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Morphological Causatives
in Zapotec of Santo Domingo Albarradas

Wolfram Kreikebaum -- May 1983*

There are a number of pairs of verbs in Zapotec of Santo Domingo Albarradas (SDZ) which differ in that the first is (typically) intransitive while the second is transitive, with the meaning that the process designated by the first verb is caused to occur by the subject of the second verb. This paper explores the various morphological markings associated with this causativization.

In Section I are presented the basic processes and morphemes marking causativization, most of which usually occur in combination with one or more others rather than alone. In Section II are presented a number of phonological processes which occur on stems marked in these ways.

I. Basic Elements of Causative Marking

1. The Thematic Vowel U

Consonant-initial stems in SDZ are assigned a thematic vowel, which is either a-, u-, or i-, preceding the stem and following the aspect prefix (Fn.1). In most causative verbs the thematic vowel is u-, no matter what the thematic vowel of the non-causative stem is (Fn.2). In one example, (1), this is the only overt marking of causativity; usually it is combined with one or more other markings (e.g. ~~m~~ⁱ2-12; 14; 15; 17; 20; 21; 26-29; 33-44). (Fn.3) ←

- | | | |
|-----|-------------------------------|-------------------------|
| (1) | r-i-zuhu- <u>ɬ</u> | 'he stands' (Fn.4) |
| | HAB-TV-stand-3pM | |
| | r-u- <u>ø</u> -zuhu- <u>ɬ</u> | 'he stands (s.t./s.o.)' |
| | HAB-TV-caus-stand-3pM | |

In some cases the causative has the thematic vowel i-. This occurs only (?) when the non-causative also takes i-, and has a ɬ-initial stem, or when the non-causative stem is vowel-initial and the causative prefix k- (?) undergoes Dentalization (II.5). Examples of the thematic vowel i- in causative verbs are (13; 16; 18&22; 19; 23; 24; 30-32; 45; 46) below.

2. s-/k-/l- 'Causative'

Many verbs take a prefix s- or k- in their causative forms. This prefix comes between the thematic vowel (usually u-) and the stem. Typically it causes Fortition of the stem-initial consonant and often coalesces with it; the processes involved are discussed in section II.

SDZ Causatives (Kreikebaum -- 1983)

The s- prefix is used only with verbs whose non-causative form takes the thematic vowel a- (where the thematic vowel a- is not part of a derived verb form denoting a recurrent event), and before certain other stems that begin with a resonant.

- | | | |
|-----|--|----------------------------|
| (2) | r-a-dib-án
HAB-TV-end-3pN | 'it ends' |
| | r-u-s-tib-iž-án
HAB-TV-caus-end-3pM-3pN | 'he finishes it' |
| (3) | r-a-jag-iž
HAB-TV-tire-3pN | 'he gets tired' |
| | r-u-s-čag-iž
HAB-TV-caus-tire-3pM | 'he gets (s.o.) tired' |
| (4) | r-i-yaaw-án
HAB-TV-close-3pN | 'it closes' |
| | r-u-s-yaaw-iž-án
HAB-TV-caus-close-3pM-3pN | 'he closes it' |
| (5) | r-i-lyäb-án
HAB-TV-boil-3pN | 'it boils' (Fn.5) |
| | r-u-s-läb-iž-án
HAB-TV-caus-boil-3pM-3pN | 'he boils it' |
| (6) | r-a-žü?ün-án
HAB-TV-be:shortened-3pN | 'it is shortened, shrinks' |
| | r-u-(s)-žü?ün-ž-án
HAB-TV-caus-be:shortened-3pM-3pN | 'he shortens it' (Fn.6) |
| (7) | r-e?ek-án
HAB-burn-3pN | 'it burns' |
| | r-u-z-e?ek-iž-án
HAB-TV-caus-burn-3pM-3pN | 'he burns it' (Fn.7) |

k- occurs in clear cases only before stems whose non-causative does not take a- and which begin with a vowel, an affricate, or a stop. Intervocalic k- undergoes Lenition (II.1a).

