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Some Phonetic Rules for Mainland Comox Vowels

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The four phonemic vowels of Mainland Comox /i ə u a/ have been mapped by John H. Davis[1] onto (roughly) Sapir's phonetic values in the form of thirteen vocalic ranges [i e I E ε æ ɨ ʌ ə ʊ Ω u o]. Davis assigns these ranges as static, though illuminatingly overlapping, allophonic values. But a quick inspection shows these values not to be isolated and stable entities, as it were, but rather a graded set (or collection of sets) that co-varies with matching features of the environment in greater or lesser degree.[2] Thus certain of the surface values seem to result from a greater measure of a given feature than that which produced other values. If a certain feature is found, for example, on both sides of a vocalic segment that segment is doubly affected by the feature; some of the features appear to affect adjacent segments separately and additively. It is desirable to capture these cumulative effects.

But it is not enough simply to posit a gradation. One could formulate the rule (expressing §9.3e) whereby /ə/ becomes [i] between two palatals

(9.3e) $ə \longrightarrow i \;/\; [\text{pal}] \;\_\_\_\_\; [\text{pal}]$

and then apply to the output of that rule

(9.3d) i ⟶ I / [+ glott] [3]

It might be objected by some that it is against an intuitive sense of naturalness first to raise schwa to a close (or tense?) [i] and then to lower this to an open [I], when in the least specific environments (§§9.3i, j) schwa seems to end up as [ʌ]. This would also oblige one to order the contextual change of /i/ to [e ɛ] (§9.1) before generating [i] from schwa, but that is no inherent obstacle. The crucial reasons for observing a particular direction in this gradation are found in the form and content of the rules themselves. It will be seen that the above direction will segregate and fail to explain the two outputs [I] (§9.3c and d) of /ə/. At the same time the parallel fronting of / iə / and schwa are not fully captured. In what follows a similar bifurcation in raising and lowering of [ʊ] is also observed; thus our formulation is pervasive in its compactness. Finally, it is harmonious with (and hence we understand) the lack of a close [ɨ] to match [ɪ̶].

A natural set of directions to these gradations is therefore imposed. Let us first draw up a summary of the rules and schemata needed, in alphabetic segmental terms.[4]

(9.1c) i ⟶ e / [-hi] ____

(9.1a,b) i ⟶ ɛ / ⟷ ʔ ____ [+anter] ; [+ glott] [5]

(§9.1d, i ⟶ i / [+hi] ___, is of course supplied simply by the underlying specification of /i/.)

(9.2a,b) $$i\!: \longrightarrow ey \,/\, \left\{ \begin{array}{l} [+\text{glott}] \\ \begin{bmatrix} -\text{hi} \\ +\text{back} \end{bmatrix} \\ \sim [+\text{lo}] \end{array} \right\} \_\_\_$$

may be regarded as a further context for, and collapsed in the same schema with, (9.1c) above.

(9.7b) $$u \longrightarrow o \,/\, [-\text{hi}] \;\_\_\_\; [-\text{hi}]$$

with which

(9.8a) $$u\!: \longrightarrow o \,/^{\leftrightarrow}\, \begin{bmatrix} -\text{hi} \\ \left\{ \begin{array}{l} +\text{lo} \\ +\text{back} \end{array} \right\} \end{bmatrix} \_\_\_ \; [-\text{hi}]$$

may likewise be collapsed in a single schema.
(Again, the effect of §9.7a, $u \longrightarrow u /^{\leftrightarrow} [+\text{hi}] \_\_\_ \begin{bmatrix} -\text{lo} \\ -\text{back} \end{bmatrix}$, is supplied by the underlying specification of /u/.)

(9.5b,c,d) $$i\partial \longrightarrow i\varepsilon \,/\, [\text{palatal}] \;\_\_\_$$

(9.5a,e) $$i\varepsilon \longrightarrow \left\{ \begin{array}{l} \varepsilon \\ e\wedge \end{array} \right\} / \begin{array}{l} \_\_\_ \;\# \\ \_\_\_ \;CV \end{array}$$

(9.5) $$i \longrightarrow \hat{i} \,/\, \_\_\_ \; V$$

Davis does not tell us (§9.6) what happens to a: after a palatal.

