GWR SOUND CHANGES

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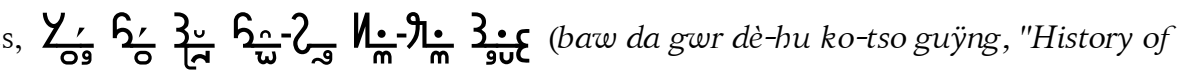
This work would not have been possible but for the inspiration of that seminal work in Gwr linguistics,  *(baw da gwr dè-hu ko-tso guÿng, "History of Baw Da Gwr Language")* by Profs. Chang Shi and Ha Le.

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I. Introduction

The following discussion presents the rules needed to derive modern Baw Da Gwr (BDG or BD) from Proto Baw Da (PBD). The theory and format used is that of Generative Phonology, vintage 1970s, the system I am most familiar with, and the distinctive features used are basically those of Chomsky and Halle's *Sound Pattern of English* (1968) with some modifications (in particular, substituting "front, high" for their "anterior, coronal").

PBD had a relatively simple sound system: Stops p b, t d, k g, q; Voiceless fricatives s h; Resonants: nasals m, n, ŋ, and liquids r, l; Semivowels w, y, and Vowels i a u (all have IPA values, except "y" for [j]).

= =

TABLE 1: DISTINCTIVE FEATURES OF PROTO BAW DA GWR

|Consonants |Resonants |Semivowels |Vowels

	p	b	t	d	s	k	g	q	m	n	ŋ	r	l		w	y	h	i	a	u
Cons	+	+	+	+	+	+	+	+	+	+	+	+	+		–	–	–	–	–	–
Voc	all +Cons are -Voc														–	–	–	+	+	+
Obs	+	+	+	+	+	+	+	+	–	–	–	–	–		all -Cons are -obs					
Front	+	+	+	+	+	–	–	–	+	+	–	–	+		–	+	–	+	–	–
Back	–	–	–	–	–	+	+	+	–	–	+	–	–		+	–	–	–	–	+
High	–	–	+	+	+	+	+	–	–	+	+	+	+?		+	+	–	+	–	+
Low	all these are -Low							+	all these are -Low						–	–	–	–	+	–
Cont	all -Cont				+	all -Cont						+	+		all -Cons are +Cont					
Nas	all are -Nas								+	+	+	–	–		all -Cons are -Nas					
Lat												–	+							
Retr.												+	–							
Voi	–	+	–	+	–	–	+	–							+	+	–			
Len		±		±			±						±							

Unmarked features can be supplied by redundancy rules, e.g. all [+Cons] are [-Voc]; all [+Cons -Obs αNas] and all [+Voc] are [+Voi +Cont], all [+Voc +Ba] are [+rnd] etc. The feature "Len(ition)" is needed for the operation of certain rules affecting the voiced stops and /l/-- the stops > vd.fricatives, ult. > semivowels, while *l[+len] via [ʎ,ɬ] ultimately vocalizes > y/w (only in certain environments--these (and other) sporadic rules are due to borrowing from related dialects. These vd.fricatives and variant l's and one or two other sounds appear in the course of derivation, and must be described with relevant features, but need not be ascribed to the proto-language, nor do they survive as phonemes in the modern language.

The matrix above also describes the same sounds in modern Baw Da Gwr, with the exception that [+len] consonants are no longer present, nor is consonantal *r, having merged with *l. And although *r is at first distinguished from *l only by ±lat(eral), its redundant feature "retr(acted)" becomes important in later developments--in the formation of certain affricates and for the late conversion of all **-Vr- sequences to the retroflexed mid vowel [ɝ], phonemicized as /r/.

It is also likely that every proto-phoneme was marked with a ternary-valued feature "Tonality"-- + for high tonality, 0 for mid, - for low-- but we omit it from discussion for now since it is not entirely clear how it would work.

In the course of the derivations several "temporary" sounds arise that do not survive into the final phonologic inventory of modern BDG. These are (1) the voiced continuants **β,ð,ɣ < [bdg +len]; (2) palatal/velar laterals **ʎ,ɬ < [l +len]; (3) the semivocalic glides **ɯ̯ < **ɣ and **ă < [a -str]. The laterals, which ultimately > semivowels /y,w/, require no further comment.

Clearly, there is a relationship between the vowels *u/i and the respective semivowels *w/*y-- they differ only in the feature [voc]; similarly there is a relationship between **β/ð and *w/y, for that is what the vd.continuants eventually become-- ð/y differ only in their major-class features [C obs], but the features of β [+fr -hi +cont] < *b [+fr -hi -cont] and the features of *w [-fr +hi +ba] obscure that very logical and common change. One possibility--rejected--was to mark *w [+fr -hi], the same as *b and **β-- but that obscures the more useful *w/u relationship.

Another question concerns the **ɣ > ɯ̯ change. Clearly, [ɣ] is [+obs -fr +hi +ba], like *g from which it derives; and therefore its corresponding semivowel [ɯ̯] ought also to be [-obs -fr +hi +ba]-- but now we have two semivowels, *w and **ɯ̯, with identical [+hi +ba] features....how to resolve this? One solution would have introduced the feature [rounded] into the matrix-- thus *w would be [+hi +ba +rnd] while **ɯ̯ would be [+hi +ba -rnd]-- but it seems unncessary in the proto-language, where [+ba] serves to fully identify *w/u, and roundness would only be a redundant phonetic feature-- [-C αvoc] > [+rnd] / [__+ba]. In fact, even in modern BDG, where all [+ba] vowels are [+rnd], they are distinguished by other features, and roundness is still redundant.

The solution chosen has been to classify **ɯ̯ as a *centralized* glide, the approximant corresponding to [ɨ], with features [+hi -fr -ba -lo]-- this has the added advantage of being

logically convertible to [ə] in our system by changing +hi to -hi, which indeed happens when ụ is the off-glide of many diphthongs. In proper IPA, no doubt, we should use the centralizing diacritic --[ụ̈]-- but for simplicity's sake we forego that technicality.

This little table contrasts the vd.stops--continuants--semivowels--related vowels:

	b	**β**	**w**	**u**	**d**	**ð**	**y**	**i**	**g**	**ɣ**	**ụ**	**a**	**ă**	**ə**
cons	+	+	-	-	+	+	-	-	+	+	-	-	-	-
voc	+	+	-	+	+	+	-	+	+	+	-	+	-	-
fr	+	+	-	-	+	+	+	+	-	-	-	-	-	-
ba	-	-	+	+	-	-	-	-	+	+	-	-	-	-
hi	-	-	+	+	+	+	+	+	+	+	+	-	-	-
lo	-	-	-	-	-	-	-	-	-	-	-	+	+	-
cont	-	+	+		-	+	+		-	+	+		+	

The highlighted cells are those where features must change when the glide has features different from the stop/continuant.

The semivowel **ă is admittedly somewhat ad-hoc. It arises when unstressed [i,u,a -str] shift to semivowels in VV sequences. Obviously *i/u > w/y-- what then becomes of central-low *a [-C +V -fr -ba -hi +lo]? The answer is: central-low **ă [-C -V -fr -ba -hi +lo]-- this now makes clear the rule that sequences of identical [+V αF +str][-C -V αF] > long V since [iua +str] and [ywă] now differ only in their major class features; it accounts logically for the fact that, in sequences of [ă+í,ú], [í,ú] are lowered > [e,o], nor it is too great a leap to say that ă is raised > [ə] (thus behaving like **ụ) when it follows a stressed vowel (other than [á] of course) in diphthongs. (But it does now require a special rule lengthing **ÿə > /ÿ:/.) Unlike the other sounds under discussion here, **ə does survive, though with marginal phonemic status-- it contrasts only with /w,y/ as the off-glide of falling diphthongs. (In fact, we could consider it the allophone of /ÿ/ in that environment.)

RULE-WRITING CONVENTIONS. Phonologists familiar with the conventions detailed in Harms (1967) or Chomsky and Halle (1968) will recognize most of those used here. Perhaps the most important to keep in mind is the use of Greek-letter variables, were [αFea] means + or - that feature, and any other feature marked α has the same value; a subsequent [-αFea] indicates reversal of the sign (i.e. if α is +, -α is -; conversely if α = -, -α = +; thus [αfr -αba] means [+fr -ba] or [-fr +ba] and can be useful in abbreviatng whole classes of sounds-- [+V αfr -αba] describes the set of all front or back vowels). Adding a second Greek-letter introduces another +/- independent of the value of α (e.g. [αhi βfr] can refer to [+hi +/-fr] or [-hi +/-fr]. And so on thru the Greek alphabet (I have not found it necessary to go beyond δ.)

I also use "αF" to abbreviate--usually-- "any set of features" in a single segment; or if two or more segment are so marked, "same features in all segments", as when describing like-vowels; it eliminates the need to specify [hi fr ba lo] for each one. Similarly, sometimes "+F" is used, to avoid proliferation of Greek letters when α and β are already in use; though here, +F in subsequent segments does NOT indicate identical features-- it would be equivalent to writing [...αF...]....[...βF...]

Also frequent here is the use of Transfomations (T-Rules), typically when two or more segments change into a single one, for instance Vowel Crasis, where e.g. [a +str][i -str] > [æ +str] (Gwr /è/), or Palatalization, where e.g. [k,g][y] > [tš,dž], absorbing the *y, and the cluster becomes a unit phoneme (/c,j / in Gwr). Most such cases could equally well be handled with a sequence of ordinary A > B /__C rules, but many of us feel that the T-Rules better reveal the process (quite aside from reducing the number of rules to be written!).

In a few cases I have used a format without "environment bar", e.g. A > B / C, to be understood "A is rewritten as B *either side* of C". It combines the two disjunctive rules: A > B / C__ and A > B / __C, which could also be written--

A > B / 1{C__}
2{__C}

but that format is awkward, even though occasionally it too has been used. Fortunately too, since Gwr does not require specification of consonant clusters, I have not had to use Chomsky & Halle's convention of "C" with super-/subscript numerals to indicate "presence of N or N consonants", nor their angled-brackets <Fea> convention to indicate obligatory co-occurrence of features in complex environments.

A format of my own invention is the use of ">>> (RULE)" to mean "the forms in questions proceed to (whatever rule is mentioned)."

Aside from the "temporary" sounds mentioned above, several other new consonants and vowels develop, and require some new feature specifications; e.g. prior to merging with *l, the feature [+retr] of *r becomes non-redundant, as it affects certain clusters and vowels. The result is the sound system of modern BDG: Stops p,b,t,d,k,g,q; Voiceless fricatives f,s,š,x,h; Affricates ts, dz (alveolar); tr, dl (retroflexed); c [tʃ], j [dʒ] (alveo-palatal); Resonants m,n,ŋ and lateral l; Semivowels w,y,ə; and Vowels front i,e,æ, central ɨ,ɜ,a, back u,o,ɔ, short or long. (The front/back low vowels are written "è, ò"; the high central vowel "ÿ", and the mid-central retroflexed vowel "r".) A relatively late development neutralizes all final stops > /q/ (phonetically [ʔ]); all final fricatives > [h], all final nasals and l > [ŋ]. Aside from the merger of *r > l, other PBD consonants and vowels survive, albeit with different privilege of occurrence in many cases.. The new consonants and vowels are specified in the following matrix (next page):

TABLE 1A: ADDITIONAL DISTINCTIVE FEATURES OF MODERN BAW DA GWR

|Consonants |Vowels (and semivowel ə)

	f	ts	dz	tr	dl	ch	j	š	x			i	e	è	ÿ	ə	r	a	u	o	ò
Cons	+	+	+	+	+	+	+	+	+			-	-	-	-	-	-	-	-	-	-
Voc	-	-	-	-	-	-	-	-	-			+	+	+	+	-	+	+	+	+	+
Obs	+	+	+	+	+	+	+	+	+			-	-	-	-	-	-	-	-	-	-
Front	+	+	+	-	-	-	-	-	-			+	+	+	-	-	-	-	-	-	-
Back	-	-	-	-	-	-	-	-	+			-	-	-	-	-	-	-	+	+	+
High	-	+	+	+	+	+	+	+	+			+	-	-	+	-	-	-	+	-	-
Retr	-	-	-	+	+	-	-	-	-								+				
Del/r		+	+	+	+	+	+				Low	-	-	+	-	-	-	+	-	-	+
Cont	+	-	-	-	-	-	-	+	+		Rnd	-	-	-	-		-	-	+	+	+
Voi	-	-	+	-	+	-	+	-	-		Voi	all +Voc are +Voi									
											Long	±	±	±	±		-	±	±	±	±

Note: we have included the semivowel [ə] even though its phonemic status is marginal--it is the semivocalic counterpart of /ÿ/ in falling diphthongs.

The morpheme structure rules of PBD were quite straightforward: (C)V(C)(V)(C) with the vast majority of forms being bisyllabic CV.CV or CV.CVC. Stress could occur on either syllable. (When using formulaic "CVCV(C)" in this discussion, A denotes the stressed vowel.) All V and C could occur in every position, with only the following constraints: no original sequences *wu/uw or *yi/iy; no like-vowels in *(C)VV(C); no sequences of *rVr; and some restrictions on [+C +len]. Some dialects, though not standard BD, disfavored sequences of identical stops in a final closed -CVC syllable.

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II. Monosyllables, vowel+vowel in hiatus or with medial *h

Gwr linguists who study the history of their language family class these as "weak" forms, either because they show very few changes (monosyllables) or show specific changes not seen elsewhere. Diphthongizing forms--both those with original medial *w,y as well as early borrowings with medial leniting *bdg,l-- are also considered "weak", but will be dealt with in Chapter 3, since their rules are rather extensive.

A. MONOSYLLABLES

1. (C)V i.e. #([αCons -voc][-Cons +voc +stress]# : The vowel is inherently [+str]. These survive without change, but initial C, if present, will proceed to these later rules: (a) *q- will lower *i,u > e,o; (b) h-loss, (c) tds,kg palatalize /#__i.

2. (C)VC i.e. #([αCons -voc])[-Cons +voc +str][αCons -voc]# (all final C allowed, including bdg,l[+len]: Initial (C)V survive as in (1) above, but with the following exceptions:

a) initial h- survives if the following C_2 is [q,s,h], otherwise > 0; and *kVk# > xVk and qVq# > hVq (similar rules also apply to bisyllables CACV(C), CVCA(C)); other C- as in #1 above.

Later final-C rules:

a) final-h regularly lowers [iu] here; or SPOR/RARE may lengthen [iua]; or SPOR/RARE may have no effect, simply leaving C[iua]#-- but *-h drops in any case

b) SPOR(50%) either (1) V-w/y changes (STRONG) and the final semivowels are lost (forms must be marked [+V-WY Rules]); or (2) NO changes to the vowel and [wy] are retained.

Other final-C survive until later in the derivation; among the rules that will or may apply are:

c) lenited **βɬ, ðʎ, γ (< **bdg,l[+len]) by late rule > wyuɥ, the resulting V+semivowel sequences >>> VV-REDUCTION RULES

d) SPOR N-breaking or SPOR V-length or Breaking /__vd.stop#-- precede Final NEUT.

e) SPOR/RARE A-AFFECT: [a] undergoes changes preceding certain final stops/nasals--the rule can affect any surviving #CAC# form regardless of origin (*(C)VC, CVCAC, CACV). The affected [a] cannot be [+long].

f) vd.stop[-len] > vl /_#

g) q-lower iu > eo // SPOR does not apply if V: (1/28 or if i: < yi--that wd be in 2-syl)

h) tds,kg palatalize /#__i(:)

i) FINAL C RULES: stop, fricatives, N,l, ,r > neut.~r-rule

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B. VOWELS IN HIATUS (*-VØV = -VV-)

B.1. Crasis-1 of *-AV(C) i.e. (C)[+V +str][+V -str]([+C]): since like-V sequences do not occur, this affects only á+iu, íú+a, and íu/úi, with or without initial/final consonants. T-rules works best in this case-- whether they can be stated with a single SD (and lots of α and β features) is not clear; therefore, we state them separately here:

1a) (áu/ái > ò/è) SD: 1[+V -hi +lo -fr -ba +str] 2[+V +hi -lo αfr -αba -str]X#

SC: 1 + 2 ==> 1[+V -hi +lo αfr -αba +str]

1b) (ía/úa > e/o) SD: 1[+V +hi -lo αfr -αba +str] 2[+V -hi +lo -fr -ba -str]X#

SC: 1 + 2 ==>1[+V -hi -lo αfr -αba +str]

1c) (íu/úi > ÿ) SD: 1[+V +hi -lo αfr -αba +str] 2[+V +hi -lo -αfr αba -str]X#

SC: 1 + 2 ==>1[+V +hi -lo -fr -ba -ro +str]

NOTE: X may be null, or any permissible final seqment, [αC -voc]

--All initial C survive unchanged (though *h- is lost later, unless there is a following [qsh]). Other final cons., if present, survive until later rules.