- (8) r-ahaj-iž 'he gets wet'
HAB-get:wet-3pM

r-u-g-ahaj-iž 'he gets (s.o.) wet' (Fn.7)
HAB-caus-get:wet-3pM
- (9) r-i-bij-án 'it dries (off)'
HAB-TV-dry-3pN

r-u-k-wiij-iž-án 'he dries it (off)' (Fn.8)
HAB-TV-caus-dry-3pM-3pN
- (10) r-i-ja-án 'it fills up (fluid or container)'
HAB-TV-fill-3pN

r-u-Ø-ča-ž-án 'he fills it (fluid or container) up'
HAB-TV-caus-fill-3pM-3pN

Some causative verbs have s- and k- co-occurring:

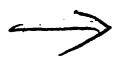
- (11) r-oon-án 'it rings'
HAB-ring-3pN

r-u-s-k-oon-ž-án 'he rings it'
HAB-TV-caus-caus-ring-3pM-3pN
- (12) r-ool-án 'it (e.g. a radio) plays'
HAB-play-3pN

r-u-s-k-ool-iž-án 'he plays it (e.g. a radio)'
HAB-TV-caus-caus-play-3pM-3pN

l- clearly occurs in the following example with a vowel-initial root:

- (13) r-ä?äp-iž 'he climbs (on s.t.)'
HAB-climb-3pM


r-i-ly-ä?äp-iž-án 'he lifts it (=some object) up,
HAB-TV-caus-climb-3pM-3pN raises it (=price)' (Fn.5)

l- may also be present in the following example with an l--initial root:

- (14) r-i-lyoʒ-án 'it ends' (Fn.5)
HAB-TV-end-3pN

r-u-∅-looʒ-iʒ-án 'he ends it'
HAB-TV-caus-end-3pM-3pN

Some speakers indeed pronounce the l- in the causative form (14b) fortis. If we base our analysis on the pronunciation of those who do not make a fortis-lenis distinction for laterals, we could assume L-Deletion preceding l, or we might consider the stem nucleus change (from a simple to a rearticulated nucleus) and the change of the thematic vowel the only elements in the causativization of the verb 'end' (cf. 3.1).

3. Stem Changes.

3.1 Stem Nucleus Change.

Another morphological element sometimes associated with causative forms is a change of the vowel nucleus. In most cases the change is from a simple nucleus in the non-causative to a rearticulated nucleus in the causative (Fn.9).

Two examples of such a change are (9) and (14) above; others follow.

- (15) r-i-jü-ʒ 'he gets burned'
HAB-TV-get:burned-3pM

r-u-∅-jüü-ʒ 'he burns (s.o.)'
HAB-TV-caus-get:burned-3pM

- (16) r-aʒ-án 'it breaks, tears'
HAB-break-3pN

r-i-g-iiʒ-iʒ-án 'he breaks, tears it' (Fn.10)
HAB-TV-caus-break-3pM-3pN

Occasionally other change patterns show up. In (17) below, an aspirated nucleus in the non-causative alternates with a rearticulated nucleus in the causative; in (18) an interrupted nucleus alternates with an aspirated nucleus.

- (17) r-i-zohob-án 'it goes in'
HAB-TV-enter-3pN

r-u-∅-zoob-iʒ-án 'he puts it in'
HAB-TV-caus-enter-3pM-3pN

- (18) r-i-žo?op-án 'it is shelled'
 HAB-TV-be:shelled-3pN
- r-i-ø-žohop-iž-án 'he shells it'
 HAB-TV-caus-shell-3pM-3pN

3.2 Ablaut

In a number of pairs, the non-causative has a as stem vowel, while the causative has i. This can be attributed to a stem-formation rule of Ablaut:

a → i in marked stems.

(16) is an example of Ablaut's application; (19) is another. Apparently all verbs which condition Dentalization (II.5) also are marked to undergo Ablaut when causative. Ablaut also occurs in certain other (non-causative) stems, e.g. (61&62) below.

