing; túlšals chase, follow; skálás deer (Ch s’kalás, Cm skálx Coast deer); čayós grease, fat (Ch s’cáyós); sá?š liver (Ch sá?š);
pašék’- go flat; lářšem- clear the forest.

8. Additional instances of k x:
kái- give (Ch čái-, Cm kái-); káws nut; skáw sister-in-law
(Ch stáw, Cm skáw; PS *skáw); kált and; ká- where (Ch čá-;
PS *ka-); kátyán fishnet; káwlan pretend; kálwi-cx guest;
kásuci- outside; kanílstx’ayaq- kneel, confess; kássen
keep (a secret); kác- lay something down; kénó- maybe
(Ch čónó’); kán- three (Ch čán-, Sq čán-; PS *kan-);
ká?íi? three (Ch čá’ií, Cm ka?íás); ká’wan lie on side;
ká?o someplace else; káwlic Cowlitz; kén- make a mistake;
kákítémtn carpentering (Ch čc’-ax’ build a house, Sq
čá?-t make); katísa? strawberry (Ch čatísa?); kánnmän
dissatisfied; kómmt- cry (Ch čóm-); ká’xa? take it away!
kóm- bend over, stoop (Ch čóm?-qs-, Sq čóm?- close; come
together, be folded, doubled up); káw- pack; kálk’u- look
for lice; tkó’ between; tkxán? there, opposite; -ki our
(Ch -či); -aka(?) hand (Ch -aća, Cm -akst); ?aks- an aspect;
?aks- color; -ák belly (Ch ęč; PS *ąč(?)k; -ksa again
(Ch -čsa); -kx you (Ch -čš); -alaka? nomen actoris (Ch
-alača); yákémx near (Ch yá?čém?š); táki(a)k- sick, ache
(Ch táči(a)č); yómks sinew, pack-strap (Ch yěnk’ś); ?átyk
lots of; né?sk younger brother (Ch né?sči); ła?šällı skin (Ch
šlą?šiči); yómksı its tallow (Ch yómciš-s); čakálnut give
up (Ch čóč- all gone, use up); màxkän horns; ?ac-káləlksti?
cramp in the side (Ch čáččsti); xólk- pull (Ch ṣólč-); čókačti earn, win (Ch čóč-); mólk summer (Ch móčč); süskpoč hemlock (Ch süsčp-ní); šakálwasumx she married him; téktkëni humming-bird (Ch tétctčni, Sq tětććńis); ?amółmalaki pleats; šakox put or take out; pátk- reach; nák- sink (Ch nóč-); wáyolk- let go (Ch wáyelč-); ?áctixkëna memory (Ch ?ććć-kun remember); pútaka? half done; stékální Indian pipe (Ch stóq ?); sóskk- swim (of a fish) (Ch sóč-); ?áyakakamón thimble; ?ákan then; tawáks- stab (Ch tawaqsi- or tawáksi-); kót drown (Ch čóč-); kálx branch (Ch čálš); ?ac-káčćwu puddle (Ch čáčćwyq); káši get in trouble; škátp rib; kánáp scissors (Ch čanáp); kánápsen squeeze; kaláľus a cross; škáčka? crow (Ch škáčka, Lo šóčh, Pg káčka?); káxńčo? oil, grease, lard; kóc- put in the mouth (Ch čóč-); kót- nibble, gnaw (Ch čót-, Pg čítí- chew up, Sq čítín?); kóškš hair (Ch sčós); kleigh salal berry (Ch k(?)léhé); káp- tame; skónomton shiver, shake (Ch čón-, Pg čódob); káykay- tickle; tkacnáwél older; tknémc half-breed; -kp wood (Ch -čp, Lo -čop, Pg -čup, Cm -ātkw-p); tók sharp, ache, sore (Ch ičč, Lo ičč(?), Sq šič be cut); nák- one (Ch nač-, Pg dčú and dčču?, Cm nkw-); tičak-ka? revolver; yálcōn twist (Cm yóksw- bend); lók- fill (Ch, Lo lóč, Sq yóč, ?Cm líq- fill, put dirt on); wák- uncover (Ch wách-, ?Pg gówč- look for); šómíliaamk wrinkled; wólč polish, shine (Ch wólč-glitter, Pg gówč口碑); někáľus coyote (Ch sněčšč, Ka sënčelö(p); PS *s-n-kēl-), saxamálax people (Ch šamálax w); x to (Ch š); sxén husband (Ch sšén?, Lo šén); xayálumon saddle (Ch šayáwimón); xán? there (Ch, Lo šán?); sxóp blanket (Ch šóp- cover); xów(a)-l raise, grow (Ch šówī, Sq šóway); ?áchexnaťšém lie on back (Ch šanásšém, Cm xén- put a flat object on); xóy? mind, heed, obey; xasökš wild (Ch časökš); xóšč break in two (Ch šóšč); xáćon- clubbed; xápən yawn;
sxépawən going down; sxamyúpi his side; nxəmtəni his children/relatives; xépi? comb (Ch šapá?); txməñstəm stay where you are; nx- -tən kin plural (Ch nš- -tn); -cx reflexive (Ch -cš); -wax reciprocal (Ch -uwš, Cm -wáx'); -tumx -ty (Ch -tumš); wácxanəm dance (Ch wətšənm); yáyix stingy; tawílx sitting (Ch tawé·lš); tìwxtən crossing; təm- both (Ch təmš-); síkəlxayu? snake; káq'utumx enough; kóaxlx tree, wood (Ch kōšš); ?ɪ́mx grass for baskets (Ch ʔɪ́m?); téqtumx middle; məsímx a personal name; sá·tanx knead; yax nothing but; tāylaxkw'u? out of breath; šépəntən drying-rack for berries; skanálxanəm make a mistake; ?ac?əxtk'əlx Indian doctor (Ch ?ac?əxtk'əlš, Cm šə?·k'ílx); ?áyəlx happy; ?acwánx doctor (Ch ?acwánš); səcəʔ is partner; wálx soft; wəx- pull (Ch wəš-).