B.2. Development of final C in forms with crasis, *(C)AVC#

Final [+C αobs]: Final stops, nasals, l,r and s survive (final *l is [-len]); later rules apply (e.g. *bdg devoice), then all final [+C αobs] >>> applicable FINAL-C and NEUTRALIZATION rules.

(NB by MS Rules, final *l is always [-len] in both *-AV__# and *-AhV__# envs.; even if *l[+len] could occur, crasis eliminates its environments and it could not vocalize after the new V-- this implies 1. AV crasis is a very early rule in all dials; 2. l-lenition is a later innovation in all dials.

Final [-C -V] i.e. *wyh ~lenited **wyuɻ: (1) Normally, in all *-VV- forms, crasis produces mid/ low vowels that no longer fit the environments for the changes that take place in the V-WY Rules (see Ch.3.E below). Therefore, original *wy and (by later rule) **wyuɻ < lenited *bdg, have no effect and simply form V(wyuɻ) diphthongs with the new mid/low vowels (later rules in VV-REDUCTION adjust **-Vuɻ-- see Ch. 7). (2) *-h is lost /[+V-str]_# by an early rule, normally without affect.

However, there are SPORADIC/VERY RARE dialect borrowings where, rather than crasis, original final *-V[wy] first undergo the V-WY Rules--presumably the WEAK [+V -str] not STRONG version--though the outcome would be the same in either case), resulting in sequences of [iua +str][eoÿ -str]#).

Similarly (and probably from the same dialect) there are SPOR/RARE forms where *-h first lowers unstressed pre-final *i,u > e,o. All these anomalous sequences are resolved in the later VV-REDUCTION/ DIPHTH RULES.

The underlying forms of these SPOR cases must be marked "[+V-WY rules]" or "[+h-lower]", and they constitute exceptions to the requirement that a [αC] segment precede the -V[wy] sequence, which is another reason why these -VV- forms do not normally undergo V-WY Rules.)

(DIGRESSION) To look ahead a bit, and show at this point the ultimate outcome of the anomalous V-sequences--

a) from *-[íúá]V[wy]: íay > íe > ey íaw > ío > ew íuy > íÿ [íə]
úay > úe > oy úaw > úo > ow úiw > úÿ [úə]
(while áiw/áuy both > áÿ > a:, as is normal)

Although not indicated here, the original *w/y are retained-- thus more accurately í|ay > í|ey > éy|y-- and then lost by the 2-glide Rule (Ch. 7).

Note that although -í+ay and -úa+w have outcomes identical to ía+y/úa+w, they are in fact the result of different rule applications.

b) from *-[íúá]Vh: íuh > ío > ew úih > úe > oy
áih > áe > ay áuh > áo > aw
(while í,ú+a(h) no effect, so > e,o as expected)

(End digression)

B.3. Changes to hiatus [+V -str][+V +str](C)#. These *-VA- forms are treated the same as *-VhA(C), and will be discussed in the next section, C.

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C. RULES GOVERNING INITIAL AND MEDIAL *h.

C.1, Initial *h is lost in many but not all environments.

1a. INITIAL *h BEFORE A STRESSED VOWEL (#_A-), with one exception, is lost everywhere, whether followed or not by another C or full syllable, thus in _A#, _AC# or #_A+(C)V(C)#. The **exception** is: if C_2 is *q,s or another *h. This rule can be stated as--

RULE A: h > 0 / #__[+V +str] ({ 1[+C αobs {-cont -lo}] })X#
({ 2[-C -V +voi] })

where X may be null (thus *#hA(C)#) or another syllable -(C)V(C)#

(NB: env.1 excludes C2 = s (+cont) or q (+lo); env.2 excludes another h [-C -voc -voi]-- thus *h- is retained in *hA[qsh]# and *ha[qsh]V(C)#, but lost in all other cases, viz.: *hA#, *hAC#, *hAV(C)# and hACV(C)#

--There are **SPOR/RARE cases of h-retention /#_A-** in all forms where it would normally be lost; these are old loans and must have Underlying Forms specially marked "[-Init-h loss]" or similar-- they retain the *h- and the remainder of the form simply undergoes relevant later rules (e.g. FINAL-V loss, V1 REM, DIPHTH.).

C.1b. INITIAL *h BEFORE AN UNSTRESSED V (with, of course, a following stressed -(C)A(C) syllable), is also lost when the medial C is *wy, *bdg[+len] or *l[+len], or--

h > 0 / #__[+V -str] {1.[+C αobs +len]} A(C)#
{2.[-C-V+voi] } A(C)#

(here, env.1 allows only bdg+ and l+, env. 2 allows only *wy)

-- and such forms proceed (as **0V[wy,bdg,l+]A(C)) to other rules (lenition and DIPTH Rules). BUT INITIAL *h- IS RETAINED IN ALL OTHER ENVS., or "elsewhere", i.e. before medial vl/vd stops, s, N, l, r, AND another *h ([-C-V -voi]) -- and these forms, with one exception, proceed to the V1-REMNANT and associated rules. WHAT'S THE EXCEPTION???

C.2. Medial h.

C.2a. MEDIAL *h FOLLOWING [+V -str]: These can only be *#(C)VhA(C)#, and the medial *h survives if an initial C (SPOR including *wyh) is present, but deletes otherwise (vowel-initial forms).

[-C-V-voi] > 0 / #([-C -V])[+V -str]__[+V +str](C)#

OCCURRENCE: SPOR(60%) IF [-C -V] IS PRESENT; ELSE OBLIG.

Forms of the shape CVhA(C) thus survive and >>> V1 REM.RULES (where they > **ChA(C); and the initial cluster is modified by later rules-- e.g. *pihút > **phút > **fut, ult. /fuq/).

SPOR/RARE medial h-loss may apply to forms with an initial C (including *wyh)-- thus a form like *pihút will > **piút > **pyut, ult. /pyuq/; or *tihí > **ti0í > ti: > /tsi/ (vs. reg. **t0hí > **thi > ti:) This SPOR application is more likely if the form is CVhA# and the initial C is a TRUE CONS. (not *wyh), and especially a stop. (These forms must be marked for "+h-loss" in underlying forms.)

The VA sequences resulting from regular/SPOR application of -h- loss >>> VV-REDUCTION/ DIPTH Rules.

C.2b. MEDIAL *h FOLLOWING [+V +str]: These will be *#(C)Ah# monosyllables and *#(C)AhV(C)-- the initial C may include *wyh-- and medial *h (final -h in the case of #(C)Ah#) is regularly lost in all cases. Note that in #(C)Ah#, *i,u, being inherently stressed, will have lowered > e,o.

Before loss occurs, however, there is a SPOR(30%) rule that "umlauts" *á > é,ó /(C)_h(i,u)(C)#, (Note: if -i,u have been SPOR lowered by *-h, "umlaut" cannot take place.)

The rule for this SPOR. "UMLAUT" is--

[-fr -ba +lo] > [αfr -αba -lo] / [+V -hi __ +str][-C-V -voi][+V +hi αfr -αba -str](C)#

This SPOR rule is more likely to occur if the initial is a C or *wyh, not 0.

The general rule for **MEDIAL-h LOSS** can then apply:

RULE D: [-C -V -voi] > Ø / #([αC -voc])[+V +str]__X #
where X may be null (thus (C)A_# monosyllables) or a following syllable [+V-str](C) (thus (C)A<u>h</u>V(C). (In both cases, the initial C if present may include *h-)

The resulting **(C)AV(C) forms will later undergo reduction of their VV sequences, and applicable Final-C rules.

(DIGRESSION) Another peek ahead: later rules will also create many -VV- sequences (either stress pattern) to be resolved in the VV-REDUCTION Rules. Relevant here is the rule that regularly changes [+V -str =iua] into the corresponding semivowels [-C-V =ywă] when they precede or follow a [+V +str = iua]. That will produce:

--in hiatus-VA (no like-V): ya, wa, yu, wi, e, o (< **ăi/ău <*aí/aú)
--in -VA (from h-loss, like-V possible): the same, plus i:, u:, a: (< like-V/glide, yi, wu, ăa)
--while in -AV (h-loss, like-V possible) the outcome is: ay, aw, a: (< ağ); i: (< iy), iw, iă; wi, u: (< uw), uă. (Note the behavior here (**AV < *AhV) differs from original hiatus *AV.)

(End digression)

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3. V[+str] LOWERING BY FINAL *h:

The high V[i,u +str] > mid e,o /__h# --

[+hi] > [-hi]/ [αC -voc][+V__ βfr -βba -lo +str][-C -V -voi]#
(applies regularly to #(C)Ah# and #(C)V(C)Ah#)

NB The presence of [αC -voc] excludes medial 0 (but allows every other Consonant or semi-vowel), hence the rule DOES NOT APPLY to VA (hiatus/medial h-loss), except SPOR/RARE; there are other SPOR/RARE exceptions:

--SPOR/RARE does not apply at all.

--SPOR/RARE may apply to <u>unstressed</u> -[i,u]h# mainly in CAC(iu)h (V2 REM. forms).

--SPOR/RARE instead of lowering, [iua] may > [+long]-- but only in #(C)__h# monosyllables and (C)AC[iua]h (V2 REM.), when the syllable-initial C_2 is [+C +voi] (stop,N,lr) (so not in diphthongizing V[wyuų]Vh#.

(NB: After *-h rules have taken place, it can be dropped early in several envs.-- VVh, V(0)Vh, #CVh#, and (after lenition of *bdg,l) in diphthongizing forms (see below, Ch.3). It is retained, however, in final-syl. -[+C αobs][+V]__# at least into the REM.RULES.

D. Development of final C in forms with <u>crasis</u> (final stress *(C)VAC#) and **<u>medial-h loss</u>** (initial or final stress). If such forms have a final C, it will be subject to these later rules:

D.1a. Final TRUE CONS.: [+C αobs] (i.e. vl/vd.stops, s, N, l,r) remain and undergo the relevant later rules. Note again that, as was the case with hiatus-VV, MS Rules do not permit *l[+len] in final position following medial *h.

D.1b. Final glides [-C -V] *w,y,h ~lenited **wyu̧: (1) final *h /*-A(0<h)V_# is normally lost without affect, by a later rule. (2) final [wy ~bdg+] /*-V(0<h)V_#: the **-VV- env. disallows application of V-WY Rules; thus after VV-REDUCTION mentioned in the "Digression" above, in the case of (a) -AV-, final *wy/**wy<u>u̧</u> simply end up in sequences <u>long V+glide</u> or <u>vowel+glide+glide</u> (e.g. *íi<u>u̧</u> via **íyu̧ > i:<u>u̧</u> or *-áiw > áy<u>w</u>), and a later rule deletes the final glide, e.g. *i:|u̧ > i: or **áy|w > /ay/. But in casses of (b) -VA- (e.g. ya, yu, wi, e, o and V: etc.), again by later rules, *wy/**wyu̧ delete following V: but form triphthongs, diphthongs, or long V with the remaining sequences--

wa/ya+w,y > waw/yaw, way/yay, but wa/ya+u̧ via wa/ya+ə > wa:/ya:
yu+y > yuy, yu+u̧ > yuÿ, but yu+w (< *b+) > yu:
wi+w > wiw, wi+u̧ > wiÿ, but wi+y (< *d+) > wi:
e/o+wyu̧ > resp. ew, ey, eÿ and ow, oy and oÿ

D.1c.. Sporadic effects of final *w,y,h:, As in normal developments of original hiatus-AV sequences, hiatus-VA and medial h-loss also produce envs. with 0-medial that disallow the V-WY changes. But here too there are SPORADIC/VERY RARE borrowings that must be specially marked "[+V-WY rules]" or "[+h-lower]" where those rules *will* operate, resulting in anomalous vowel changes in the final syllables. Thus, unstressed <u>-V[wy]#</u> (by the WEAK Version) will > [iua +str][eoÿ -str]#, while stressed <u>-A[wy]#</u> (by the STRONG version) will > [iua -str][èòÿ +str].

(DIGRESSION:) Another peek ahead, to show the ult. outcome of these forms:

--from [íúá]+V[wy] (< medial-h loss only; WEAK V-WY; sequences of like-V permitted)

í+ay > íe > ey í+aw >ío > ew í+uy > íÿ [íə]
ú+ay > úe > o ú+aw > úo > ow ú+iw > úÿ [úə]
while á+iw and á+uy both > á+[ÿ] > a:)
Like-V: í+iw > iÿ ú+uy> uÿ á+aw> áo> ò á+ay áe

--from [V]+[íúá][wy] (< hiatus of med.-h loss; STRONG V-WY; like-V < -h- loss)

i+áy > iè > yè i+áw > iò > yò i+úy > iÿ > yÿ
u+áy > uè > wè u+áw > uò > wò u+iw > uÿ > wÿ
while a+úy and a+íw both > ăÿ > ÿ:
Like-V: i+íw > iÿ > yÿ u+úy > uÿ > wÿ a+áw > aò, ăò > ò: a+áy > aè, ăè > è:

Similarly (and probably from the same dialect) there are SPOR/RARE forms where *-h lowers stressed/unstressed *i,u > e,o-- again, when a medial C is present, this is a regular application. These anomalous sequences resolve in the same way:

--from initial stress (all < med.-h loss, like-V permitted):

í+uh > ío > ew	ú+ih > úe > oy	á+ih > áe > è
í+ih > íe > ey	ú+uh > úo > ow	á+uh > áo > ò

(while -ah does not effect í,ú,á, which > iă,uă,a: as in normal development)

--from final stress (< hiatus (unlike V) or med.-h loss, like-V permitted):

i+úh > ió > yo	u+íh > ué > we	a+íh > ăé > e:
i+íh > ié > ye	u+uh > uó > wo	a+úh > ăó > o:

(while -áh does not affect i,u,a, which > ya,wa,a: as in normal development)

(End Digression)

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III. DIPHTHONGIZATION AND ASSOCIATED .RULES

RULES GOVERNING LENITING *l AND *bdg:

Lenition of *l (as well as of *bdg), it is believed, was a sporadic process in the Ang-Lay dialect of BDG, but was evidently more widespread in many of the dialect areas that were ultimately absorbed in the course of Ang Lay's expansion; consequently when dialect forms were borrowed by Ang Lay, the leniting rules came along with them. The result is the occasional presence of doublets, sometimes outright synomyms, but more often with semantic changes in one or the other; subsequent developments, of course, have tended to obscure the relationship between the forms.

A. *l[+len]: its occurrence is restricted to (1) final position and (2) medially between certain vowels; the MS Rules do not allow final *l[+len] in VV_ or VhV__ (regardless of stress), nor do they allow more than one *l[+len] per CV̲CV̲C̲ morpheme (i.e. not both medially and finally). That means that *l+ CANNOT occur in *CA[*l+]V_ or in diphthongizing *CA[*bdg+]V_ ; but its permitted environments do include diphthongizing *CA[*wy]V_ and *CV[*wy]A_ forms.

Basically, a high vowel V env. changes *l[+len] to a fronted/palatal [ʎ]; a back (more precisely, non-front) vowel env. changes it to a backed/velarized [ɬ]. At this stage in derivations, *i is the only front V, *a,u the only non-front V.

A.1. Final position. Specifically marked final *l[+len] > [ʎ] /[i ±str]__# and > [ɬ] /[a,u ±str]__#. A special rule changes pre-final unstressed a > o/__ɬ#, but stressed **-áɬ is not affected. For more on the fate of final **ʎ,ɬ, see below, ¶4.

A.2. Medial position. *l[+len] occur *regularly* only in certain initial-stress A_V envs.-- to wit, between like-V and between sequences of a/u in either order (á_u, ú_a, in addition to like-V í_i, á_a, ú_u); a final C, if present, must be a TRUE CONS[-len] (excludes *wyh and *bdg+ and l+). In SPOR/RARE cases, *l[+len] may occur in the other vocalic envs., to wit, í_(a,u), ú_(a,i) and á_i.