(9.3a) $$\partial \longrightarrow I \,/\, [\text{palatal}] \;\_\_\_$$

(9.3b,c,d) $$I \longrightarrow \left\{ \begin{array}{l} \varepsilon \\ I \end{array} \right\} / \begin{array}{l} \_\_\_ \;[+\text{lo}]\;\# \\ \_\_\_ \;[-\text{lo}]. \end{array}$$ [6]

(9.3e) $$I \longrightarrow i \,/\, [-\text{glott}] \;\_\_\_\; \begin{bmatrix} \text{palatal} \\ -\text{glott} \end{bmatrix}$$

(9.3g) $$\partial \longrightarrow \upsilon \,/\, [+\text{round}]$$

(9.3f,h) $$\upsilon \longrightarrow \left\{ \begin{array}{l} u \\ \text{ɔ} \end{array} \right\} / \begin{array}{l} [+\text{hi}] \;\_\_\_\; [+\text{hi}] \\ [-\text{hi}] \;\_\_\_\; \begin{bmatrix} +\text{hi} \\ +\text{round} \end{bmatrix} \end{array}$$

or, to capture greater generality[7],

(9.3f,h) $$\upsilon \longrightarrow \left\{ \begin{array}{l} u \,/\, [+\text{hi}] \;\_\_\_ \\ \text{ɔ} \,/\, [-\text{hi}] \;\_\_\_\; \begin{bmatrix} (\;\;) \\ +\text{round} \end{bmatrix} \end{array} \right\} [+\text{hi}]$$

(9.3k) $$\partial \longrightarrow \text{ɨ} \,/\, [+\text{anter}] \;\_\_\_\; [+\text{anter}]$$

(9.3j) $$\text{ɨ} \xrightarrow{\sim} \wedge \,/\, [-\text{glott}] \;\_\_\_\; [-\text{glott}]$$

(9.3i) $$\partial \longrightarrow \wedge \,/\, \left\{ \begin{array}{l} [+\text{lo}] \\ \begin{bmatrix} -\text{hi} \\ +\text{back} \end{bmatrix} \end{array} \right\}$$

To show the minimal ordering necessary in the above rules we may recapitulate in brief tabular form:

	iə	ə				i	u
(1) $\longrightarrow$	iɐ	E	ʊ	ɨ		e, ɛ	o
(2) $\longrightarrow$	eʌ, iɛ	ɛ, I	u, Ω	~ʌ	ʌ		
(3) $\longrightarrow$	iɐ̂, iɛ̂	i					

We see then that to reach greatest generality of explanation we may hope to approximate three rules or schemata to express the above formulations. To attempt this we must assign provisional features that will characterize the above phonetic values. The following seem appropriate in light of the above rules:

lo	hi	tense/close		front +	front −		
−	+	+	i				u
		−		I	ɨ	ʊ	
	−	+	e				o
		−		E		Ω	
+		−		ɐ	ʌ		
		+	ɛ		ə		
					round −	round +	

The underlying vowels are distinctive as follows:

	i	u	a	ə
hi	+	+	−	−
lo	−	−	+	−
round	−	+	(−)	(−)
front	(+)	(−)	(−)	(−)
close	(+)	(+)	(+)	(−)

Though the details of context differ, we see now that 9.1c, 9.7b and 9.8a are essentially assimilation rules of the general form

$$\text{(I)}\qquad [+\text{hi}] \longrightarrow \begin{bmatrix} -\text{hi} \\ \alpha\ \text{round} \\ \beta\ \text{front} \end{bmatrix} \Big/ \ [-\text{hi}] \quad \begin{bmatrix} \underline{\ \ V\ \ } \\ -\ \text{lo} \\ +\ \text{close} \\ \alpha\ \text{round} \\ \beta\ \text{front} \end{bmatrix} \ (\,[-\text{hi}]\,)$$