All causative verb stems that have undergone Ablaut take the thematic vowel i- rather than u-.

- (19) r-aha-ž-iž 'he is paid'
 HAB-be:paid-3pM
- r-i-g-ih-iž-iž 'he pays'
 HAB-TV-caus-be:paid-3pM

3.3 Tone Pattern Modification (Fn.11)

Causativization may involve a floating high tone at the end of the verb root. "Floating high tones" are placed on an adjacent suffixal vowel if there is one; otherwise they fall on the last vowel of the root if the root's nucleus is complex. (20) illustrates the association of a floating high tone with a causative.

- (20) r-i-jeb-iž 'he is afraid'
 HAB-TV-fear-3pM
- r-u-ø-žehéb-iž 'he frightens (s.o.)'
 HAB-TV-caus-fear-3pM
- r-u-ø-žehéb wáh 'Juan frightens (s.o.)'
 HAB-TV-caus-fear Juan

Or it may involve the loss of a floating high tone in the very same location, as in (21) and (22).

- (21) r-i-zohob-iġ-án 'it goes into him'
HAB-TV-enter-3pM-3pN
- r-i-zohób wáh-án 'it goes into Juan'
HAB-TV-enter Juan-3pN
- r-u-Ø-zoob-iġ-án 'he puts it in' (Fn.12)
HAB-TV-caus-enter-3pM-3pN
- (22) r-i-žo?óp nihiz 'corn is shelled'
HAB-TV-be:shelled corn
- r-i-Ø-žohop-iġ nihiz 'he shells corn' (Fn.13)
HAB-TV-caus-be:shelled-3pM corn

3.4. Suppletion

Some non-causative verb stems are vowel-final, while their causative counterparts are consonant-final:

- (23) r-i-behe-ž 'he sits down' (Fn.14)
HAB-TV-sit:down-3pM
- r-i-Ø-be?ek-iġ 'he makes (s.o.) sit down' (Fn.14)
HAB-TV-caus-sit:down-3pM
- (24) r-aa-ž 'he lies down'
HAB-lie:down-3pM
- r-i-g-ihis-iġ 'he puts (s.o.) to bed' (Fn.14)
HAB-TV-caus-lie:down-3pM

A possible explanation for the causative stem g-ihis in (24b) might be its association with the noun gihiš 'net, hammock'. Our language helper confirmed that he saw a relation between the noun and the causative verb.

3.5. Detransitivization of Certain Verbs

In terms of predictability it is more convenient to describe the intransitive verb as the one derived from the transitive verb in cases such as the following:

- (25) r-i-Ø-da?a-ń 'it is poured' (Fn.15)
HAB-TV-detrans-pour-3pN
- r-i-ga?a-ž-án 'he pours it'
HAB-TV-pour-3pM-3pN

The transitive verb stem in (25b) begins with a g that undergoes Dentalization (II.5). In the intransitive counterpart (25a), g is replaced by d.

II. Phonological Rules

1. Lenitions

a) S- and K-Lenition

Fortis obstruents are lenited between vowels which belong to different morphemes.

$$\begin{bmatrix} +\text{obs} \\ +\text{fort} \end{bmatrix} \rightarrow \begin{bmatrix} -\text{fort} \end{bmatrix} / V+ _ +V$$

This process is illustrated by examples (7&8, 16, and 19). Additional examples follow:

A. Causative Prefix s-

- (26) r-i-yehek-án 'it turns'
 HAB-TV-turn-3pN
- r-u-z-ehek-iž-án 'he turns it' (Fn.16)
 HAB-TV-caus-turn-3pM-3pN

B. Causative Prefix k-

- (27) r-ahaz-iž 'he bathes (himself)'
 HAB-bathe-3pM
- r-u-g-ahaz-iž 'he bathes (s.o.)'
 HAB-TV-caus-bathe-3pM

- (28) r-äht-iž 'he dies'
HAB-die-3pM

r-u-g-üht-iž 'he kills (s.o.: person or animal)'
HAB-TV-caus-die-3pM (Fn.17)