The regular/obligatory changes to *l[+len] take place, then, according to the following rules (which can possibly be conflated, but will be stated separately here for clarity):

2.1. *l+ > [ʎ] (a) in final -i__#, b) medial -i__i- and c) SPOR. i__(a,u)-- . It is in fact a simple assimilation: *l is [-fr]; that feature changes to [+fr] / front V; formally--

2.1a. final: [-fr] > [+fr] / [+V +fr +hi αstr][+C -obs -nas +lat __ +hi -ba+len]#

2.1b. medial: [-fr] > [+fr] / [+V +fr +hi +str][+C -obs -nas +lat +hi -ba_ +len][+V +fr +hi -str]([+C])

2.1c. SPORADIC/RARE medial: in 2.1b, V2 may also be [+V -fr αhi αba -αlo -str] i.e. í__u,a

2.2. *l+ > [ɬ] (a) in final -(a,u)__#, (b) medial (á/ú)__(a/u) in any order, and (c) SPOR (á,ú)__i-- again, a simple assimilation: *l is [-ba]; that feature > [+ba] / non-front [u,a]. Formally:

2.2a. final: [-ba] > [+ba] / [+V αstr -fr βhi βba -βlo][+C -obs -nas +hi -fr __ +lat +len]#

2.2b. medial: [-ba] > [+ba] / [+V +str -fr αhi αba -αlo][+C -obs -nas +hi -fr__ +lat +len]...
...[+V -str -fr αhi αba -αlo]([+C])#

(This env. covers intervocalic á_a, ú_u, á_u, ú_a)

2.2c SPORADIC/RARE medial: in 2b, V2 may also be [+V +hi +fr -ba -lo -str], i.e. ú__i, á__i

A.3. Next, medial **ʎ,ɬ > y,w, but *only* in *high V* envs., i.e. after í,ú-- /[íú]__[any V] --

3a. [+C +hi αfr -αba +lat] > [-C -V +hi αfr -αba] / [+V +hi αfr -αba +str]__[+V βF -str]

This creates sequences (reg.) íyi, úwu, úwa, (irreg., spor.) íya, íyu, úwi, which then proceed >>> DIPHTH. RULES.

And the rather ad-hoc rule shifting unstr. pre-final a > o/__ɬ# is--

3b. [-ba +lo] > [+ba -lo (+rnd)] / [+V +hi __ -str][+C -obs -nas +hi -fr +ba +lat +len]#

A.4. Development of <u>final **ʎ/ɬ.</u> In V2-REMNANT forms (CACV[ʎɬ], see Ch.___) they will be lost in the course of derivation; while in other cases (diphthongized, final-stress and monosyllabic forms), they survive until a late rule shifts them > y,w, after which, by various adjustment rules, they are either lost or form diphthongs, e.g. **[+fr V=íé]y# > i:/ey, **[+ba V=úó]w# > u:/ow; but **áw# < **áɬ is unaffected, always > /-aw#/

A.5. Now we are left with the sequences -áła-, áłu- and SPOR -áłi-. Rules governing these are more complex, because in some of the source-dialects *ɬ > w early on, and the derived sequences **-áwV- then underwent diphthongization. But rule-ordering in the Ang Lay dialect did not allow that; **-ɬ- remains [ɬ], and a special rule drops the [+V -str] in the vast majority of **áɬ[a,u] forms; **-ɬ- then (or later, see 5b next) > w--

5a-- (APPLIES ±90%) [+V αhi αba -αlo -str] > 0 / [+V +lo +str][+C -obs -nas +lat +hi +ba]__(C)#.

If a final C is present, another special rule shifts **ɬ > w, producing -awC# (it will not undergo V-WY Rules since the **-w- is neither intervocalic nor final). If there is no final C, now-final *ɬ will remain and then by later rule (see 4 above) shift > /w/, and /-aw#/ will remain (but **-uw > /u:/, as is normal).

But all SPOR **-áłi- and a handful of **-áɬ[a,u]- forms *do* undergo the ɬ > w shift and >>> DIPHTH.RULES, leading ult. to òy, òă, òw diphthongs. This MEDIAL *ɬ > w rule can be stated as:

5b-- [+C -obs +lat +hi +ba +len] > [-C -V +hi +ba] / [+V +lo +str]__ {1[+V +hi +fr -str] }(C)#
{2[+V αhi αba -alo -str]}

OCCURRENCE: OBLIG. in Env. 1, SPOR/RARE in Env. 2 >>> DIPHTH.RULES

B. Voiced stop lenition: occurrence of *bdg[+len] is also restricted to medial and final positions, but without limitations as to vocalic envs.; again, MS Rules disallow more than one per CVCVC morpheme. Early on, *bdg+ all shift to their voiced continuant counterparts, *β, *ð, *γ--

[-cont +len] > [+cont] / [+C +obs αF __+voi]

then in intervocalic envs. these shift to semivowels [-C -V +voi] y, w, ɰ (note that ɰ becomes a central [-fr -ba] semivowel)--

a) β > w [+C +obs +fr -ba -hi +cont +voi] > [-C -V -fr +ba +hi +voi] / [+V αstr]__[+V -αstr]

b) ð > y [+C +obs +fr -ba +hi +cont +voi] > [-C -V +fr -ba +hi +voi] / [+V αstr]__[+V -αstr]

c) γ > ɰ [+C +obs -fr +ba +hi +cont +voi] > [-C -V -fr -ba +hi +voi] / [+V αstr]__[+V -αstr]

and, with original *-V[wy]V-, trigger diphthongization. (Note: henceforth, unless specified otherwise, "[wyɰ]" is our shortcut to represent both original *w,y and **w,y,ɰ < these rules.)

In **final position**, like **ʎ,ɬ, **β,ð,γ are lost in the course of the V2 Remnant derivation; otherwise they survive until later rules shift final **-β > w, **-ð > y, **γ > ɰ, and the resulting V+wyɰ sequences >>> VV-REDUCTION RULES.

C. FINAL *h can be dropped now in several environments--

[-C -V -voi] > 0 / X [+V αstr]__# where X may be: #(C), thus a (C)V_# monosyllable;
or (C)[V-αstr]([-C-V+voi]), thus (C)VV_# (hiatus/medial-h) or (C)V[wyɰ]V_# (diphth.)

but it survives in [+C αobs βvoi]V_# at least into the REMNANT RULES where it is deleted in the course of those derivations.

D. Special unstressed-V_2 loss in like-V A(*wy)V(+C)# -- The final, if present, must be a TRUE CONS and [-len]. Because of u/w and y/i constraints, only -áwa-, áya-, -íwi-, -úyu- are involved here.

[+V αF -str] --> 0 / [+V αF +str][-C -V +hi]__([+C αobs -len])#

OCCURRENCE: OBLIG if 0-final; if C final, MAJORITY(80%), SPOR/RARE(20%).

The rule leaves -áw, -áy, -íw, -úy(+C), and they proceed to the **V-WY Rule (strong version),** where the vowels are modified, and final [wy] are deleted. All like-V V(wy)V sequences with final bdg,l+ or wy, and all unlike Á(wy)V(+any C) sequences are dealt with in the

DIPHTH.RULES. (This special rule is necessary, because the like-V sequences Á(*wy)V(C)# (i.e. original *wy) develop differently from like-V A(**wy)V(C)# (i.e. **wy < lenited *bd).

(Examples: by this rule, *awak > aw0k, awk >**òk ult. /òq/; or *-áwal > áw0l, awl > **òl, ult. /òng/; whereas (SPOR V_2 retained, or reg. < β) *awak > resp. **ò|ak > **ò|ăk > òək ult. /òÿq/; while *awal > ò|al > ò|ăl, òəl ult. /òÿng/.)

SPOR/RARE the rule may not apply to like-V if there is a final [+C]; such forms >>> diphth.rules and the outcome will be (C)A[wyă]C (exs., cf. *-áwap reg. > áw0p > òp ult. /òq/ vs. SPOR. -áwap (original *w) ~or reg. -áwap (w < β): > ò|ăp ult. > /òÿq/).

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Prob.em: should -wy be deleted in (???) envs. by V-WY rules???? Which envs??? Mention too that V-WY only occur SPOR in VV env. INTEROVCALIC WY AND FINAL....

E. V-WY RULES. These affect instances of [+V αstr] + original *w/y in most environments; (Note that **w,y < β,ð is a later rule; they can occur after *u/i resp., but those sequences are not relevant here.) There are two versions, WEAK and STRONG.

E.1. Weak V-WY can only be in final position, unstressed -[i,u,a][w,y]# (the only vowels present at this stage), and it (a) raises and fronts/backs *ay > ey, *aw > ow; (b) centers *iw/uy > ÿ(wy)--

E.la. a-raising: [-fr -ba +lo] > [αfr -αba -lo] / X[+V -hi __ -str][-C -V +hi αfr -αba]#
E.lb i/u centering: [αfr -αba] > [-fr -ba] / X[+V +hi __ -str][-C -V +hi -αfr αba]#
OCCURRENCE; OBLIG IF X = [αC αobs -V -αvoi], SPOR/RARE IF X= 0

Thus the rule applies OBLIG to V2 Remnant [+C +obs -voi]__ and diphth. [-C -V +voi]__ forms, but only SPOR if 0-medial (i.e. VV < hiatus or medial h-loss).

E.2. Strong V-WY applies to stressed [i,u,a] in all cases, which will include init.syl. [íúá][w,y] in diphthongizing *(C)A[wy]V(C)# as well as in stressed final syllables with restrictions similar to the above-- it differs from Weak version in that *a is fronted/backed but remains low (> è,ò)--

E.2a, a-shift: [-fr -ba] > [αfr -αba] / X [+V -hi__+str][-C -V +hi αfr -αba]([+V -str]([βC -V]))#
E.2b. i/u centering: [αfr -αba] > [-fr -ba] /X[+V+hi__+str][-C-V+hi -αfr αba]([+V -str]([βC -V]))#

OCCURRENCE: OBLIG IF ([+V -str]([βC -V])) is present, THEN X may = any [αC] or 0) and OBLIG IF ([+V -str]([βC -V])) is absent, THEN X must = [αC αobs -V +voi]; else SPOR/RARE IF X = 0.

(The first statement covers OBLIG *(C)A[wy]V(C)#; the second, OBLIG V2 Remnant with medial [+C +vd] and DIPHTH. with medial [wy]; SPOR only if medial 0 (VV < hiatus, h-loss

Final *w,y are now lost in *#(C)V(wy)# monosyllables, and in #(C)A__[+C] forms created by Rule D above--

E.2c SPOR(50%) [-C -V +hi αfr -αba] > 0 / #(C)[+V +str]__([+C])#

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F. DIPHTHONGIZATION affects all sequences of *-V[wyɥ]V-, with outcomes depending on the stress pattern and presence/absence of final consonants. (We use "[wyɥ]" as shorthand to indicate that the medials may be either original *w,y or **w,y,ɥ < *bdg[+len]-- both w/y's behave identically, only **ɥ needs special treatment.) Note that orig. *w,y do not occur in sequence with u/i resp., (i.e. no -uwV-/Vwu, nor -iyV-/-Vyi-) whereas **w,y may occur in those sequences (thus e.g. **-uwu- can only be < *-u[b+len]u- etc.) The rare diphthongizing forms with medial **w,y < -A[ʎɬ]V- can also have **-íyi-/-úwu- sequences.

Note that in dipthongizing -A[wy;bdg,l+]VC# forms, MS Rules disallow final *l[+len], but do not disallow *bdg[+len] --even though, when they occur, their effect is null due, ultimately, to their position either following V:_# or as second member of a final 2-glide sequences (see comments below Sec. ___). However, all final [C+len] *are* permitted in final-stress forms (-V [wy,bdg+]A__#).

The following changes have taken place prior to this stage:

1. Final *h has been lost. Unstressed now-final [iau]/_h are unchanged, except SPOR [iu] may have lowered > [eo]/_h. Stressed [iu]/_h have been lowered > [eo], [a] is unchanged. (Recall that likeV *A(wy)V- with final *h are not affected by the next rule.)

2. Special final-V loss in like-V [+V+str](wy)__(C)#-- where final C must be TRUE CONS. (i.e. all C [-len], but excluding final *wyh-- thus e.g. *awa[wyɥ] will undergo diphth. rules.). Creates -áw, áy, íw, úy; leaves áwi, áyu, íwa, úya (sequences involving i/y and u/w do not occur); also leaves all final-stress forms. Applies in vast majority of cases; SPOR, a few like-V A(wy)V(C) remain and >>> DIPTH.RULES

3. Medial l-lenition rules have created sequences of reg. íyi, úwu and SPOR íya, íyu, úwa, úwi, áwi and RARE reg. áwa, áwu. Similarly, medial voiced stop lenition / V__V regardless of stress placement-- that is *bdg (via β ð γ) > semivowels w,y,ɥ -- has created sequences of V(wyɥ)V including previously non-permitted u/w and y/i, i.e. uwu, iyi, uwi, iyu (along with iwa, awi, ayu, uya), plus new sequences with -ɥ-. Thus sequences like **-íyi-, úwu, áwu can only derive from either **í(ʎð)i, ú(βɬ)u or á(βɬ)u. (No Final [+C +len] occurs in this A(wyɥ)V_ env.)

4. The V-WY Rules have created (Weak) final [eoÿ -str][w,y]#; and (Strong) [èòÿ +str][w,y] in both initial (C)A[wy]V(C)# and final (C)V[wy]A[wy]# positions; some of these vowels undergo further changes in the course of the derivation.

F.1a. Diphthongs of [+V +str](wyɥ)V(C)# where -C is TRUE CONS (not *wy or *βðγ). Includes (i) SPOR likeV A(*wy)V(C) and (ii) final e/o < SPOR h-lowering --

íwi ÿy	íwu ÿw	iwa ÿ:	úwi uy úwe oy	úwu u: úwo ow	úwa oÿ	áwi > òwi >oy áwe > òy	áwu > òwu > ow áwo > òw	áwa òÿ
íyi i: íye ey	íyu iw íyo ew	iya eÿ	úyi ÿy	úyu ÿw	úya ÿ:	áyi > èyi > ey áye > èy	áyu > èyu > ew áyo > èw	aya èÿ
íuɻi i: íuɻe ey	íuɻu iw íuɻo ew	íuɻa eÿ	úuɻi uy úuɻe oy	úuɻu u: úuɻo ow	úuɻa oÿ	áuɻ(ie) > a:uɻe > è:uɻe > èy	áuɻ(uo) > a:uɻo >ò:uɻo > òw	áuɻa a:

Note: in certain cases final e/o have the same affect as final i/u; thus those cells in the table show no e/o alternative form.

F.1b. Diphthongs of [+V +str][wyuɻ]V[*wy]# The difference with #1a is that <u>final V-wy</u> has undergone WEAK V-WY rule, > eoÿ.

a. initial í **b. initial ú**

íwiw > ÿwÿ > ÿ:	íwaw > ÿwo > ÿw	íwuy > ÿwÿ > ÿ:	íway > ÿwe > ÿy	úwiw > uwÿ > uÿ	úwaw > uwow > owo > o:	úwuy > uwÿ >uÿ	úway >oway >owe > oy
íyiw > iyÿ > iÿ	íyaw > eyaw > eyo > ew	íyuy > iyü >iÿ	íyay > iyey > eye > e:	úyiw > ÿyÿ > ÿ:	úyaw > ÿyo > ÿw	úyuy > ÿyÿ > ÿ:	úyay > ÿye > ÿy
íuɻiw > iuɻÿ > iÿ	íuɻaw > euɻo > e:uɻo > ew	íuɻuy > iuɻÿ > iÿ	íuɻay > euɻe > e:uɻe > ey	úuɻiw > uuɻÿ > uÿ	úuɻaw > ouɻo > o:uɻo > ow	úuɻuy > u:uɻÿ > uÿ	úuɻay > ouɻe > o:uɻe > oy

c. initial á

áwiw > òwiw > owÿ > oÿ	áwaw > òwo > òwò > ò:	áwuy > òwuy > owÿ > oÿ	áway > òwe > òy
áyiw > èyiw > eyÿ > eÿ	áyaw > èyo > èw	áyuy > èyuy > eyÿ > eÿ	áyay > èye > èyè > è:
áuɻiw > a:uɻÿ > a:	áuɻaw > a:uɻo > òw	auɻuy > a:uɻÿ > a:	áuɻay > a:uɻe > èy

Diphthong Rules for the above-- Á[*wy,uɻ]V(C)# and Á[wy,uɻ]V[*wy]#

(The 4 prior changes mentioned above have applied; Rule 1 modifies the output of WEAK V-WY in one special case. NOTE: "ÿ" by itself is [ɨ], later > [ə] in diphthongs)

1. Special lowering, o > ò / òw__w# and e > è / èy__y#

[-lo] > [+lo] / [+V αfr -αba +lo +str][-C -V αfr -αba][+V -hi αfr -αba__ -str][-C-V αfr -αba]#

affects only *-áwaw (> òw<u>ow</u> > òwòw) and -áyay (> èy<u>ey</u> > èyèy; does NOT affect final e,o < SPOR h-lowering.