Expressed in this fashion in terms of distinctive features, it is now seen that (9.1a,b) may be readily derived from the output of (I) above, and therefore ordered after it as

$$\text{(II)}\qquad [-\text{lo}] \rightarrow [+\text{lo}] \Big/ \overset{\longleftrightarrow}{\ } \ [+\text{lo}] \begin{bmatrix} \underline{\ \ V\ \ } \\ -\ \text{hi} \\ +\ \text{close} \\ -\ \text{round} \\ +\ \text{front} \end{bmatrix} \begin{bmatrix} -\ \text{hi} \\ +\ \text{anter} \end{bmatrix} \ ; \ [+\ \text{glott}]^{8}$$

Again we have a simple assimilation rule, where the $[+\text{lo}]$ environment prevails. The above two rules account for most of the behaviour of the two high (and close) vowel phonemes.

We now develop a set of rules for the contextual variants of the underlying non-high vowels. It will be found that (9.3a) and (9.5b,c,d) can be collapsed as

$$\text{(A1)}\qquad \left\{ \begin{matrix} \begin{bmatrix} V \\ -\ \text{hi} \\ -\ \text{lo} \end{bmatrix} \\ [+\ \text{lo}] \end{matrix} \right\} \longrightarrow \begin{bmatrix} +\ \text{front} \\ -\ \text{close} \end{bmatrix} \Big/ \quad \begin{bmatrix} +\ \text{hi} \\ +\ \text{coron} \end{bmatrix} \ \underline{\qquad}$$

There then follow

$$\text{(9.5a)}\qquad [-\ \text{close}] \longrightarrow [+\ \text{close}] \Big/ \begin{bmatrix} \underline{\ \ V\ \ } \\ +\ \text{lo} \\ +\ \text{front} \end{bmatrix} \#$$

and

$$\text{(9.3b)}\qquad \begin{bmatrix} -\ \text{close} \\ -\ \text{lo} \end{bmatrix} \longrightarrow \begin{bmatrix} +\ \text{close} \\ +\ \text{lo} \end{bmatrix} \Big/ \begin{bmatrix} \underline{\ \ V\ \ } \\ +\ \text{front} \end{bmatrix} \ [+\ \text{lo}] \quad \#$$

These may be collapsed as

$$\text{(B1)}\qquad \begin{bmatrix} -\ \text{close} \\ \langle -\ \text{lo} \rangle \end{bmatrix} \longrightarrow \begin{bmatrix} +\ \text{close} \\ +\ \text{lo} \end{bmatrix} \Big/ \begin{bmatrix} \text{V} \\ \hline +\ \text{front} \end{bmatrix} \Big\langle \begin{bmatrix} +\ \text{lo} \end{bmatrix} \Big\rangle \ \#$$

We may associate with the last rule (9.3c,d):

$$\text{(B2)}\qquad \begin{bmatrix} -\ \text{hi} \end{bmatrix} \rightarrow \begin{bmatrix} +\ \text{hi} \end{bmatrix} \Big/ \begin{bmatrix} \text{V} \\ \hline -\ \text{lo} \\ -\ \text{close} \\ +\ \text{front} \end{bmatrix} \begin{bmatrix} -\ \text{lo} \end{bmatrix} \begin{Bmatrix} \text{C} \\ \# \end{Bmatrix}$$

(B1) and (B2) are species of height assimilation. Very different in sort, but ordered in the same relation to (A1) is (9.5e):

$$\text{(B3)}\qquad \begin{bmatrix} +\ \text{hi} \end{bmatrix} \begin{bmatrix} +\ \text{lo} \\ +\ \text{front} \end{bmatrix} \rightarrow \begin{bmatrix} -\ \text{hi} \end{bmatrix} \begin{bmatrix} -\ \text{lo} \\ -\ \text{front} \end{bmatrix} \Big/ \begin{bmatrix} \text{V} \\ \hline +\ \text{close} \\ +\ \text{front} \end{bmatrix} \begin{bmatrix} \text{V} \\ \hline -\ \text{close} \end{bmatrix} \ \text{CV}$$

Here a height difference in the diphthong is converted into a fronting difference.