- (29) r-äy-án 'it cooks, bakes'
HAB-cook-3pN

r-u-g-üüy-ž-án 'he cooks, bakes it'
HAB-TV-caus-cook-3pM-3pN (Fn.17)

- (30) r-ahč-án 'it explodes, breaks'
HAB-explode-3pN

r-i-g-ihč-iž-án 'he pops it' (Fn.18)
HAB-TV-caus-explode-3pM

- (31) r-až-ya?a-ń 'it breaks, gets torn' (Fns. 15 & 19)
HAB-break-...-3pN

r-i-g-iž-ya?a-ž-án 'he tears it' (Fns.18&19)
HAB-TV-caus-break-...-3pM-3pN

- (32) r-u-ž 'he enters'
HAB-enter-3pM

r-i-g-u?u-ž-án 'he puts it in' (Fn.18)
HAB-TV-caus-enter-3pM-3pN

b) B-Lenition

Prevocalic b- becomes w- following the causative prefix k-.

b → w / k+__V

This process is illustrated by verb pair (9). A further example is

- (33) r-i-behej-án 'it (a brass or wind instrument) sounds' (Fn.20)
HAB-TV-sound-3pN

r-u-k-wehej-iž-án 'he plays, blows it'
HAB-TV-caus-sound-3pM-3pN

2. Fortition (Fn.21)

In a number of the verb pairs already presented, the stem initial consonant alternates between a lenis and a fortis version. In (2), d alternates with t; in (3, 10, and 20), j with č; and in (6), ž with š. All non-labial obstruents (and in the speech of certain speakers the labial obstruent b as well) are modified in this way. (For all speakers b lenites after k-. i.e. B-Lenition bleeds Fortition for speakers who would apply Fortition to b following k-.) To explain these alternations, we posit a rule of Fortition:

$$\left[\begin{array}{c} +\text{obs} \\ -\text{lab} \end{array} \right] \rightarrow \left[+\text{fort} \right] / \left[\begin{array}{c} +\text{cons} \\ +\text{fort} \end{array} \right]$$

Additional examples follow:

A. Causative prefix s-

- (34) r-a-bij-án 'it runs out'
 HAB-TV-run:out-3pN
 r-u-s-pij-iž-án 'he uses it up' (some speakers)
 HAB-TV-caus-run:out-3pM-3pN
 r-u-s-bij-iž-án 'he uses it up' (other speakers)
 HAB-TV-caus-run:out-3pM-3pN
- (35) r-a-dōp-án 'it gets shortened'
 HAB-TV-get:shortened-3pN
 r-u-s-tōp-iž-án 'he shortens it'
 HAB-TV-caus-get:shortened-3pM-3pN
- (36) r-i-zääb-án 'it gets lost; it (a document) expires'
 HAB-TV-get:lost-3pN
 r-u-∅-sääb-iž-án 'he loses it, throws it away'
 HAB-TV-caus-get:lost-3pM-3pN (Fn.22)

B. Causative Prefix k- (Fn.22)

- (37) r-i-da?akw-án 'it closes'

HAB-TV-close-3pN

r-u-Ø-ta?akw-iž-án 'he closes it'
HAB-TV-caus-close-3pM-3pN

(38) r-i-do?o-ń 'it is sold' (Fn.15)
HAB-TV-be:sold-3pN

r-u-Ø-to?o-ž-án 'he sells it'
HAB-TV-caus-be:sold-3pM-3pN

(39) r-i-do?op-án 'it is gathered'
HAB-TV-be:gathered-3pN

r-u-Ø-to?op-iž-án 'he gathers it'
HAB-TV-caus-be:gathered-3pM-3pN


(40) r-i-jaa-ń 'it changes' (Fn.15)
HAB-TV-change-3pN

r-u-Ø-čaa-ž-án 'he changes it'
HAB-TV-caus-change-3pM-3pN

(41) r-i-ja?á-n 'it is heated'
HAB-TV-be:heated-3pN

r-u-Ø-ča?á-ž-án 'he heats it'
HAB-TV-caus-be:heated-3pM-3pN

(42) r-i-g-ihiz-iž 'he pays'
HAB-TV-caus-be:paid-3pM

r-u-Ø-k-ihiz-iž 'he demands' (Fn. 22 & 23) 
HAB-TV-caus-caus-be:paid-3pM

3. Deletions

a) Deletion of The Causative Prefix s-

When the causative prefix s- fortisizes a following alveolar sibilant, s- is subsequently deleted, as in (36).