2. final-wy loss: [-C -V] > 0 / [wyuɻ][V-str]__# (specific to diphth. forms)

(Note that to this point in these rules, the medial glides [wyuɻ] are retained.)

3a. Raising stressed èò > eo / __[wy][i,u,ÿ](C) -- the final C may be any permissible C (not *wy)--

[+lo] > [-lo] / / [+V -hi αfr -αba __+str][-C -V +hi βfr -βba][+V +hi -str](C)#

3b. Fronting/backing "umlaut" á > èò / __ɥ[V -lo -str =ie,uo](C)#--

[-fr -ba +lo] > [αfr -αba -lo] / [+V -hi__+str][-C -V -fr -ba][+V -hi -lo -str](C)#

3c. Lowering ú > o if _(wɥ)[eoa], and í > e if _(yɥ)[eoa] -- lowers í(yɥ)- and ú(wɥ)- if mid/lo vowels follow (stated as two rules for clarity)--

u > o [+hi] > [-hi] / [+V -fr +ba__-lo +str][-C -V -fr +hi αba][+V -hi βlo](C)#

i > e [+hi] > [-hi] / [+V +fr -ba__-lo +str][-C -V αfr +hi -ba][+V -hi βlo](C)#

4. V+str > V: / __ɥV-- [ ] > [+long] / [+V +str][-C -V -fr -ba]

5. wyɥ > 0 / V+str__V -- leaves e.g. ÿ|o, ÿ|e; a:|i, i:|ÿ

[-C -V +hi] > 0 / [+V +str αlong]__[+V -str](C)#

6. sequences of like-V -AV- coalesce to a long V (the stressed V must be [-long], i.e V: < Aɥ-) (Rule 4 above) are not affected)--

SD: 1[+V αF +str -long] 2[V αF -str]

SC: 1 2 ==> 1+2 = [+V αF +str +long]

affects **ee < *iyay, **oo < uwaw, and èè, òò from Rule 2 (spec.lowering)

7. long stressed á: fronted/backed / __[e,o] (sequences < aɥ rule: á: > è: /_ɥe, and > ò: /_ɥo

[-fr -ba +lo] > [αfr -αba -lo] / [+V -hi __+str +long][+V -hi αfr -αba -lo -str]

--Glide formation (unstr. V):

8a. unstressed lo/mid èe,òo resp. are raised to i[+fr], u[+ba]

[-hi αlo] > [+hi -lo] / [+V __ βfr -βba -str]

8b. unstressed [+V -str =iua) > ywă / [V +str]__(C)#

[+V -str] > [-V αhi -αlo βfr -βba] / [-C __](C)#

9. long V > short / __[wy](C)# (remainder of -AɥV- and specific to diphth. rules)

[+long] > 0 / [+V αF +str __][-C -V](C)#

10. INITIAL/FINAL CONS, if present, >>> relevant rules

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F.2 DIPHTHONGS WITH FINAL STRESS

F.2a. Diphthongs of [+V-str](wyɥ)[+V+str](wy)# where final w/y only < *w,y

Final -A(wy)# is the segment first affected here, undergoing Stong V-WY Rule. But note that now, the initial unstressed V[wyɥ] develops anomalously.

a. initial i **b. initial u**

iwíw yÿ	iwáw yò	iwúy yÿ	iwáy yè	uwíw wÿ	uwáw wò	uwúy wÿ	uwáy wè
iyíw yÿ	iyáw yò	iyúy yÿ	iyáy yè	uyíw wÿ	uyáw wò	uyúy wÿ	uyáy wè
iuɻíw yÿ:	iuɻáw yò:ÿ	iuɻúy yÿ:	iuɻáy yè:	uuɻíw wÿ:	uuɻáw wò:	uuɻúy wÿ:	uuɻáy wè:

c. initial a

awíw wÿ	awáw wò	awúy wÿ	awáy wè
ayíw yÿ	ayáw yò	ayúy yÿ	ayáy yè
auɻíw ÿ:	auɻáw ò:	auɻúy ÿ:	auɻáy è:

Diphthong rules for the above V(wyuɻ)Á(*wy)

Previous Strong V-WY has produced: òw, -èy and -ÿ[wy] in all cases --

1. final -wy > 0-- [-C-V] > 0 / [+V +str]__# or [-C-V+voi][+V+str]__#???

2. all stressed V > long following uɻ -- [ ] > [+long] / [-C -V -fr -ba][+V +str __]

3. all unstressed a > 0 / _[wyuɻ]A -- leaves 0[wyuɻ]A and (iu)[wyuɻ]A

[+V +lo -str] > 0 / __[-C-V +hi][+V +str]

4a. uɻ > 0 /(V)_A -- leaves A: and [iu]A

[-C -V -fr -ba] > 0 / ([+V -str])__[+V +str]

5. wy > 0 /V_A -- removes remaining medials in i(wy)A, u(wy)A

[-C-V +hi] > 0 / [+V -str]__[+V +str]# (no need to specifty the [V-str] = i/u here)

6. remaining unstr. init. iu > yw (a- already eliminated; could be simply V-str > (yw))

[+V +hi αfr -αba -str] > [-C -V +hi αfr -αba] / __[+V +str]

INITIAL CONS. will proceed >>> relevant rules; note that surviving yi(:) and wu(:) /#[tds,kg]__will >>> Palatalization; otherwise >>> VV-REDUCTION and adjust > i:, u:

F.2b. Diphthongs of [+V -str](wyuɻ)[+V +str](C)# where C if present may be TRUE.CONS or *bdg,l[+len] (and [+V+str] includes eo < -Áh# (equiv. to 0-final)

iwí yÿ iwé ye	iwú yu iwó yo	iwá yo	uwí wÿ uwé we	uwú u: uwó wo	uwá wo	awí > wé awé > "	awú >wó awó > "	awa wa
iyí i: iyé ye	iyú yÿ iyó yo	iyá ye	uyí wi uyé we	uyú wÿ uyó wo	uyá we	ayí> yé ayé > "	ayú > yó ayó > "	aya ya
iuɻí i: iuɻé ye:	iuɻú yu: iuɻó yo:	iuɻá ya:	uuɻí wi: uuɻé we:	uuɻú u: uuɻó wo:	uuɻá wa:	auɻí/auɻé > auɻè > è:	auɻú/auɻó > auɻò > ò:	auɻa a:

In this environment, the diphthongization process differs from what we have seen in the foregoing cases. Here, it is the -[wyuɥ][+V +str]- sequence that changes, and due to prior regular h-lowering, the stressed vowel can be [e,o] in additon to usual [i,u,a]. The unstressed initial V in some cases survives as a glide, in others not.

1. í,ú > ÿ in -iwí#/-uyú# (NB not in -awi/-ayu; leaves iwÿ, uyÿ)
   [αfr -αba] > [-fr -ba] / [+V +hi -str][-C-V +hi -αfr αba][+V +str +hi __ +lo](C)#

2. í/ú lower> eo / a[wyuɥ]__ (so -a[wyuɥ]+i/u > -a[wyuɥ]+e/o)
   [+hi] > [-hi] / [+V +lo -str][-C-V +hi][+V +str __ αfr -αba -lo](C)#

3. e/o lower > èò / a[uɥ]_# (e/o either < -h lowering, or previous rule)
   [-lo] > [+lo] / [+V +lo -str][-C-V -fr -ba][+V +str -hi αfr -αba__]#

4. a-raising/"umlaut": á > o/[hiV]w_# and á > e/[hiV]y_#
   [-fr -ba +lo] > [αfr -αba -lo] / [+V +hi -str][-C-V +hi αfr -αba][+V -hi __ +str]#

(Note: no changes to sequences -a[wyuɥ]á or -[iu -str][wyuɥ][iu +str]

5. All stressed vowels > long following uɥ --
   [ ] > [+long] /[-C-V -fr -ba][+V +str __](C)#

6. unstr. a > 0 / _[wyuɥ]A -- leaves -[wyuɥ]A (and -(iu)[wyuɥ]A)
   [+V +lo -str] > 0 / __[-C-V +hi][+V +str]

7a. uɥ > 0 /(V)_A -- uɥA: from previous rule, and (iu)uɥA: --leaves -A: and -(iu)A:
   [-C-V -fr -ba] > 0 / ([+V -str])__[+V +str](C)#

7b. wy > 0 /V_A -- removes remaining medials in i(wy)A, u(wy)A
   [-C-V +hi αfr -αba] > 0 / [+V -str]__[+V +str]# (no need to specify that [V-str]=i/u here)

8. remaining unstr. init. iu > yw (a- already eliminated) (will leave yi(:), wu(:) inter alia)
   [+V +hi αfr -αba] > [-C -V +hi αfr -αba] / __[+V +str]

INITIAL CONS. will proceed >>> relevant later rules; note that surviving yi(:) and wu(:) /#[tds,kg]__will >>> Palatalization; otherwise >>> VV-REDUCTION and adjust > i:, u:

FINAL CONS: if TRUE CONS. proceed >>> relevant later rules

FINAL βɬ, ðʎ, ɣ,ʎɬ later > **w, y, uɥ (then **-uɥ > ə) and adjust as follows:

after long-V:, all > 0 // after í, w/ə remain, y lengthens/deletes, sim. after ú, y/ə remain, w lengthens/deletes // after a/ÿ, y/w remain, ə lengthens/deletes // after e/o and è/ò, all remain (NB lengthen/delete is actually part of VV-REDUCTION RULES-- apply here????

TEST IT OUT!!!!note Pal. t+yið > tsið > tsiy > tsi: just what we want!!! sim. t+yiʎ.

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IV. INITIAL-STRESS (C)ACV# FORMS

The principal feature of these forms is: loss of the unstressed final V. Before that happens, however, several changes, both obligatory and sporadic, affect the stressed V.

A. RULES THAT MUST OCCUR PRE-Final-V loss

A.1. [+V+str] > long in CACV#, likeV with Nasal,l,r, i.e. $CA_1(Nlr)V_1$# only:

OBLIG [ ] > [+long] / [+V αF __ +str] [+C -obs αnas] [+V αF -str]#

The outcome >>> Final V loss >>> Neut. or r-rules

NB: (1) It is no longer necessary to specify [len] in [-nas +lat__], since all medial *l[+len] have been changed/deleted by earlier rules. (2) The rule in fact applies vacuously if *-r- (because of the later -Vr-rules). (3) DOES NOT APPLY if a final C is present, $-A_1\{Nlr\}V_1C$-- these >>> remnant rules; outcome is often but not always the same.

SPOR/RARE also if the medial is [+C +obs -len] = stops and s.

A.2. Dial./Sporadic diphthongization < dialectal affrication *(C)A[td,s,kg]i#

In some dialects from which BDG has borrowed, this palatalization occurs; then (either as a form of weak remnant rule, or (after Final V-loss) by influence of the now-final [+hi] affricates) a y-glide developed between the stressed V and the final, e.g. *páti > patsi > paytsi > **payts, or pági > paji > payj i > **payj ~devoiced **payc. If these are recent borrowings --since in BDG their affricated/fricative finals, like stops, would all be neutralized in any case -- it is unncessary in BDG derivations to go through the intermediate steps. But since many are old borrowings, before BDG had developed its own affricates/fricatives, it appears that the rule itself was modified and simply interpreted as insertion of the high semivowel before the sequence [+C +hi][+V +hi], then with regular deletion of the final V (e.g. *páti > pa-y-ti > **payt, uly. > /payq/. In these old forms, there is a tonal difference depending on the voicing of the original C2. (And in some of the dialects, of course, the final affricates have survived.)

If the stressed V is *i, of course, the new sequence -iy- > i:. otherwise normally, the other Vy diphthongs survive unchanged; but there are SPOR/RARE cases where they undergo V-WY rules, and -ay- > è, -uy- > ÿ.

Note that in a case like **pi:ti, that form might also derive from SPOR application of the rule that normally affects N,l,r between like-V -A__V# (given in ¶A.1 above).

The Baw Da rule, therefore, is cast as an anticipatory assimilation, inserting the [+hi] glide before the [+C +hi] [+V +hi]# sequence:

0 > [-C-V +hi +fr] / (C)[+V +str]__[+C +obs +hi αvoi][+V +hi +fr -str]
OCCURENCE: RARE(20%) IF #([+C])-, LESS RARE(30%) IF #y-

Adjustment: -íy- > i: but other -Ay- are unchanged. (But there are SPOR/RARE cases where they >>> V-WY (strong)-- this is most likely if #y-

---

A.3.. Dial/SPOR. w-diphthongization in *-A[pb,kg;q]u#

Similar to the SPOR i-diphthongization seen in A2.a above, this rule creates SPOR w-diphthongs, but in a more specific env., viz. á__u#:

0 > [-C-V +hi +ba] / (C)[+V +lo +str] __ { 1[+C +obs +hi αfr -αba -cont βvoi]#} (=pb,kg)
{ 2[+C +obs -hi +ba +lo -cont -voi]# } (= q)

OCCURRENCE: Preferably with initial C but RARE(20%), somewhat less rare if C2[+voi].

The -áw- diphthongs so created remain unchanged by later rules, except SPOR/RARE they may undergo V-WY rule (strong), and this especially if the initial is *w-. All outcomes >>> Final V-loss and later relevant rules.

The resemblance of some of the sporadic diphthonization rules in CACV# forms to WEAK REMNANT forms is not coincidental-- some of the dialects clearly included CACV# in their versions of that procedure (unlike BDG, where it only affects CACVC#).

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B. OBLIG. rules that best/must occur before final-V loss

B.1. p --> f / #[p]A__V# (SPOR also affects #b--p) (Note: applies only in CACV#, not CVC# or CACVC.)

[-cont] > [+cont] / #[+obs +fr -hi αvoi][+V +str][+obs +fr -hi __-voi][+V -str]#
OCCURRENCE: OBLIG is α = -, SPOR. if α = +

The following two rules do apply to CVC# as well as to CACV(C)--

B.2. both q,k > x /#__Ák- does apply to CVC as well as CÁCV(C)

[-cont] > [+cont] / #[+obs +ba αhi -αlo __ -voi][+V+str][+C] X #
where X may null or [+V -str](C) -- NB: removes env. for vowel-lowering /q-#

B.3. q --> h / #__Áq- does apply to CVC as well as CÁCV(C)

[+C +obs -cont] > [-C-obs +cont]/ #[__+lo -voi][+V +str][+C +obs +lo -voi] X#
where X may be null or [+V -str](C) >>> V-lowering /_q#

All resulting CACV# forms proceed >>> Final V-loss >>> Neut. rules
(NOTE: there are similar rules affecting *p and *q,k sequences in CV_CÁ(C), but these do not concern us here; their circumstances differ)

==========

C.. FINAL-V LOSS (CÁCV#)

This rule affects a wide variety of forms. Unstressed final V > 0 / (C)ÁC__# -- the str.V may at this point be short, long or a diphthong -V(wy)-, and the medial C must be a TRUE CONS., i.e. any stop (+vd-len),s, N,l[-len],r

[+V -str] --> 0 / #(C)[+V +str αlong]([-C -V +hi])[+C αObs]__#

CONDITION: 1. medial C2 must be [-len] if [+obs +voi]; 2. if α = +, then [-C -V] segment is absent.

(Note that [wyh] and [bdg,l+] are excluded from medial C env. The fact that *-h- is not included in the env. here implies that medial h-loss was a much earlier, almost-pan-Gwr??, rule.)

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V. INITIAL-STRESS WITH FINAL CONSONANT #CACVC#: V2 REMNANT

(Note: Since diphthongizing forms #(C)A(wy,bdg+)V(C)# have already undergone their changes, they are not affected here--therefore, there is no longer any need to specify whether a medial [+C] is [±len]. We should also mention that medial *h, having been deleted earlier, will not regularly appear in the forms to be discussed here, though there are SPOR/RARE cases.)