Then following (B2) we have (9.3e):

$$\text{(C1)}\qquad \begin{bmatrix} -\ \text{close} \end{bmatrix} \rightarrow \begin{bmatrix} +\ \text{close} \end{bmatrix} \Big/ \begin{bmatrix} -\ \text{glott} \end{bmatrix} \begin{bmatrix} \text{V} \\ \hline +\ \text{hi} \\ +\ \text{front} \end{bmatrix} \begin{bmatrix} +\ \text{hi} \\ +\ \text{coron} \\ -\ \text{glott} \end{bmatrix}$$

We see that (A1) and (C1) are closely related as assimilations to palatals; it seems that the features could be better chosen.

Let us now turn to (9.3k). This rule of dissimilation must be ordered before (9.3g) since part of its output in the form of (9.3j) must bypass (9.3g), though the underlying structure would fit the configuration required by (9.3g). Hence we have:

$$\text{(A2)} \quad \begin{bmatrix} V \\ -\text{hi} \\ -\text{lo} \end{bmatrix} \rightarrow \begin{bmatrix} +\text{hi} \\ -\text{close} \\ -\text{round} \\ -\text{front} \end{bmatrix} \Big/ \begin{bmatrix} +\text{anter} \\ -\text{hi} \end{bmatrix} \_\_\_\_ \begin{bmatrix} +\text{anter} \\ -\text{hi} \end{bmatrix}$$

Then

$$\text{(B4)} \quad \begin{bmatrix} +\text{hi} \\ -\text{lo} \end{bmatrix} \rightsquigarrow \begin{bmatrix} -\text{hi} \\ +\text{lo} \end{bmatrix} \Big/ \begin{bmatrix} -\text{glott} \end{bmatrix} \begin{bmatrix} V \\ \hline -\text{close} \\ -\text{round} \\ -\text{front} \end{bmatrix} \begin{bmatrix} -\text{glott} \end{bmatrix}$$

It seems that $\begin{bmatrix} -\text{glott} \end{bmatrix}$ has a lowering effect.

It is not clear whether (9.3i) must be ordered before (9.3g) or not; note the interesting word 'wood', which appears to fail to undergo (9.3g). Perhaps this ordering indeterminacy reflects the redundancy in rounding for $[\wedge]$ and the universal phonetic poverty in perceptual discrimination in the low-back region. Let us order (9.3i) tentatively before (9.3g):

$$\text{(A3)} \quad \begin{bmatrix} V \\ -\text{hi} \\ -\text{lo} \end{bmatrix} \rightarrow \begin{bmatrix} +\text{lo} \\ -\text{close} \\ -\text{front} \\ (-\text{round}) \end{bmatrix} \Big/ \left\{ \begin{matrix} \begin{bmatrix} +\text{lo} \end{bmatrix} \\ \\ \begin{bmatrix} -\text{hi} \\ +\text{back} \end{bmatrix} \end{matrix} \right\}$$

This is a back-and-low assimilation.

We are now free to turn to (9.3g), a very simple assimilation:

$$\text{(B5)} \quad \begin{bmatrix} V \\ -\text{hi} \\ -\text{lo} \end{bmatrix} \rightarrow \begin{bmatrix} +\text{hi} \\ -\text{close} \\ -\text{front} \\ +\text{round} \end{bmatrix} \Big/ \begin{bmatrix} +\text{round} \end{bmatrix}$$

Then follow

$$\text{(9.3f)} \quad \begin{bmatrix} -\text{close} \end{bmatrix} \rightarrow \begin{bmatrix} +\text{close} \end{bmatrix} \Big/ \begin{bmatrix} +\text{hi} \end{bmatrix} \begin{bmatrix} V \\ \hline +\text{round} \end{bmatrix} \begin{bmatrix} +\text{hi} \end{bmatrix}$$

$$\text{(9.3h)} \quad \begin{bmatrix} +\text{hi} \end{bmatrix} \rightarrow \begin{bmatrix} -\text{hi} \end{bmatrix} \Big/ \begin{bmatrix} -\text{hi} \end{bmatrix} \begin{bmatrix} V \\ \hline -\text{close} \\ +\text{round} \end{bmatrix} \begin{bmatrix} +\text{hi} \\ +\text{round} \end{bmatrix}$$