s → Ø / +__+s

Further examples of S-Deletion preceding s- follow:

- (43) r-a-za?a-ń 'it is completed' (Fn.15)
 HAB-TV-be:completed-3pN
- r-u-∅-sa?a-ž-án 'he completes it'
 HAB-TV-caus-be:completed-3pM-3pN
- (44) r-i-za-ž 'he moves, walks'
 HAB-TV-move-3pM
- r-u-∅-sa-ž-án 'he transports, drives it'
 HAB-TV-caus-move-3pM-3pN

Preceding a retroflexed alveopalatal sibilant, s- is optionally deleted following a non-front vowel with low tone, as in (6) above. It is invariably deleted following i-, as in the following examples:

- (45) r-i-že?é-n 'it leaks'
 HAB-TV-leak-3pN
- r-i-∅-šye?é-n-án 'I pour, spit it out' (Fn.24)
 HAB-TV-caus-leak-lpsg.-3pN
- r-i-∅-šye?é-ž-án 'he pours, spits it out' (Fn.24)
 HAB-TV-caus-leak-3pM-3pN
- (46) r-i-žál-án 'it opens'
 HAB-TV-open-3pN
- ⇒ r-i-∅-šyál-iž-án 'he opens it' (Fn.24)
 HAB-TV-caus-open-3pM-3pN

Thus we can write the following rule for S-Deletion preceding š:

$s \rightarrow \emptyset / _ \text{š}$

Condition: optional / u

Uniting it with the rule for S-Deletion preceding s- results in

$s \rightarrow \emptyset / _ \left. \begin{array}{c} \text{space} \\ \downarrow \\ \text{(s)} \\ \text{(š)} \end{array} \right\}$

Condition: optional / u š

b) Deletion of the Causative Prefix k-

The causative prefix k- is deleted preceding any fortis stop or affricate, as in (10, 20, and 37-42).

$$k \rightarrow \emptyset / +_+ \left[\begin{array}{c} -\text{cont} \\ +\text{fortis} \end{array} \right]$$

Both S- and K-Deletion are ordered after and fed by Fortition.

c) Y-Deletion

A verb-root initial y is deleted following the causative prefix s-, when the root begins with an unraisable low tone, i.e. a tone that cannot be raised by a preceding morpheme. (Nevertheless, the high tone is not lost: when a tone raising prefix precedes an unraisable low tone, the high tone is associated with the prefix itself rather than with the stem.) It is also deleted when enclosed between s- and e, regardless of the tone pattern, as in (26). (Apparently the sequence sy is not permitted in SDZ.)

$$y \rightarrow \emptyset / s+ _ \text{unraisable low tone}$$

$$y \rightarrow \emptyset / s+ _ e$$

The second of these two rules feeds S-Lenition, but the first one does not. Because of this, the two Y-Deletion rules should not be united.

In the following two examples, y is deleted preceding an unraisable low tone:

- (47) r-i-yahab-iž 'he falls'
 HAB-TV-fall-3pM
- r-u-s-øahab-iž-án 'he drops it'
 HAB-TV-caus-fall-3pM-3pN
- (48) r-a-ya?án-ž 'he stays (behind)'
 HAB-TV-stay-3pM
- r-u-s-øa?án-ž-án 'he leaves it behind'
 HAB-TV-caus-stay-3pM-3pN