Whereas in Ch. 4.C we saw that in regular CACV# forms the final V[-str] simply drops, now in forms with a final-C ($C_1AC_2VC_3$) we will see that the unstressed vowel of final closed syllable has an effect on the stressed vowel of the penult. (NB Bear in mind that only *i,u,a and SPOR eo (< -h) are present in final syllables at this point in the derivations). The medial will be a TRUE CONS. (or RARE -h-). The vowel of the final unstr. syl. will (1) in some cases undergo changes in quality, (2) then in all cases metathesize with the medial C_2 to form a diphthong-like sequence in the surviving **$C_1A\_C_2C_3$ and the final CC clusters are resolved.) The specific environments are:

(1) WEAK REMNANT (operates when one or both C_2/C_3 are voiceless):

a) if the medial C is any consonant ([+C αobs] = vl/vd.stops,s,N,l,r) then the final C *must* be voiceless: vl.stop,s or h; that is--

--[+C αobs βvoi] [+V -str] [αC αobs -voc -voi]# OR the reverse--

b) if the medial C is voiceless ([+C +obs -voi] = vl.stop,s only, plus SPOR h) then the final C may be voiceless (stops,s,h) or any voiced sound: vd.stop[±len] or l[±len], nasal, r or glides *wy; that is--

--[+C +obs -voi][+V -str] [αC βobs -voc +voi (βlen)]#
SPOR/RARE medial C_2 may be [-C -V -voi], that is, *h
NB: [len] is relevant only if [+obs -cont] or [-obs +lat], else absent/irrelevant

c) A few vowel changes have occurred by prior rules: (1) final unstressed -V[wy] and -ał have become new sequences of -ey, -o(w,ł) and -ÿ(wy), and (2) final -h may have SPOR/RARE lowered [i,u], but otherwise [iau] are unchanged before *-h and all other final C.

d) by the transformational V2 MET. Rule, the unstr. pre-final V (now [iua,eoÿ]) is shifted unchanged to follow the original str.V, thus *-AC_2VC_3 > **-AVC_2C_3#. Rules now adjust certain C_2C_3 sequences (homorganic vl.stop/nasal and SPOR. h+C), then all the remaining final -C_2C_3 clusters lose C_3, leaving **#C_1AVC_2#. The new [+V +str][+V -str] sequences >>> VV-REDUCTION/DIPTH.

(2) STRONG REMNANT (operates when both C_2 and C_3 are voiced):

a) the medial must be [+C αobs +voi] (vd.stop,N,l,r), and the final may be (i) the same, but including lenited **βðγ and **ʎ,ɬ, or (ii) the final C may be a glide *wy [-C -voc +voi]; that is--

--[+C αobs +voi] [+V -str] [αC βobs -voc +voi (γcont)]#
CONDITION: IF α,β both = -, THEN γ = +

b) the unstr. pre-final V undergoes various changes depending on the final (lengthening, breaking, or changes due to following *wy). As in Weak Remnant forms, *-h usually has no effect, but SPOR lowering/length is seen more frequently than in Weak Remnant forms.

These changes may be specified as follows:

(i) by prior rules, (1) unstressed *-aɬ# is now **-oɬ#; (2) -V[wy] by STRONG V-WY Rule > òw,èy, and ÿ[wy] (in the special env. -[+C αobs +voi]__[-C -V +hi]#, see Ch. 3E).

(ii) all V > V: preceding the final vd.continuants **βðγ,ʎɬ and r,l--

[ ] > [+long] / [+V -str __][+C +cont +voi]#
(creates i:,u: a: o: ; the [+C] disallows *w,y)

(iii) First, V-breaking (homo.glide insertion) /V__bm,dn,gŋ creates -Vw(bm), -Vy(dn), -Vuɻ(gŋ)

0 > [-C -V +hi +ba]w / [+V -str]_ [+C αobs +fr -hi -ba αcont -αnas +voi]#
0 > [-C -V +hi +fr]y / [+V -str]__[+C αobs +fr +hi -βba αcont -αnas +voi]#
0 > [-C -V +hi -fr -ba]uɻ / [+V-str]__[+C αobs -fr +hi +ba αcont -αnas +voi]#

Second, a special version of WEAK V-WY with glide-deletion-- *only* at this point, *only* in the env. [+C αnas +voi]#, viz. a > e/o /_y/w, iy/uw > i:/u:, iw/uy > ÿ, iua > long /_uɻ, then [wyuɻ] > 0.

--ay/aw > èò
[-hi -fr -ba +lo -rnd] > [-hi αfr -αba -lo -αrnd] / [+V__-str][-C -V +hi αfr -αba][+C αnas +voi]#

--iu > ÿ/_wy
[+V +hi αfr -αba -αrnd] > [-fr -ba -rnd] / [+V +hi __-str][-C-V +hi αfr -αba][+C αnas +voi]#

--V-length /_uɻ
[ ] > [+long] / [+V __-str][-C -V -fr -ba][+C αnas +voi]#

--glide loss
[-C -V +hi +voi] > 0 / __[+C αnas +voi]#

(NB this is similar to a later SPOR BREAKING Rule, except that that rule applies to [+V +str], uɻ > ə/length, and -wy do not delete.)

c) as above, the V2 MET. Rule shifts these pre-final unstressed V (now iua,eè,oò,ÿ, i:,u:,a:) into the original penult, then final nasal/stop sequences are adjusted, and remaining C_3 are deleted from the final -C_2C_3 cluster. The new **-AV- sequences >>> VV-REDUCTION/ DIPHTH.

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3. THE V2 METATHESIS RULE applies to all Remnant forms:

SD: 1#(C)[+V +str] 2[+C αobs] 3[+V (+long) -str] 4[βC -V] (4 = any +C or *wyh])

SC: 1 2 3 4 ==> 1 3 2 4

(NB SPOR/RARE 2 may be [-C -V -voi] --i.e., -h-)

This will create: #(C)[+V +str][+V (+long) -str][+C αobs][βC -V]#, with a variety of final C_2C_3 clusters. Four of these clusters show special development: (1) identical nasal+nasal > nasal + homorganic vd.stop (e.g. mm > mb); (2) if homorganic nasal+stop [±voi] (including the output of case (1), the nasal deletes; (3) in the case of homorganic stop [±voi] +nasal, the stop deletes (e.g. pm > m; (4) SPOR/RARE h+C/wyh). (These rules occur only in this REMNANT env.) Thus in these cases, the original pre-final C is deleted.

3a. Identical Nasal+Nasal > Nasal+homorganic vd.stop:

[-obs +nas] > [+obs -cont +voi] / [+C -obs +nas αF][+C ___αF]#

3b. Homorganic nasal+stop[±voi] > 0-stop (applies to original hom. NC + output of Rule 1)

[+C +nas αF] > 0 / __[+C+obs -cont αF βvoi]#

3c. Homorganic stop[±voi]+nasal > 0-nasal

[+C +obs -cont αvoi βF] > 0 / __[+C +nas βF]#

3d. SPOR/RARE medial -h- deletes before final [+C]; this leaves original C_3 and (temporarily) the final C_2C_3 sequence -h+wyh#.

[-C -V -voi] > 0 / __[αC -voc]#

The net effect is that forms that had **-h[C]# will not now undergo the normal -CC rule, but **h+wyh will, and such forms will end up with /h/ in final position.

After those rules, which reduce their clusters to a single C, all remaining sequences of final C+C or C+semivowel, lose the second, absolute final, element--

3d. Final-CC Rule:

[αC -V] > 0 / [+C]__# (leaving in effect the original C_2 of all forms)

The -AV- vowel sequences proceed to the VV-REDUCTION/DIPHTH Rules

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VI. FINAL-STRESS #CVCA(C)#: V1 DELETION AND REMNANT RULES

Note again: because all forms with medial *wy, and leniting *bdg,l have now undergone their respective developments, those consonants are no longer present in medial position in CVCA(C) forms-- except for a few SPOR/VERY RARE cases where medial *wy has not triggered diphthonization-- these are loans, of course, and must have Underlying Forms specially marked "-Diphth.". At this stage in the derivation, then, we are dealing with initial TRUE CONS. (stops,s,N,l,r) plus *wyh, and medial TRUE CONS. plus h (and rare w/y)-- in the following sequences:

A.1. BOTH CONS. [-voi] (including *h): 1) the unstressed V_1 deletes; 2) the C_1C_2 clusters that result then undergo modification in the INIT.CC RULES to be set forth below (specifically, *pp-, *k+k/q-, *qk-, *qq-, *tt- *ss and sequences of *Ch-/hC-); but otherwise it will be seen that C_1 deletes, leaving C_2 unchanged. HI tone is the usual result, unless *q has survived-- it produced MID tone. Forms with 0-initial (#VC[-voi]A(C)) also delete the initial V, with no further effect. Note that *(ts)i(ts)í# is an exception, it undergoes V1 MET.),

A.2. CONS #[-voi]--[+voi] or #[+voi]--[-voi]: The initials/medials may include: *h if VL, initial *wy if VD. As above, the unstressed V deletes and all the resulting CC clusters >>> INIT.CC RULES. A frequent outcome is that C_2 takes on ±voice of C_1. Note here that *(ds)i(ds)í is an exception, it undergoes V1 MET.

B. CONS #[+voi]--[+voi] (initial may include *wy): A MINORITY(30%) of CVCA# (no final) are treated as in (2) above (i.e. V1-DEL), and include OBLIG. specifically forms with sequences of *(n,d,ŋ,g)i(r,l)A- (or the reverse *(rl)i(n,d,ŋ,g)A-, and SPOR the same forms with initial *u,a as well.; the MAJORITY all-voiced CVCA#, and all CVCAC undergoV1 REMNANT/ METATHESIS, then >>> INIT.CC RULES. 0-initial #VC[+voi]A(C) forms also undergo V1 REM., but with no further effect.

Final consonants, which may be of any sort (including *bdg,l[+len]) are irrelevant to the application of these rules.

6.1. V_1 DELETION

1a. OBLIGATORY when both the initial and medial C are voiceless (*ptkq,s,h); OR if there is 0-initial and voiceless medial; OR when the initial and medial are opposite in voicing (thus vl--vd or vd--vl).

1a. [+V -str] > 0 / {1 #([αC -voc -voi])__[αC -voc -voi]}
{2 #[αC -voc βvoi]__[αC -voc -βvoi]}

1b. SPOR/MINORITY(30%) in CVCA# only: when the initial/medial C are both voiced and TRUE CONS.

1b. [+V -str] > 0 / #[+C αobs +voi]__[+C αobs +voi][+V +str]#

There are exceptions in both cases and among these are (both 1a/b) forms where both initial/ medial are dental [t,d,s], and both vowels are *i (i.e. [td]i[td]í#. These undergo V1 REMNANT/MET (next rule).

The regular output of Rules 1a/b will be **$(C_1)C_2$A(C)#-- the initial CC-clusters, along with those created by the next set of rules, are then resolved/modified by the later INITIAL-CC RULES. (NOTE: since a frequent effect of CC RULES is to voice/devoice the C2, homophonous forms will arise, but they are ult. differentiated by tone, depending on the original sonority of C2. Thus while both **pk- and **pg- > k-, the first will show HI tone, the second LO; similarly, **dp- > b-(HI) while **db- > b-(LO).

6.2. V1 REMNANT/METATHESIS. The unstressed V_1 metathesizes to position between C_2 and the stressed vowel according to the following T-Rule. It affects the majority (70%) of *CVCA, and all CVCAC forms whose initial and medial C both are voiced, thus initial [bdg,N,rl,wy], medial [bdg,N,rl]; and also forms with 0-initial and voiced medial-- these last behave somewhat irregularly. Again, there may be rare sporadic instances of medial *w,y.

SD: 1#([αC -voc +voi]) 2[+voc -str] 3.[+C βobs -voc +voi] 4.[+voc +str](C)#

SC: 1 2 3 4 ==> 1 3 2 4, leaving a structure **(C)C-[V-str][V+str]-(C)

CONDITIONS: 1. also applies OBLIG if 1,3 both [+C +fr +hi αcont βvoi], 2,4 both [+V +hi +fr];
2. SPOR if 3 is [-C -obs -voc +voi]

(Condition 1 applies to specifically to *(tds)i(tds)í(C); Cond. 2 allows spor. medial *w,y)

In 0-initial forms, *i- and *u- always metathesize, *a- often does not.

(Most of these forms *will* have a final C.)

In all cases, the resulting #C_1C_2-clusters proceed to the INIT. CC RULES; after CC clusters have been resolved, general rules like Palatalization and r/l merger take place, then all Glide-V sequences-- those created by previous rules, as well as in this series-- are resolved in the VV-REDUCTION RULES.

6.3. INITIAL-CC CLUSTERS

The following initial clusters are now present in derivations (those resulting from V1 MET., of course, are of the shape #CC[iua -str]A(C)#, but the presence of the [V -str] does not affect the operation of these CC- rules):

vl+vl/vd-- (ptkqsh) + (ptkqsh/bdg,N,l,r; rare w,y)

vd+vl/vd-- (bdg,N,lr,wy) + (ptkqsh/bdg,N,lr; rare w,y)

or in summary: (ptkqs,bdg,N,lr,wyh) + (ptkqs,bdg,N,l,r,h; rare w,y). There are also cases of single now-initial C (formerly medial) < original 0-initial forms; they do not undergo the following rules. (Note also that *[wyh]V[wy]- cannot occur, since RARE medial w/y are retained only after TRUE CONS initials.)

At this point, certain initials in C_1C_2 can be removed, since the C_2 undergoes no change. These initials are: (a) all vl/vd stops,s,l,r before nasals, and (b) *h before t,nasals,l,r, and another h--the reason being that nasals, and t,s,l,r,h are unaffected by those preceding sounds. There are other sequences where C_2 are unaffected, but in more specific envs. that will be dealt with at the appropriate time. However, there are SPOR/RARE instances where [ptk][nasal] coalesce > vd.stop at the original vl.stops POA (thus tm- > d-, pŋ- > b etc.-- the nasal vanishes)

6.3.1a. SD 1# 2[+C +obs αF -lo -cont -voi] 3[+C -obs βF +nas]

SC: 1 2 3 ==> 1 2 3 > 0 = #[+C +obs αF -lo +voi]

But in case of **q+N, the outcome is a voiceless stop at the nasal's POA (e.g. qn > t, qŋ > k)--

6.3.1b. SD 1# 2[+C +obs +ba +lo -cont -voi] 3[+C -obs αF +nas]

SC 1 2 3 ==> 1 2+3 = #[+C +obs αF -cont -voi]

The now-initial single C are not affected by the rules to follow.

Otherwise, this general INIT-C Loss rule applies:

6.3.2a INIT-C Loss(a): [+C αobs -voc -nas βlat] > 0 / #__[+C -obs +nas] = all stops,s,l,r > 0/#_N

6.3.2b INIT-C Loss(b): [-C -V -voi] > 0 /#__{1 #[+C αobs -αvoi (+fr +hi -cont)]} (h > 0/t,s,N,l,r)
{2 #[-C -V -voi] } (h > 0/#_h)

CONDITION ON (b), Env. 1: IF α = +, THEN [+fr +hi -cont] are present; IF α = -, THEN [fr hi cont] are absent/irrelevant.

Rule (a) covers covers all stops/s,l,r [+C ±obs -voc -nas] before nasals; (b) covers *h before (1) *t [+C +obst...] and nasals,l,r [+C -obs] and (2) h [-C -V -voi]. (We insert versions of INIT. C LOSS at various points here, for clarity; in fact it would be a general rule, with many specific environments, at the end of all derivations.)

6.4. CONT-CONS. MET. Next, initial [wy,rl] METATHESIZE with C_2--

SD: # 1[αC -obs -voc +voi (βlat)] 2[+C] 3([+V -str])[+V +str](C)#

SC: # 1 2 3 ==> # 2 1 3

CONDITION: IF α = +, then [βlat] is present; otherwise irrelevant/absent.

The reason for this rule is, that the outcomes of **[wyrl]+C and **C+[wyrl] are identical.

From this point on, the single #cons. remaining after C-Loss 1a/b undergo no further rules here; similarly, most sequences of #vl/vd stop,h+[wy]- survive until later rules. There are, however, some exceptions: *q > x before r,l and SPOR before w/y; and td/kg+y and s+wy will undergo the later PALATALIZATION Rule.

q-fric. rule:
[-hi +lo -cont] > [+hi -lo +cont] / #[+C +obs __ +ba -voi][αC -obs -voc +hi (-αnas βlat)]

CONDITION: [nas lat] present only if α = +; else absent/irrelevant
OCCURRENCE: OBLIG if C2 = [+C], SPOR ±40% if C2 = [-C]

This sequence **x+w,y, like other C+wy (including regular *q+w,y), survives without further changes.