These may be collapsed as suggested before:

$$\text{(C2)} \quad \left\{ \begin{matrix} \begin{bmatrix} -\ \text{close} \end{bmatrix} \\ \left\langle \begin{bmatrix} +\ \text{hi} \end{bmatrix} \right. \end{matrix} \right\} \rightarrow \left\{ \begin{matrix} \begin{bmatrix} +\ \text{close} \end{bmatrix} \Big/ \begin{bmatrix} +\ \text{hi} \end{bmatrix} \\ \begin{bmatrix} -\ \text{hi} \end{bmatrix} \Big/ \left. \begin{bmatrix} -\ \text{hi} \end{bmatrix} \right\rangle \end{matrix} \right\} \begin{bmatrix} \dfrac{\text{V}}{\langle -\ \text{close} \rangle} \\ +\ \text{round} \end{bmatrix} \begin{bmatrix} +\ \text{hi} \\ +\ \text{round} \end{bmatrix}$$

Note that (C1), besides being related to (A1), is also akin to (C2) as an assimilation to consonant height. The above ten schemata are now to be read in the order A, B, C. There are a good many rough spots left in the above, but it is believed that they tell us considerably more than a table of allophones.

We may group and order the above rules as follows:

1. a. (A1) palatal fronting; (A3) backing and lowering;
   (I) close lowering.
   b. (A2) anterior dissimilation.
2. c. (II) close glottal lowering; (B4) open non-glottal lowering.
   d. (B1) and (B2) front height assimilation; (B5) rounding.
   e. (B3) diphthong rotation.
3. f. (C1) and (C2) palatal and round height assimilation.

It seems then that we have twelve rule-schemata, made up of six kindred groups, ordered into three sets. Most (groups a, d, f, and perhaps c) are assimilations. Groups b and e may be classed as dissimilations.

The separate behaviour of the high vowels /i u/ and the non-high vowels /a ə/ is striking; it is somewhat reminiscent of the Caucasus. But perhaps more accurately,

/i u/ recall the Proto-Indo-European semivowels, while the variations of /ə/ suggest the state of affairs that may have preceded the phonologization that prehistorically could have led to Indo-European ablauting *e and *o. The partial phonetic kinship between /ə/ and /a/, moreover, is reminiscent of IE *e (o) and *a. Of course, these resemblances are restricted to typological character[9]; but they are nonetheless instructive for our grasp of the general properties of human language.

Anyone familiar with Old Irish will also be struck by the parallel between the contextual variation in vowels in non-final unstressed position in that language (as reflected indirectly but ingeniously and with surprising clarity by the Latin graphs) and the variants of Comox schwa as set forth by Davis in his §9.3.

FOOTNOTES

1 Notes on Mainland Comox Phonology, 5th Salish Conference, Gonzaga University, Spokane, Wash., 17-18 Aug. 1970.

2 See in this connexion Stephen R. Anderson's discussion of conjunctively ordered subrule expansions to neighbourhood rules, with reference to Chontal and Old Irish, in his 1969 MIT dissertation, pp. 132-6.

3 A "neighbourhood" rule.

4 We accept provisionally Davis's consonantal feature specifications.

5 This collapses a neighbourhood rule and a mirror-image rule; for the notation with double arrow, which is preferable to Langacker's asterisk for historical formulations, see my forthcoming article in <u>Münchener Studien zur Sprachwissenschaft</u> on Gk. πρυμνός etc.

6 Full-stop means syllable boundary, however that may be generated or marked.

7 From the examples actually given we could state

$$(9.3f,h) \qquad \smile \longrightarrow \left\{ \begin{matrix} u \\ \Omega \end{matrix} \right\} \Big/ \left\{ \begin{matrix} [+\text{hi}] \\ [-\text{hi}] \end{matrix} \right\} \_\_\_ \begin{bmatrix} +\text{hi} \\ +\text{round} \end{bmatrix}$$

FOOTNOTES (cont'd)

8 I leave open the best way of characterizing glottalized segments.

9 See Aert H. Kuipers, The Squamish Language (1967), Appendix, pp. 401-5.