Furthermore, n, l, and s are palatalized following i- (Fn.25). This palatalization process results in an offglide that is more distinct in (45b) than in (45a), where the offglide has not been written. Palatalization of s also occurs in (46b). Palatalization of l occurs in (5a, 13b, and 14a). (Fn.26)

5. Dentalization (Fn.28)

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SDZ Causatives (Kreikebaum -- 1983)

	HABITUAL		COMPLETIVE	
	Non-1st	1st Dual	Non-1st	1st Dual
(50) 'break, be torn, get lazy' 'break, tear'	raž-	ráyaž	gož-	báyaž
	rigiiž-	radfiž	gudiiž-	badfiž
(51) 'break, be torn'	ražya?a-	--	gožya?a-	--
'tear'	rigižya?a-	radfižya?a	gudižya?a-	badfižya?a
(52) 'explode pop, burst, be shot' 'pop (trns), shoot'	rahač-	ráyaháč	gohoč-	báyaháč
	rigihič-	radfihič	gudihich-	badfihič
(53) 'be paid'	rahaž-	rayáhaž	gohož-	bayáhaž
'pay'	rigihiž-	radfihiž	gudihich-	badfihiž
(54) 'lie down'	raa-	radó?ot	gó?ot-	badó?ot
'put to bed	rigihiš-	radfihiš	gudihish-	badfihiš
(55) 'enter'	ru-	rajú?u	guyu-	bajú?u
'put into'	rigu?u-	ralú?u	gulu?u-	balú?u
(56) 'call'	ribehej-	raréhej	gurehej-	baréhej
(57) 'sit down'	ribehe-	rajú?u	gurehe-	bajú?u (Fn.29)
'make to sit'	ribe?ek-	ralé?ek	gule?ek-	balé?ek
(58) 'climb'	rä?äp-	rajă?äp	wä?äp-	bajă?äp
'lift, mount'	rilyă?äp-	rală?äp	gulă?äp-	bală?äp (Fn.30)

SDZ Causatives (Kreikebaum -- 1983)

(59) 'drink'	rä?ä-	radũ?ü	gu?u-	badũ?ü
'give to drink'	rugä?ä-	ragä?ä	bagä?ä-	bagä?ä (Fn.31)
(60) 'bathe (self)'	rahaz-	radóhoz	gohoz-	badóhoz
'bathe (s.o.)'	rugahaz-	ragáhaz	bagahaz-	bagáhaz
(61) 'read, sing, play'	rool-	radóol	biil-	badóol (Fns.32&33)
'play (caus.: e.g.radio)'	ruskool-	raskóol	baskool-	baskóol
(62) 'weep; ring (non-c.)'	roon-	radóon	biin-	badóon (Fn.33)
'ring (caus.)'	ruskoon-	raskóon	baskoon	baskóon
(63) 'be poured'	rida?a-	--	bida?a-	--
'pour'	riga?a-	radá?a	guda?a	badá?a
(64) 'be smeared'	ridäáb-	--	bidäáb-	--
'smear'	rigäáb-	radäáb	gudäáb-	badäáb (Fn.31)
(65) 'be dug'	ridään-	--	bidään-	--
'dig'	rigään-	rádään	gudään-	bádään (Fn.31)

FOOTNOTES

*This paper was written in consultation with David Tuggy. It is tentative because the following steps remain to be taken:

1. enlarging the corpus of data
2. checking the data with a variety of speakers
3. continuing to investigate aspect formation, especially the directional verb forms, most of all the coming-directional forms (it is to be expected that such studies will solve some uncertainties concerning causativization, too).

Fn.1 An alternative analysis might treat i- as a transition vowel (occurring according to phonological rules) rather than a thematic vowel. What we term "thematic vowels" are treated by Bartholomew and Yates (1974) as part of the aspect prefixes: they thus have ra-class, ru-class, and ri-class verbs, as well as r-class (vowel-initial) stems.

Fn.2 We have no clear examples of causatives whose non-causative takes u-.