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6.5. INITIAL CC RULES

6.5.1. NASAL+STOP and STOP+STOP

First we deal with (1) nasals and vl.stops following any nasal, and (2) vl.stops following any vd.stop, where all C2 > vd.stop at C2 POA. Basically, a vl.stop or any N [αF] > vd.stop [αF] following any initial N or vd.stop. There is one exception: *bp SPOR > bh (ult. > f), actually a sporadic part of a more general rule where serveral C2 > h in certain envs. (see ___below). But we will give the relevant portion of the rule here for clarity:

5.1a. SPOR. *p > h / #b_ : [+C +obs +fr -lo -cont] > [-C -obs -fr +lo +cont] /
#[+C -obs +fr -hi -cont +voi][-voc -hi -ba __ -voi]

This SPOR form no longer fits the [-cont] stop env. for the next rules; along with others to be developed later, it joins the set of C+h forms, to be discussed below.

Then the general nasal/stop rule: nasals and vl.stop [ptk only] > vd.stop /[N,vd.stop]__

5.1b. [αobs -αnas -αvoi> [+obs -nas +voi]/ #[+C αobs -αnas βF -cont +voi][+C__ γF -cont]

The sequence [nas, vd.stop]+q requires a special rule, there being no voiced counterpart of *q; instead, *q > k in these cases:

5.1c. [-hi +lo] > [+hi -lo] / #[+C αobs -αnas βF -cont +voi][+C +obs__+ba -cont -voi]

These rules create such sequences as (mnŋ)b < N[m,p]; (mnŋ)d < N[n,t]; (mnŋ)g < N[ŋ,k], plus [mb]k or [nd]k etc. < [mnŋ]q; also bd < bt, dd < dt, gg < gk (but NB gk < gq) etc.

Aside from **dd, all these forms, along with unaffected nasal+vd.stop then proceed >>> INIT. C Loss(c) at 6.5.5 below. Note that cases of #(stops/s/h/l/r)+nas have been reduced to #nasal by INIT. C-Loss(a/b) above.

6.5.2. identical vd/vl stop sequences. Second, sequences of identically voiced stops, vl--vl or vd--vd. In most cases, there is no change to C2, but there are some exceptions where C2 aspirates, > h (ult. > a fricative).

5.2a. pp, k(k,q), qq resp. > ph, kh, qh. While this could all be written as a single rule, for clarity each portion will be given separately here:

5.2b. p > h / #p_ :

[+C +obs +fr -hi -lo -cont] > [-C -obs -fr -hi +lo +cont] / #[+C +obs +fr -hi -lo -cont][__ -voc -voi]

5.2c. k,q > h / #k_ :

[+C +obs αhi -αlo +ba -cont] > [-C -obs -hi -ba +lo +cont] / #[+C +obs αhi -αlo +ba -cont][__ -voc -voi]

5.2d. q > h / #q_ :

[+C +obs +ba -cont] > [-C -obs -ba +cont] / #[+C +obs +ba -cont][__ -voc +lo -voi]

The output of these rules joins the set of C+h forms, and undergoes those rules.

5.2e. q > h / #_pkq (creates new seq. of h+pkq)

[+C +obs +ba] > [-C -obs -ba] / [-voc__ -voi][+C +obs αfr -αba βhi -βlo -cont -voi]

CONDITION: IF α = +. THEN [hi lo] are absent/irrelevant

-- q also > h / #_s: [+C +obs +ba] > [-C -obs -ba] / [-voc__ -voi][+C +obs +hi +fr +cont -voi]

These outputs join the set of *h+C forms and undergo those rules.

Note also, sequences of **tt and *dd are subject to later rules.

6.5.3. vl--vd stops--Finally, a rule devoices vd.stops following vl.stops (ptkq + bdg > (ptkq)ptk, without exceptions:

[+voi] > [-voi] / #[+C +obs αF -cont -voi][+C +obs βF -cont __]

Note that because of rule-ordering, **pp, kk < *pb, kg do not aspirate.
Aside from **tt < *td, these too proceed >>> INIT. C Loss(c).

6.5.4. Rules applying to *tt/dd. These become new affricate units, /ts/ and /dz/ resp. by a T-Rule:

SD: 1# 2[+C +obs +hi +fr -cont αvoi] 3[+C +obs +hi +fr -cont αvoi]

SC: 1 2 3 ==> 1 2+3 = #[+C +obs +hi +fr +delR αvoi]

Note that if both V in these forms are [i], they are subject to a special PALATALIZATION Rule. Otherwise, since these are now C-initial forms, they are not subject to further rules at this point.

6.5.5. The vl--vl sequences pp, k(kq), q(pkq), and tt, dd having been eliminated by the foregoing rules, now the remaining sequences of vl--vl < vl.stop+vd.stop (viz. (ptkq)ptk, less tt-), and of vd.stop + vd.stop, in which, except for **dd, there is no change to C2-- plus all other outputs of

the GROUP A rules-- proceed to INIT C Loss(c). At this point, C_1 = only initial nasals/stops, and C_2 = stops.

INIT. C Loss(c): [+C αobs -αnas -cont] > 0 / __[+C +obs -cont]

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6.6. INIT. *s+C (but not s+N-- INIT.C Loss(a) deleted this *s, and such forms are now simply N-initial). Here we will leave aside *s+wy, which undergoes the general PALATALIZATION rule much later, as well as *s+h, which is dealt with in the C+h rules below. That leaves *s followed by the remaining TRUE CONS., viz. stops,s,r,l.

Because the effects of *s+C and *C+s are the same, we posit metathesis, to avoid duplication of rules; however, since the sequence s+r,l is already the result of the CONT-CONS MET Rule (and *rl+s would develop the same as s+rl) and need not be re-metathesized, it must be dealt with first. Recalling the discussion of that MET. rule, we mentioned that *q > x /_[r,l]; now it appears that *r,l behave anomalously following both voiceless fricatives **x and *s (for **x+r,l see 5.9 below); in the case of *s+r,l, both > y--

6.6a. [+C -fr αlat] > [-C +fr] / [+C +obs +hi +fr +cont -voi][__ -obs -voc +hi -nas +voi]

The output **sy >>> later PALATALIZATION.

Now remaining sequences of *s+C can undergo s-metathesis (applies vacuously to *s+s):

6.6b. SD: # 1[+C +obs +hi +fr +cont -voi] 2.[+C αobs -nas]

SC: # 1 2 ==> # 2 1

6.7. INIT. *C+s. All sequences are affected, and the result is usually a new fricative or affricate phoneme. Where two seqments are being changed into one, T-Rules are preferred over series of ordered rules.

6.7a. STOPS/S + S

1.Like **tt, *ss also affricates > /ts/:

1a. s+s > ts SD: # 1[+C +obs +fr +hi -cont -voi] 2[+C +obs +fr +hi +cont -voi]

SC: #1+2 ==> #[+C +obs +hi +fr +delR -voi]

Since [ts] is now a unit phoneme /ts/, thus a single C, no further rules affect it here; but if both vowels in the form were *i, it will undergo a special Palatalization rule.

1b. The sequence *q+s > hs can also be treated here:

[+C +obs +ba -cont] > [-C -obs -ba +cont] / #[__ +lo -voi][+C +obs +hi +fr +cont -voi]

6.7b. ptk/bdg+s, and Nasal+s (and stops/nasals+r,l): There are similar developments here: stops+s > new fricatives/affricates, and stops+r,l > new stops/affricates. In the sequences N+s and

N+r,l, an excrescent stop develops between the nasal and the continuant-- this stop is homorganic with the nasal, but matches the voicing of the following *s or *r,l; these then develop in the same way as stop+s/r,l. The excrescent stop rule is--

0 > [+C +obs +F -cont -αvoi] / #[+C -obs +F +nas]__[+C αobs -nas +cont -αvoi]

This creates mps, nts, ŋks and mb(r,l), nd(r,l), ŋg(rl), to be discussed later).

2a. (N)p,b+s > f SD: 1# ([+nas]) 2[+C +obs +fr -hi -cont αvoi] 3[+C +obs +fr +hi +cont -voi]
SC: 1 2 3 ==> 1 2+3 = #([+nas])[+C +obs +fr -hi +cont -voi]

2b. (N)t,d+s > ts,dz SD: 1#([+nas]) 2[+C +obs +hi +fr -cont αvoi] 3[+C +obs +fr +hi +cont -voi]
SC: 1 2 3 ==> 1 2+3 = #([+nas])[+C +obs +hi +fr +delR αvoi]

2c. (N)k,g +s > x SD: 1#([+nas]) 2[+C +obs +hi -fr +ba -cont αvoi] 3[+C +obs +fr +hi +cont -voi]
SC: 1 2 3 ==> 1 2+3 = #([+nas])[+C +obs +hi -fr -ba +cont -voi]

CONDITION: [+nas] optionally present only if 2, and output, is [-voi]

6.8. stop+r,l, and N+r,l. In these cases, new stops or affricates are created from the basic stop+rl and N+stop+rl clusters. Although *r/l have the same effect in all cases, it appears they had not yet actually merged, since the tones associated with the outcomes will differ (if *l, usually a higher tone than if *r); and the [+retr] feature of *r is relevant. Essentially: p/b+r/l > t,d resp.; t+r/l > new /tr/, d+r/l > new /dl/; while k/g+r/l > c,j resp.

3a. (N)b,p+rl > d,t SD: 1#([+nas]) 2[+C +obs +fr -hi -cont αvoi] 3[+C -obs +hi -nas βlat]
SC: 1 2 3 ==> 1 2+3 = #([+nas])[+C +obs +fr +hi -cont αvoi]

3b. (N)d,t+rl > dl,tr SD: 1#([+nas]) 2[+C +obs +fr -ba +hi -cont αvoi] 3[+C -obs +hi -nas βlat +retr]
SC: 1 2 3 ==> 1 2+3 = ([+nas])[+C +obs -fr -ba +hi +delR +retr αvoi]

3c. (N)g,k+rl > j,c SD:1#([+nas]) 2[+C +obs -fr +hi +ba -cont αvoi] 3[+C -obs +hi -nas βlat]
SC: 1 2 3 ==> 1 2+3 = #([+nas])[+C +obs -fr -ba +hi +delR αvoi]

CONDITION: [+nas] optionally present only if 2, and output, is [+voi]

At this point we will apply C1 Loss to the nasals that survive in N+[f,ts,tr,c] and N[dz,dl,j]--

[+C +nas] > 0 / #__[+C +obs +delR αvoi]

These sequences thus become unit C phonemes /tr,dl,c,j), and their forms have simple C-initial.

6.9a. Sequences of **x+r,l-- these derive from original *qr- and *rq- initial clusters, and their anomalous behavior following voiceless continuants *s and **x was mentioned above. In the case of **s+r,l, we saw that [r,l] both shift to **y; here, they shift > **w,y depending on the following vowel, but each behaves differently.

In **xr-, r dissimilates, > w before front [i], y before non-front [u,a]; while in **xl, l shows a change similar to lenition, > y before the front V, w before the non-front.

1a. r > y / #x__(au)
[+C -nas -lat] > [-C +fr] / #[+C +cont +ba][__-obs -voc +hi][+V αhi -αlo -fr +str]

1b. r > w / #x_i
[+C -nas -lat] > [-C +ba] / ##[+C +cont +ba][__-obs -voc +hi][+V +hi +fr +str]

2. l > y / #x__i, and > w/ #x__(u,a)
[+C -nas +lat] > [-C αfr -αba] / #[+C +cont +ba][__-obs -voc +hi][+V βhi -βlo αfr -αba +str]
CONDITION IF β = -, THEN [fr ba] are both -

SPOR/VERY RARE(10%) there may be a remnant V by MET preceding the stressed vowel; it does not affect these rules-- there will simply be an optional ([-C -V]) preceding the [+V +str], and anomalous outcomes **x[wy](wy)A to be dealt with in VV-REDUCTION.

6.9b. Sequences involving r,l+r,l-- specifically, *rl,*lr and *ll (*rVr- being impermissible), some of which arose by CONT-CONS MET. (i.e. original *l+r > rl, and original *r+l > lr, and vacuous *l+l). In all three cases, the sequence > new unit /dl/ by the following T-Rule:

SD: # 1[+C -obs +hi -fr -ba -nas αlat -αretr +voi] 2[+C -obs +hi -fr -ba -nas βlat -βretr +voi]

SC: # 1 2 ==> # 1+2 = [+C +obs +hi -fr -ba -nas +delR +retr +voi]

Note that the new /dl/ will NOT be followed by [wy], since their original forms are among those that undergo V1 DEL, not V1 MET. These forms undergo no further rules, since they are now C-initial. spor qira ? qrya > xrya > xyya xye // qura qrwa xrwa xwwa xwo

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6.10. Sequences of *h+C. The early rule C1 Loss(b) eliminated *h before *t,nasals,r,l and h, so that those are now C-initial forms and out of consideration. (However, *r will ult. merge with *l.)

1. *h+vd.stop: the vd.stops devoice; the forms >>> C1 loss

[+voi] > [-voi] / [-C -V -voi][+C +obs αF -cont __]

2. *h+w,y remain unchanged; they do not undergo C1 loss.

3. *h + remainder, ie, h+[p,k,q,s]: some are original, others derived from the shift of q > h before those consonants; but all will develop the same as [p,k,q,s]+h, and to avoid duplication of rules we posit metathesis of the *h-:

SD: # 1[-C -V -voi] 2[+C +obs -voi]

SC: # 1 2 ==> # 2 1

6.11. Sequences of *C+h.

1. ph (and SPOR bh), kh, qh and sh all become fricatives, /f, x, h, š/ resp. The individual rules are:

1a. p+h (SPOR bh) > f SD: 1# 2[+C +obs +fr -hi -cont αvoi] 3[-C -V +cont -voi]

SD: 1 2 3 ==> 1 2+3 = #[+C +obs +fr -hi +cont -voi]

OCCURRENCE: OBLIG IF α = -, SPOR(40%) IF α = +

1b. k+h > x SD: 1# 2[+C +obs +hi +ba -cont -voi] 3[-C -V +cont -voi]

SC: 1 2 3 ==> 1 2+3 = [+C +obs +hi +ba +cont -voi]

1c. q+h > h (simple deletion): [+C +obs +ba +lo -cont -voi] > 0 / #__[-C -V +cont -voi]

1d. s+h > unit /š/ SD: 1# 2[+C +obs +hi +fr -ba +cont -voi] 3[-C -V +cont -voi]

SC: 1 2 3 ==> 1 2+3 = #[+C +obs +hi -fr -ba +cont -voi]

2. SPORADIC(40%) In the sequences *th and *nas+h (there will be no following glide [ywă]), the stressed V lengthens, especially if there is a final C-- V > V: / #[t,n]h__(C)# --

SPOR(40%) [ ] > [+long] / #[+C αobs -αnas +hi +fr -cont][-C - -voi][+V αF __+str](C)#

3. vd.stops devoice before h: [+voi] > [-voi] / #[+C +obs αF -cont __][-C -V -voi] -- as we just saw, however, *bh may SPOR > f. In these reg. sequences **ph,th,kh, plus *th and nas+h from rule 2, and **fh- here, the -h- now deletes:

H-LOSS: [-C -V -voi] > 0 / #[+C αobs -αnas -αvoi]__

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6.12. There remain now the clusters *r+w,y and *l+w,y created by CONT-CONS.MET < *#w/y--r/l-, and RARE clusters *w+r,l and *y+r,l created by that MET < *#r,l--w,y- in cases of SPOR retained medial *w,y. To complicate developments, these will usually have a following glide due to V1 MET in the #[+voi]__[+voi] env.; thus e.g. **rw(ywă)A(C) < *rVwA- or **yl(ywă)A(C) < *lVyA-.

These clusters behave irregularly: rw, wr, wl > f, while ry > š, but yr > j; and lw, ly > w,y (simple deletion, though historically it involved several steps), while yl > š. The rules are quite ad-hoc:

1. l > 0 / #__[wy]: (eliminates **lw- from Rule 2, **ly from Rule 3)
[+C -obs -nas +lat] > 0 / #__[-C -V +voi]

2. w > f/ l,r (either side, rw/wr,wl; but not **lw, already > w in Rule 1)
[-C -obs -V -fr +hi +ba +cont +voi] > [+C +obs +fr -hi -ba +cont -voi] / [+C -obs -nas αlat]

3. y > š /l,r (either side ry/yr, yl, but not **ly, already > y in Rule 1)
[-C -obs -V +fr +hi -ba +cont +voi] > [+C +obs +hi -fr -ba +cont -voi] / [+C -obs -nas αlat]

4. š+r ==> j (removes š+r (y+r) from next rule)

SD: 1# 2[+C +obs +hi -fr -ba +cont -voi] 3[+C -obs +hi -fr -ba -nas -lat +retr]

SC: 1 2 3 > 1 2+3 = #[+C +obs +hi -fr -ba +delR +voi]

5. l,r > 0 / [š,f] (either side, fr/rf,šr/rš and fl,šl,)
[+C -obs -nas αlat] > 0 / [βC βobs +hi -fr -βba +cont -βvoi]

==========

delete this stuff.....

The general C1 Loss Rule (in case any are left!! or have been overlooked)--

[αC -voc] > 0 / #__[αC -voc]

==========

Summary of CC changes (initial C_1 in the left column, C_2 across the top)

	-p	***-b***	***-t***	***-d***	***-k***	***-g***	***-q***	***-m***	***-n***	***-ŋ***	***-s***	***-r***	***-l***	***-w***	***-y***	***-h***
p-	f	p	t	t	k	k	q	m	n	ŋ	f	t	t	pw	py	f
b-	b/f	b	d	d	g	g	k	m	n	ŋ	f	d	d	bw	by	p/f
t-	p	p	ts	tz	k	k	q	m	n	ŋ	ts	tr	tr	tw	ts	th*
d-	b	b	dz	dz	g	g	k	m	n	ŋ	dz	ll	ll	dw	dz	t
k-	p	p	t	t	x	k	x	m	n	ŋ	x	c	c	kw	c	x
g-	b	b	d	d	g	g	k	m	n	ŋ	x	j	j	gw	j	k
q-	f	p	t	t	x	x	h	m	n	ŋ	š	xy	xy	qw**	qy**	h
m-	b	b	d	d	g	g	k	b	d	g	f	d	d	mw	my	mh*
n-	b	b	d	d	g	g	k	b	d	g	ts	ll	ll	nw	ny	nh*
ŋ-	b	b	d	d	g	g	k	b	d	g	x	j	j	ŋw	ŋy	ŋh*
s-	f	f	ts	dz	x	x	š	m	n	ŋ	ts	š	š	šw	š	š
r-												-	ll	f	š	
l-												ll	ll	w	y	
w-												f	f	fw	fy	
y-												j	š	šw	j	
h-	f	p/f	(t)	t	x	g	h	(m)	(n)	(ŋ)	š	(l)	(l)	hw/f	hy/š	(h)

* In these sequences, the following V lengthens, then the -h- drops.

** Also, sporadic xw, xy; in other cells, a sporadic development follows the /, e.g. b/f

Note that w,y,r,l cannot precede True Cons. due to metathesis; but sequences of rl, lr, ll, wr, rw, wl, lw are possible, along with rare ww, wy, yw, yy (rr is not a permissible sequence).

Note also that h deletes before t, nasals, r,l,h, leaving those consonant unchanged.

VII. REDUCTION OF VV SEQUENCES

7.1. We have mentioned-- and at times shown the effect of-- these rules at many points in the fore-going discussion. Sequences of two vowels-- one stressed, the other unstressed-- are created in the course of many derivations:

-- SPOR in hiatus, both AV and VA, if the form ended in *w,y,h

-- REG. in AV and VA < medial-h loss (± any permitted final including *w,y,h) and SPOR if the form ended in *w,y,h

-- REG in initial-stress V2 REMNANT forms (with final [+C] in almost all cases)

-- REG in certain final-stress V1-REMNANT forms, SPOR in others

and in these cases the V+V sequences remain as such at this point. The DIPHTHONG Rules also created VV sequences, but we chose to adjust them within that set of rules in order to show the complete workings of the diphthongization process. (That is perhaps a methodological error, since e.g.
[i -str][+V +str] could just as easily, and logically, be handled with these VV Rules.) As a result, some of the rules here repeat rules that have already been given in the DIPHTH. set, though in a fully specified form they would probably be seen to operate in diffent environments-- in particular, DIPHTH.RULES require a medial semivowel (V[wyuɻ]V), while these all have 0 medial.

The vowel sequences to be dealt with here are:

1. initial stressed [iua] followed by--
    a) unstressed [iua], possibly followed by C which may include wy,βðγ,ʎɬ
    b) unstressed [eo]# (< SPOR lowering/loss of *-h)
    c) unstressed [e,è,o,ò,ÿ] (< WEAK/STRONG V-WY; *w,y are lost in some cases (V2 REMNANT), retained in others)
    d) unstressed [i: u: a:] (V2 REMNANT, will be followed by [+C])
2. initial stressed [è]+[i -str] and [ò]+[u -str] (< SPOR "umlaut" in -áh[i,u]-, possibly followed by C which may include wy,βðγ)
3. initial unstressed [iua] followed by--
    a) stressed [iua], possibly followed by C which may include wy,βðγ,ʎɬ
    b) stressed [eo]# (< lowering/loss of *-h; but note *-h)
    c) stressed [èòÿ] (< STRONG V-WY; they retain the original *wy)

7.2. The most unusual changes take place in V2 REMNANT outcomes, where the sequences stressed [iua] + unstressed low [è,ò] or long [i: u: a:] occur--note that è/ò (and ÿ, irrelevant here) have lost the following *wy. These will be dealt with first.

In the case of [íú][èò] stressed [iu] lower to [eo], and unstressed low [èò] are raised to [eo], while á assimilates to [èò] ; the resulting sequences [ée, óo, èè, òò] are then lengthened by a rule specific to this series (there is a later, more general rule of V-lengthening, but [ée, óo] in particular cannot be held over to that point, as will be seen in ¶7.4 when we deal with other sequences of [íú]+[eo].)

1. iu-lowering [+hi] > [-hi] / [+V __αfr -αba -lo +str][+V -hi βfr -βba -lo -str]
output: í(èò) > é(èò), ú(èò) > ó(èò)

2. èò-raising [+lo] > [-lo] / [+V -hi αfr -αba -lo +str][+V -hi βfr -βba __ -str]
output: é(èò) > é(eo), ó(èò) > ó(eo)-- éo and óe carry over to the rules in 7.4 below.

3. a-assim. [-fr -ba] > [αfr -αba] / [+V -hi +lo __+str][+V -hi αfr -αba -lo -str]
output: á(èò) > èè, òò (stress + -)

4. V-coalescence: the sequences of identical mid/low V (ee,oo; èè,òò) reduce to a long V--

SD: 1[+V -hi αF βlo +str] 2[+V -hi αF βlo -str]

SC: 1 2 ==> 1+2 = [+V -hi αF βlo +long +str]

((((Note that the rule applies only to sequences of [-hi -lo] V (ée,óo) which do not otherwise occur; as well as to lo-lo (èè, òò, áa), but not hi-hi, hi-lo or later derived lo-lo [áă/ăá], as they are dealt with in the general lengthening rule.))))

7.3. Sequences of stressed [iua] + unstressed [i: u: a:] (in V2 REMNANT outcomes) also undergo specific rules. Like-V sequences (e.g. í+i:), somewhat unexpectedly, reduce to V+ə --

1. like-V
[+voc αhi -αlo βfr -βba +long] > [-voc -hi -lo -fr -ba -long] / [+V αhi -αlo βfr -βba +str][__-str]
CONDITION: IF α = -, THEN [fr ba] are both -

(output í+i:, ú+u:, á+a: > íə, úə (no further changes); á+a: > áă will lengthen later)

while the others behave like a sequence of three vowels (e.g. ú+i: = úii)-- wherein the first two V undergo crasis, and the final V ult. loses its length, ult. > semivowel. Crasis is best handled with T-Rules:

2a.. í+u:, ú+i: SD: 1[+V +hi -αfr αba -lo +str] 2[+V +hi αfr -αba -lo +long -str]
SC: 1 2 ==> 1[+V -hi -fr -ba -lo +str] 2[+V +hi αfr -αba -lo -long -str]

2b. á+(i:,u:) SD 1[+V -hi -fr -ba +lo +str] 2[+V +hi αfr -αba -lo +long -str]
SC: 1 2 ==> 1[+V -hi αfr -αba +lo +str] 2[+V +hi αfr -αba -lo -long -str]

2c. (í,ú)+a: SD: 1[+V +hi αfr -αba -lo +str] 2[+V -hi -fr -ba -lo +long -str]
SC: 1 2 ==> 1[+V -hi αfr -αba -lo +str][+V -hi -fr -ba -lo -long -str]

(output í+u: > ÿu -- ú+i: > ÿi -- á+(i:,u:) > èi, òu -- (í,ú)+a: > (e,o)+ă)

7.4. Now we can deal with [iua +str]+[eo -str] (either < -h lowering or WEAK V-WY); in this case too, stressed [iu] lower > eo (á is unaffected, nor any sequences [íúá][ÿ]); but here the unstressed [eo] is raised > [iu], which later will > [yw]. (This change has already been seen in the DIPHTH.Rules; an alternative might be to use a T-Rule to metathesize the vowels-- so, í+e ==> é+i-- but that seems an unncessary complication.) As a series of rules, then, we have--

1. iu-lowering [+hi] > [-hi] / [+V __αfr -αba -lo +str][+V -hi αfr -αba -lo -str]
output: í(eo) > é(eo) and ú(eo) > ó(eo)

2. [eo -str] raising: [-hi] > [+hi] / [+V +str][+V __-lo αfr -αba -str]
output: é(eo) > é(iu), ó(eo) > ó(iu), as well as á(eo) > á(iu) >>> later A+[iua] rules

The outcome of á[e,o] will ult. simply be ay, aw.

(Rule 2 has been given before, in the Diphthong Rules.)

7.5. Now we are left with a variety of sequences in which the unstressed V is i,u,a--from a variety of sources. Those with initial [tdskg]+[i -str]- trigger Palatalization (next), as does initial *s+[u -str]-. A general rule now reduces these unstr. V to [y,w,ă] resp., either side of a stressed vowel (see Ch.8.1, rules 6a/b)--

7.5a Semivowel creation
[+V αF -str] > [-C -V αF] / [+V βF +str] (either side env.)

7.5b. If a form has initial *q / _íy,úw, or final *q / yí/wú_, a SPOR version of q-lowering now applies:

SPOR(30%) íy/úw > éy,ów / #q_ AND yí/wú > ye/wo / _q#

[+hi] > [-hi] / { 1#[+C +ba +lo -cont -voi][+V __αfr -αba -lo +str][-C-V +hi αfr -αba]}
{ 2[-C-V +hi αfr -αba][+V __αfr -αba -lo +str][+C +ba +lo -cont -voi]#}

The net effect is that later these V/wy sequences remain diphthongal. The more general OBLIG version of q-lowering comes later, in Ch. 8.2 below.

Certain other forms with initial [y] now proceed >>> PALATALIZATION, while some of the remainder will require yet further adjustments, in Ch. 8.

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7.6. PALATALIZATION ordinarily takes place when initial [tdskg] are followed by [i +str], also SPOR in *s+[u +str] ([i,u] may be short or long). At this point, such forms are from a variety of sources--monosyllables, medial-h loss forms, or those remaining after operation of the Final-V

loss and V2 Remnant rules. Normally, palatalization shifts *t,d > ts,dz /#_i, and *s > š /_í,ú-- these are new phonemes in the developing BDG inventory. Now the present set of rules, as well as the V1 REMNANT/MET. Rules, have created other environments were PALATALIZATION can take place, that is, in forms with initial [tdskg]+y and (OBLIG) s+w.

7.6a. A number of forms from the V1 REMNANT/MET series have the unique shape **tsyi-/dzyi- (structurally ts/dz|y|i- by the rules) due to the fact that their original forms (init.medial [t,d,s] in any sequence with both vowels *i, *CiCí-) underwent OBLIG V1 MET, and the resulting initial clusters tt-, ts-, ts-, st-, ss or dd-, dt-, ds- sd- all > (unit) **ts- or *dz- resp. in the course of the INIT.CC Rules. Relevant here also, are possible derivations from RARE *diyV > dy+y(áú) > dz|yV or regular *did+(á,ú) which via **dd-y-V- will have > dzy(áú). But at this point in the derivations, **ts/dz result only from the operation of the INIT.CC Rules.

Although these forms actually have the structure ts|y+i or dz|y+V, in these cases the intervening -y- causes the s to palatalize first > š, absorbing the -y- in the process (as it normally does); thus they behave as if t|sy-i, d|zy-i. Now the anomalous clusters t/d+š/ž > c/j (phonetically of course [tš, dž], but unit phonemes from this point on; note that **z/ž appear only in this rule). However, all these steps, and the matter of **z/ž (which are certainly accurate from an historical point of view), can be avoided by using a T-Rule for this particular change:

ts/dz+y pal. SD: 1#[+C +obs +hi +fr +delR αvoi] 2[-C -V +hi +fr] 3[+V +str]
SC: 1 2 3 ==> 1 3, 2 > 0 or #[+C +obs -fr +hi +delR αvoi][+V +str]

7.6b. General PALATALIZATION can now occur. It will affect initial *t,d,s,k and *g before all sequences of **y+A as well as those same consonants before plain *í, long or short; further, initial *s also palatalizes regularly before **w+V, and SPORADICALLY(50%) before long **ú:, but RARE(20%) before plain short *u. In all cases the [y] is lost in the process, and the long Vs lose their length.

1. t/d > (unit) ts/dz before _iA or _í(:)
[-cont] > [+delR] / #[+C +obs +hi +fr __ αvoi] {1[+V +hi +fr -str][+V +str] }
{2[+V +hi +fr αlong +str }

2. s > š before _iA or _í(:)
[+fr] > [-fr] / [+C +obs +hi __ -ba +cont -voi] {1#[+V +hi +fr -str][+V +str] }
{2#[+V +hi +fr αlong +str] }

OCCURRENCE: Env. 1 OBLIG; Env. 2 OBLIG IF [-long], SPOR(50%) if [+long]

2a. s > š before _uA or u(:)
[+fr] > [-fr] / [+C +obs +hi __ -ba +cont -voi] {1#[+V +hi +ba -str][+V +str] }
{2#[+V +hi +ba αlong +str] }
OCCURRENCE: Env. 1 OBLIG; Env. 2 SPOR(50%) if [+long], RARE if [-long]

3. k/g > (unit) c/j before _iA or _í(:)
[+ba -cont] > [-ba +delR] / [+C +obs +hi __ αvoi] {1[+V +hi +fr -str][+V +str] }
{2[+V +hi +fr αlong +str] }

4a. i-loss after ts/dz, c/j, š
[+V +hi +fr -str] > 0 / #[+C +hi αfr -ba {+cont/+delR} βvoi]__[+V +str]
CONDITION: IF [+cont] THEN β = - (NB either [+cont] or [+delR] must be present

4b, u-loss / š_ú
[+V +hi +ba -str] > 0 / #[+C +hi -fr -ba +cont -voi]__[+V +hi +ba +str]

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7.7. Resolution of other [wyă][+V +str]. Certain cases of V1 REM/MET will also have produced clusters of two semivowels between the initial C and the stressed vowel. These generally arise from original forms with initial *w,y and a voiced medial, e.g. *wibá- or yugí-, or the SPOR forms with voiced initial and medial *w,y, e.g. *diwí- (> **dwyi-) or *buyu (> **bywu-); there can also be forms with new initial /dz/ or /j/ which still retain the V1 remnant, e.g. dudí-; and there can also be SPOR/RARE cases of V1 MET where the intial or medial was voiceless, like *qiru-/riqú-. This table shows a few possible examples:

	*wabá-	*biwá-	*dudí-	*yugá-	SPOR*qirú- or *riqú
V1 Met/Rem	wbăá	bwyá	ddwí	ygwá	qryú, rqyú
Cont-Cons Met	bwăá	---	---	gywá	rqyú > qryú
other rules			dzwí	jwá	qr(y)ú > xyyú
Input VV-Rules	bw|ăá-	bw|yá-	dz|wí-	j|wá-	xy|yú-

Since /ts,dz/ and later /c,j/ < (kg)y- are classed as units, outputs like /dzwí, jwá-/ are permissible forms. (note that a V1 Rem/Met. form like **gyyV is not possible-- it would have to derive < putative *giyV or *yiGV, but *i/y sequences do not appear in proto-forms). But with other initials (e.g. **bwăa- < *wabá-), the original post-cons. [wyă] will remain, and since two consecutive semivowels are not permitted, the next [wyă][+V +str] sequence must undergo changes.