Fn.3 The alphabet used in this paper has the normal phonetic values associated with it, with the following provisos: j is like English j in judge, ä is the low front unrounded vowel ɛ, Cy is phonetically a palatalized consonant, ž and š are retroflexed. High tone is Ṽ, low tone is unmarked, rising tone is Ṃ, and falling is Ṇ. The conventions for representing different syllable nuclei are presented in a later footnote.

The following abbreviations are used in the glosses: HAB = habitual aspect, TV = Thematic Vowel, 1p = first person, 2p = second person, sg. = singular, pl. = plural, dl. = dual, 3pM, 3pN, 3pF, 3pH = third person masculine, neuter, feminine, and honorific person marker, respectively, (s.t.), (s.o.) = something, someone, used as an indicator of transitivity when the form in question does not have a bound person marker for the object (see next footnote). Most examples are given in pairs, and we will refer to the non-causative member of any pair (the first one listed) as a and its causative as b. Thus (1a) is the example glossed 'he stands'.

Almost all forms given are in the habitual aspect; that specification is omitted from the translation glosses. Thus (1a) would more fully be glossed 'he stands (hab.)'.

Fn.4 Any of the bound person markers can appear as subject; they can all also appear as object when there is no bound subject marker (imperatives, 1pDual forms, forms in sentences with a fronted subject). In forms with a bound subject marker, only the 3pN marker -án can occur as bound object marker, and it may do so only if the subject marker is neither 3pN nor 3pH. (In other cases the object is expressed by an independent pronoun or noun phrase following the verb.)

Fn.5 Palatalization will be dealt with in section II.4.

Fn.6 The speaker whom we worked with pronounced the causative prefix s- and the following retroflexed alveopalatal sibilant rather softly but definitely voiceless. Where the causative prefix was preceded by low tone, he had the option of omitting s- and mostly (but not always) to

pronounce the following retroflexed alveopalatal sibilant definitely fortis.

Fn.7 (7b) shows the effect of S-Lenition and (8b) that of K-Lenition (II.1a).

Fn.8 (9b) shows the effects of B-Lenition (II.1b) and the nucleus change discussed in 3.1 below.

Fn.9 Vowel nuclei are of the following types: (a) Simple, represented orthographically by a single vowel (e.g. a). (b) Rearticulated, represented by a geminate vowel (e.g. aa). This type is pronounced with a lenis glottal stop between two instances of the same vowel, or is laryngealized in less careful speech, or it is simply pronounced as a long vowel in fast speech. (c) Interrupted, represented by a glottal stop (?) between a geminate vowel (e.g. a?a). In careful speech it is pronounced as written, with a fortis glottal stop; in fast speech it is pronounced with a lenis glottal stop (i.e. a rearticulated rather than an interrupted nucleus is pronounced). (c) Aspirated, represented by an h between a geminate vowel (e.g. aha) and pronounced accordingly; or -- in fast speech, if preceding a lenis consonant -- it may be pronounced as a breathy vowel. In both Interrupted and Aspirated nuclei, the second vowel is normally devoiced if it has a low tone and precedes a fortis obstruent or a pause. (In the pronunciation of certain speakers, this rule does not apply for aspirated nuclei, when the following fortis obstruent is the beginning of another morpheme.)

Fn.10 (16b) has ii instead of aa in the stem because it has undergone Ablaut (3.2).

Fn.11 This section does not deal with first person forms (which often have root allomorphs with special vowel nuclei and special tone patterns) nor with verb forms that have tone raising prefixes.

Fn.12 (21) involves the same verb pair as (17), but when a human subject is used with the non-causative, the meaning shifts from 'go in' to 'have something go into you'. E.g. r-i-zohob-iž gähčf (gähčf=thorn, needle) 'he gets injections'.

Cf. II.4, first paragraph, concerning the pronunciation of gä.

Fn.13 (22) involves the same verb pair as (18).

Fn.14 All stem initial consonants in (23) and (24) undergo Dentalization (II.5) in certain verb forms.

Fn.15 The high tone written on the 3pN pronoun -n is actually pronounced on the preceding vowel, but the preceding morpheme by itself does not end with a high tone.