If the sequence is homorganic **yi/wu/ăa it will be dealt with in the rules at 8.1 below (Rule 6a/b), and ult. > long V. But in the case of unlike [wyă]+V, the sequence will undergo changes similar to crasis, also similar to those seen in the DIPTH. RULES (Ch. 3, sec. F.2b)-- wá > o, yá > e, yú/wí > ÿ, while ăí/ăú SPOR either > e/o, or else (1) > i:, u: or (2) **ă > 0 and /i,u/ remain unchanged.

In those cases where the CC rules have modified a cluster to a single consonant (e.g. bibú- > bbyú > reg. byu or SPOR fyu, or *gurá > gr|wa > j|wa), as well as those resulting from other rules (e.g. regular h-loss in bihá > biá > bya, or hiatus taí > tăí), the [wyă]V sequence may or may not change. **ăV will always change, one way or the other; typically, [wy]V will change following the affricates (e.g. dzwa, jwa likely > dzo, jo, though /dzwa, jwa/ are also permissible); but only SPOR after other [+C]. (Note that /tr, dl/ are never followed by a [wyă]V sequence, nor can /c,j / co-occur with -yV. Note further that since palatalization has already occurred, if e.g. **tăi spor. drops the -ă- and > /ti/ or perhaps /ti:/, the /t/ will not now palatalize.

Thus we need rules that will deal with the [-C -V]([-C -V])[+V +str+] sequences resulting from V1 Remnant, but also with "ordinary" [-C -V][+V +str] not only from V1 Rem. but from earlier rules as well (such as hiatus -VA- and h-loss -V(h)A- et al.) The rules must deal obligatorily with the anomalous two-glide sequences, as well as show the sporadic changeability of the "ordinary" sequences.

T-Rules work best for these crasis-like changes:

1. wa/ya > o/e
SD: 1#[+C αobs] (2[-C -V +hi]) 3[-C -V +hi αfr -αba] 4[+V -fr -ba +lo +str]
SC: 1 (2) 3 4 ==> 1 (2) 3+4 = #[+C αobs]([-C -V +hi +F]) 3+4[+V -hi αfr -αba -lo +str]

2. yu/wi > ÿ
SD: 1#[+C αobs] (2[-C -V +hi]) 3[-C -V +hi αfr -αba] 4[+V +hi -αfr αba +str]
SC: 1 (2) 3 4 ==> 1 (2) 3+4 = #[+C αobs]([-C -V +hi +F]) 3+4[+V +hi -fr -ba -lo +str]

3. ăi/ău > e/o only in two-glide [wy]ăV position
SD: 1#[+C αobs] 2[-C -V +hi] 3[-C -V -hi -fr -ba +lo] 4[+V +hi αfr -αba +str]
SC: 1 2 3 4 ==> 1 2 3+4 = #[+C αobs]([-C -V +hi +F]) 3+4[+V -hi αfr -αba -lo +str]

OCCURRENCE ALL 3 RULES: OBLIG IF 2 IS PRESENT; SPOR(30%) IF 2 IS ABSENT.

Since other ăi/ău changes are sporadic in non-V1 REM. envs., these rules show the possibilities:

4a. SPOR i/u lowering: [+hi] > [-hi]/ [-C -V -hi -fr -ba +lo][+V __ αfr -αba -lo +str]

4b. SPOR length: [ ] > [αlong] > [-C -V -hi -fr -ba +lo][+V +hi αfr -αba -lo __+str]

4c. OBLIG ă-deletion: [-C -V -hi -fr -ba +lo] > 0 / [+V αlong +str]

(Note: a side-effect of rules 3,4 will be to create non-palatalized forms *(tds,kg)+i,i:)

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VIII. FINAL CONSONANTS (and a few other rules)

8.1 FINAL *wy OR **βðγʎɬ. Now it can be the case, in many forms that have undergone all the above rules, that there is a final consonant, and that in many cases it can be original *w,y or one of the voiced continuants **β,ð,γ,ʎ,ɬ derived < *bdg,l[+len]. Among such forms will be:

--*CVC monosyllables, where final -V[wy] has undergone Strong V-WY Rule, or their final will be one of the voiced continuants (as well as any [+C])

--hiatus *-AVC which have undergone reg. crasis (e.g. -áiC > -èC) but retain a final *wy or **βðγ (but not **ʎɬ, forbidden by MS Rules); as well as those where Weak V-WY has applied sporadically (e.g. -áiw > -áÿw); plus -VAC that have undergone both reg. changes (iáy > -yay) plus spor. Strong V-WY (e.g. iáy > ièy).

--similarly, h-loss V0VC, where the final could be *wy or**βðγ (but not **ʎɬ, forbidden by MS Rules): reg. AV[wy], e.g. -úay > -úăy, reg. VA[wy] e.g. uáy > way, or spor. development as seen in hiatus VA above.

--diphthongized forms with final vd.continuants, e.g. *-úyið > -ÿyð, or -uyíð > wið, iuɻíð > i:ð et al.-- final *w,y are lost within the Dipth. Rules)

--V1 Remnant forms, which may have final *w,y,β,ð,γ,ʎ,ɬ, but whose stressed V is either a [wy]V sequence or V:

This is the place, therefore, to deal with the final voiced continuants, which, quite simply, now shift to approximants/semivowels (as they have already done intervocalically in the Dipthong Rules); the word-final shift has been mentioned before, but it was merely said to take place "later".

1. β > w (in our feature terms, with no way to specify "bilabial", it is not as straight-forward a shift as it actually is):
[+C +obs -V +fr -hi -ba +cont +voi] > [-C -V -fr +hi +ba] /__#

2. ɬ also > w
[+C -obs -nas -fr +hi +ba +lat] > [-C -V -fr +hi +ba] /__#

3. ð > y
[+C +obs -V +fr +hi -ba +cont +voi] > [-C -V +fr +hi -ba] /__#

4. ʎ also > y
[+C -obs -nas +fr +hi +lat] > [-C -V +fr +hi -ba] /__#

5. γ > ɯ̯ ɯ̯ (shift of [+C +obs] fricative > ɯ̯ [-C -V] approximant
[+C +obs -V -fr +hi +ba +cont +voi] > [-C -V -fr +hi -ba] /__#

might have to insert SPOR breaking/ -N# here???

8.2. Some rules in Ch.7 have already reduced some VV sequences (either stress pattern) to diphthongal V/semivowel or V: (these were mainly special cases in V1 or V2 REMNANT forms). Combinations of VV from all other sources were also reduced to V/semivowel by Rule 7.5a. At this point, we will deal with sequences of homorganic V/glide combinations: they > long V--

8.2a. [wyă]/like V (resp. u,i,a) in either order > V:
[+V αF +str] > [+V αF +long +str] / [-C -V αF] (either side env.)

8.2b. homorganic glide delete
[-C -V αF] > 0 / [+V αF +long +str] (either side env.)

Output of these two rules: u: < wu/uw, i: < yi/iy, a: < ăa/aă

(Recall, however, that in the Palatalization rules, **y was deleted following the new palatals, likewise **w after š, but only in the case **šwú-; thus in those forms, there will be no long V if the sequence was original **yi or wu. But note that if the original sequence was íy or úw, there *will* be a long V after the palatalized consonant. Note further, that all these forms may have a final C, which aside from [+C] segments may be *w < original *w or β,ɬ, *y < original *y or ð,ʎ, or ɯ < **ɣ.

8.3. Glide+glide and V: +glide sequences. If a diphthong of unlike-glide+stressed V is followed by *wyɯ, they will either (1) remain if the vowel and the final glide are unlike (e.g. yaw, wiɯ), (2) have undergone lengthening by Rule 8.21a if the vowel+final glide are homorganic (e.g. wiy > wi:, yaɯ > ya:), or (3) occur after a long vowel (e.g. i:w, a:y). In this last case, and if the structure is stressed V+unlike glide, the final *wyɯ will drop according to the next rules.

The TWO-GLIDE RULE affects two types of forms: (1) those with the structure -A[wyă][wyɯ]#:

8.3a. [-C -V αF] > 0 / [-C -V βF]__#

This rule leaves (wy)A[*wy, **wyɯ].

Aside from long vowels already created by previous rules, there is another SPOR/RARE source that must be mentioned here: in a small number of cases (approx. 10%) final -ɯ may cause lengthening--

8.3b. SPOR/RARE (10%): V > V: / __ɯ#

[ ] > [+long] / [+V αF__+str][-C -V +hi -fr -ba]

And now, final ɯ deletes after all long vowels:

8.3c. [-C -V +hi -fr -ba] > 0 / [+V +long +str]__#

8.4. Finally, the two semivowels **ɯ and **ă are adjusted and merge > [ə], which has marginal status in the phonological system of modern BDG-- it occurs only as the off-glide of diphthongs.

It is considered to be the semivocalic counterpart of /ÿ/, and, in the native script, is written with a variant of the /ÿ/ symbol.

8.4. ɯ/ă merger > ə

[αhi -αlo] > [-hi -lo] / [-C -V -fr -ba__]

All surviving sequences of (unlike) [+V +str][wyə]# are unaffected; if there is also an initial glide, this will create in some cases a triphthong, e.g. -waw#, -way# wiə# = /wiÿ/.

A special note about final **-ł: recall that unstressed *a > o / _ł#, which will have created sequences like -íoł# or perhaps **-áoł#. They have been adjusted in the various rules above (e.g. ío > éwł, áo > áwł (and sim. for final **-ʎ, e.g. úiʎ > úyʎ)-- and after ʎł > yw, they will be deleted by the Two-glide Rule. But when their vowel is stressed, **ʎ,ł will survive as /y,w/, and as we showed, **-íy and -úw will > i:, u:, but -áw will be unchanged.

8.5 q-lowering of i/u: We saw above (6.5b) that sequences like #qiy- or -wuq# have SPOR lowering of the high vowels, though in most cases the original V/glide survive and > V:. Now, however, a more general version of that rule can operate on plain i/u in env. #q_(C)# or #(C)_q-- the i/u may be in an unlike glide/V diphthong (i.e. #qi(wə)(C) or (C)(yə)uq# (all forms having been reduced to monosyllables by this point in the derivation, their V is intrinsically [+str]). Because of borrowings (with different rule orders) this rule can also operate SPOR if the i/u is [+long], from whatever source.

[+V +hi αfr -αba βlong] > [+V -hi αfr -αba βlong] / #[+C +lo -cont -voi] (either side env.)
OCCURRENCE: OBLIG IF β = -, SPOR(30%) IF β = +

Outputs will be: Oblig. qi(C) > qe(C), qiw(C) > qew(C), (C)wiq > (C)weq etc.; SPOR qi:(C) > qe:(C), or (C(y))u:q > (C(y))o:q etc.

8.6. Initial r/l merger: At this point in the derivations, all proto-forms have been reduced to monosyllables of various shapes-- (C)V(C), (C)V:(C), (C)[wy]V(:)(C) or (C)V[wyă](C). Initial C will be vl.stops and affricates [ptkq; ts,tr,c], vd. stops and affricates [bdg, dz,dl,j], nasals [mnŋ], vl. fricatives [fsšx], l, r, w, y or h; and the final C will be vl/vd.stops; s and some f, x, h; nasals, l and r -- word-final [wyÿ] are considered part of the vocalic nucleus (and in any case [wyÿ] are [-C]).

All initial C remain unchanged, with the exception of *r-- in initial position, it merges with *l--

[-lat +retr] > [+lat -retr] / #[+C -obs -nas +hi __+cont +voi]

8.7 Final [+C αobs], i.e. the remaining TRUE CONSONANTS

8.7a. Final-r. All vocalic nuclei (specifically, -V-, -V:- or -V[wyə]-) followed by final *r coalesce into the mid-central retroflexed vowel [ɚ], called "/r/" in our phonemic Romanization.

SD: 1[+V αF βlong +str]([-C -V +hi]) 2[+C -obs +hi -nas -lat +retr]

SC: 1 2 ==> 1+2 = [+V -hi -lo -fr -ba -long +retr +str]

Note that the rule does <u>not</u> include a preceding glide [wy]; they are no longer considered to be part of the vocalic nucleus. Thus forms like **pVr, pV[wy]r both > /pr/, but **pwVr, pyV[wy]r will > /pwr/, /pyr/ resp.

8.7b. Some SPOR rules can affect vowels before final stops and nasals.

8.7b.i. V-lengthening /__[vd.stop] may affect plain *i,u,a (not long, not part of a diphthong, thus only in #(C)VC#) It is SPOR(±25%).

[ ] > [+long] / #(C)[+V αfr -αba βlo__ +str][+C +obs γfr δhi -cont +voi]#
CONDITION: IF β = +, THEN [fr ba] BOTH = -

8.7b.ii. Raising of *a may apply to simple *a (not long, not part of a diphthong, thus only in #(C)aC#) as follows--*a > e / _[tdn]#, > o /_[pbm], > ÿ / _[gŋ] (NB k,q excluded). This is clearly related to the <u>Breaking</u> rule to be shown next, but apparently was borrowed from a different dialect. This too is SPOR(±25%).

a) a > e /_[tdn]#--
[-fr +lo] > [+fr -lo] / #([αC])[+V -hi __-ba -long +str][+C αobs +fr +hi αnas -cont βvoi]#

b) a > o /_[pbm]#
[-ba +lo] > [+ba -lo] / #([αC])[+V -hi -fr__-long +str][+C αobs +fr -hi αnas -cont βvoi]#

c) a > ÿ /_[gŋ]#
[-hi +lo] > [+hi -lo] / #([+C])[+V __-fr -ba -long +str][+C αobs +hi +ba αnas +voi]#

8.7b.iii. Breaking V /_[vd.stop/nasal]# may affect plain *i,u,a (not long, not part of a diphthong, only in #(C)VC#; thus it cannot apply to the outputs of the previous two sporadic rules. It resembles the <u>breaking rule</u> seen in V2 REMNANT forms--inserting semivowels homorganic with the final C-- but differs in that the resulting V[wyuɻ] sequences do not coalesce (except for homorganic V+glide-- VV rules that must be repeated here). Also SPOR(±25%).

0 > [-C -V +hi +ba =w] / [+V -str]__[+C αobs +fr -hi -ba -cont -αnas +voi]#

0 > [-C -V +hi +fr =y] / [+V -str]__[+C αobs +fr +hi -βba -cont -αnas +voi]#

0 > [-C -V +hi -fr -ba =uɻ] / [+V-str]__[+C αobs -fr +hi +ba -cont -αnas +voi]#

with **uɻ shift > ə-- [+hi] > [-hi] / [-C -V __-fr -ba]

and iy/uw/aə > long, with glide deletion:

a) [ ] > [+long] / +V αF __+str] [-C -V αF]

b) glide deletion after long V:

[-C -V -fr -ba] > 0 / [+V +long]__[+C αobs -αnas +voi]#

Most instances of Breaking occur if the initial C is also a vd.stop or nasal.

8.8. Final obligatory Neutralization Rules

8.8a. Devoicing: voiced stops > voiceless /__#

[+voi] > [-voi] / [+C +obs αF -cont__]#

8.8b. Fricative merger: all voiceless fricatives (**f,x, dial. š) merge > h /__#

[+C +obs αF] > [-C -obs -F] / [__-voc +cont -voi]# (here, "-F" means "all the articulatory features have the value *minus*" which, along with +cont, defines /h/)

8.8c. Nasal/l merger: all nasals and *l merge > ŋ /__# (comparative evidence shows that *m apparently first > n, likewise *l > n (ñ in some dialects) before both finally merged with *ŋ; it is unnecessary to show these stages for BDG). Since *r is no longer present in the class of [+C -obs], the rule can be abbreviated:

[αfr -αba βnas -βlat] > [-fr +ba +nas -lat] / [+C -obs +hi -lo__]#

8.8d. Final stop merger: all final stops (now voiceless) (and dial. affricates) merge > q /__# (actually [ʔ], but in BDG phonology, [ʔ] is merely the allophone of /q/ in final position.)

[αfr βhi γba -lo] > [-fr -hi +ba +lo] / [+C +obs __-cont -voi]#

And the modern BDG phonetic rule, /q/ > [ʔ] /__#--

[+C +obs +lo -cont -voi] > [-C -obs -V -F -cont -voi]# (where -F again = "all articulatory features are -")

3/6/07