Fn.16 This is a rare example of S-Lenition preceding a y-initial stem, in connection with Y-Deletion (II.4).

Fn.17 The ü in examples (28b) and (29b) might originate from a u-ä coalescence. The completive forms of the non-causative verbs (28a) and (29a) are gühtiž 'he died' and güyán 'it cooked, baked'; the underlying

forms might be gu-äht-iž 'COMP-die-3pM' and gu-äy-án 'COMP-cook-3pN'. On the other hand, such an analysis would present the problem of having to assume u- following the k- 'causative' morpheme. (Cf. Fn.33)

Cf. II.4, first paragraph, concerning the pronunciation of gü.

Fn.18 In the first person non-singular forms and in all completive forms of (30-32), the causative prefix is "dentalized" (II.5).

Fn.19 The verb stem of (31a) is composed of the two roots až 'break' -- cf. (16) -- and ya?a (meaning not yet conclusively ascertained). Note that the simple vowel nucleus of the first root is not augmented in the process of causativization. There seems to be a general tendency to have simpler nuclei in compound stems, as the following example will illustrate: giib 'iron, weapon' + yag 'wood' -- gibyag 'axe'.

Fn.20 There is another verb the habitual form of which is identical with the habitual form of 'sound': r-i-behej-iž 'he calls (s.o.)' with the completive gu-rehej-iž 'he called (s.o.)' In contrast, the stem of (33a) remains unchanged: its completive form is gu-behej-án 'it sounded'. These seem likely related ethymologically at least (e.g. instrument calls out).

Fn.21 Bartholomew and Yates (1974) describe Fortition (Rule 5: Fortification of stem initial consonant) for the formation of certain "future definite" (=potential) verbs. For verbs with b-initial stems, a zero prefix and a replacement of b by kw are postulated. Another way to describe the formation would be to postulate the potential prefix g- (or gi- and I-Deletion, or gy- and Y-Deletion), G-Fortition (g -- k), and B-Lenition (b -- w). One may ask whether the underlying potential prefix could be ki- or ky-. However, if this were so, the distinction between the potential and the progressive prefix (ka-/k-) would be less clear. We also would have the problem of having to explain potential verb forms such as g-ahaj-iž 'he will get wet'.

Fn.22 Deletion of the causative prefix will be discussed below (II.2).

Fn.23 Note that (42a) is identical with (19b). (42b) is thus a causative of a causative.

Fn.24 Palatalization -- as written in (45&46) -- will be dealt with in section II.4.

Fn.25 This is described by Bartholomew and Yates (1974): Rule 7. Palatalization of dental consonants.

Fn.26 But the distinction between Cyü and Cü is blurred.

Fn.27 The l in (49b) may be fortis -- cf. (14b) with following explanation.

Fn.28 "Dentalization of lenis stops" is described by Bartholomew and Yates (1974), rule #6.

Fn.29 jú?u in the first person non-singular forms is a stem allomorph supplied from (55a) 'enter'. (It is also supplied in the first person non-singular forms of the verb 'stand'.)

Fn.30 The non-palatalized l in (58b) may be fortis.

Fn.31 Cf. II.4, first paragraph, concerning the pronunciation of gä.

Fn.32 'play' can be either intransitive (referring to a radio etc.) or transitive ('play an instrument').

Fn.33 One might ask whether the stem vowel o originates from an u-a coalescence, since the going-directional forms of (61a&62a) are rigyaalíŕ 'he (hab.) goes to read, sing, play (an instrument)' and rigyaánŕ 'he (hab.) goes to weep'. The underlying non-directional habitual (non-first person) forms would then be r-u-aal- and r-u-aan-. Then we would actually have the thematic vowel u- in non-causative counterparts of some causative verbs. Such an analysis would supply some explanation for the Ablaut in the completive (except first person non-singular) forms. However, we would have to assume u-a in the causative stems, too. (The overwhelming majority of verbs would not allow this analysis). (Cf. fn.17)