

Appendix D: The Development of Finno-Saamic Consonants and their Background

Finno-Saamic > Pre-Saamic

- (1) *ś > *č̣ / _V *šečä > *č̣ečä (> *č̣eačē > čeahci 'uncle')
 *läņšä > *läņčä (> *läv̄žē >> lāvžá 'horsefly')
 (but *koški ĆE *koški > *kuoškē > guoika 'rapids')

This change succeeded the satemization (PIE *k/*g̃ > *ś/*ž) in Indo-Aryan languages (as witnessed by *čuohti* 'hundred' from < Proto-Aryan *śata-, and *čoalli* 'gut' from < Proto-Aryan *śala-) but preceded the corresponding change in Balto-Slavic (as witnessed by *šūvon* 'well trained dog' from Proto-Balto-Slavic *śowon 'dog', and *šearrat* 'bright' from Proto-Balto-Slavic *žer- id.). After this change Pre-Saami had the sibilants *s, *ś (or *š) and *š and the affricates *č (or *č̣) and *č̣; at this point the Proto-Balto-Slavic palatalized sibilants *ś and *ž were substituted with the Pre-Saami palatalized sibilant *ś (or *š); for Proto-Baltic loanwords cf. Proto-Saamic (1). Pre-Saamic was probably still in a dialectal relation to Pre-Finnic. In Finnish place names of Saami origin the affricate resulting from this change has been substituted with *k-* before non-low front vowels (e.g. *Kiekki* < PS *čiekčē >> sN *čiekčá* 'osprey'), *s-* before low vowels (e.g. *Sarsa* < PS *čārsē > sN *Čārsi* place name) and *j-* before non-low back vowels (e.g. *Jolma* < PS *čoałmē > sN *čoałbmi* 'sound, strait').

- (2) *x > *k / _V *sūxi- > *sūki- (> *sukē- > suhkat 'to row')
 *kīxi- > *kīki- (> *kikē- > gihkat 'to rut, to mate')
 *mēxi- > *mēki- (> *mieķē- > sSk miōkkād 'to sell')

As pointed out by Ante Aikio in an unpublished paper, this change must have happened after FS provided that vowel lengthening before *xV did not result in new long vowels in the system, i.e. *ū̄ and *ā̄ (and possibly *ā̄ as well, but there are no examples). However, if one assumes that the long vowels *ū̄, *ā̄ and *ā̄ were introduced by vowel lengthening before *xV, then *x > *k could already have taken place in FS. In fact an exceptional FS *ā̄ might explain the unexpected first syllable vowel in sT *saaggy-* 'to get' ~ Finnish *saa-* id. < FS ?*sāxi- ~ *saxi- (otherwise the FS vowel combination *a-i always gives *uo-ē in Saamic: FS *sakita > PS *suokēdē > sN *suohkat* 'dense').

Pre-Saamic > Proto-Saamic 1

- (1a) *ṣ̌ > *s *ṣ̌alna > *salna (> *suol̄nē > suoldni 'dew')
 *pūṣ̌ä > *pesa (> *peṣ̌ē > bassi 'sacred')
 *kerṣ̌ä > *kersa (> *kear̄sē > gears̄i 'snout; disk')
 *eṣ̌ti- > *ešte- (> *eṣ̌te- > astat 'to have time')
- (1b) *č̣ > *c *č̣onč̣i > *conč̣e (> *cuoñžē > cuozza 'membrane')
 *kač̣ka- > *kacka- (> *kāč̣kē- > gāskit 'to bite')
 *šeč̣ä > *č̣eca (> *č̣eač̣ē > čeahci 'uncle')

These changes succeeded the final stages of Proto-Baltic satemization (PIE *k/*g̃ > Balto-Slavic *ś/*ž > Proto-Baltic *ṣ̌/*ẓ̌) but preceded the Finnic change *ṣ̌ > *h. Proto-Baltic loans participated in this change (Proto-Baltic *ṣ̌alnā > FS *ṣ̌alna > PS *suol̄nē > North Saami *suoldni* 'dew; night-frost'; cf Finnish *halla* 'night-frost') but in old Finnic loans, *ṣ̌ remains unchanged (Early Proto-Finnic *viša > Early Proto-Saamic *veṣ̌ā > PS *veṣ̌ē > North Saami

before light (open) syllables and weak grade before heavy (closed) syllables. Therefore it is reasonable to assume that grade alternation arose before PS3 where new heavy syllables were created through non-high vowel lengthening (e.g. FS **kota* 'hut' > PS2 **ko̩ta* > PS3 **kōtā* > PS5 **koatē* > modern sN *goahti*).

(2) **sj* > **šš* **posja* > **pošša* (> **poaššō* > *boaš'su* 'rear')

The relative chronology of this change is not critical but it probably happened after PS 1 (1), i.e. after the coalescence of FS **š* and **s* into **s*. The example contains FS **šj* (cf Finnish *pohja* 'bottom'); the reflexes of FS **sj* are identical with those of FS **šj*, cf FS **osja* > PS **oaššē* > sI *huáš'si* 'horsetail'.

PS 2 > PS 3

(1)	<i>*p</i> > <i>*B</i>	<i>*supan</i>	>	<i>*subān</i>	(> <i>*subēn</i> > <i>subi</i> 'aspen GenSg')
		<i>*kelpe</i>	>	<i>*kelbe</i>	(> <i>*kalba</i> > <i>galba</i> 'shield')
		<i>*kelpen</i>	>	<i>*kelben</i>	(> <i>*kalban</i> > <i>galbba</i> 'shield GenSg')
	<i>*t</i> > <i>*D</i>	<i>*kotan</i>	>	<i>*kōdān</i>	(> <i>*koadēn</i> > <i>goadi</i> 'hut, GenSg')
		<i>*nējte</i>	>	<i>*nējde</i>	(> <i>*niejde</i> > <i>nieida</i> 'girl')
		<i>*nējten</i>	>	<i>*nējden</i>	(> <i>*niejden</i> > <i>nieidda</i> 'girl GenSg')
	<i>*k</i> > <i>*G</i>	<i>*εkan</i>	>	<i>*ēgān</i>	(> <i>*eagēn</i> > <i>eagi</i> 'uncle GenSg')
		<i>*to̩lka</i>	>	<i>*to̩lga</i>	(> <i>*to̩lgē</i> > <i>dolgi</i> 'feather')
		<i>*to̩lkan</i>	>	<i>*to̩lgan</i>	(> <i>*to̩lgēn</i> > <i>dolggi</i> 'feather GenSg')
	<i>*c</i> > <i>*ʒ</i>	<i>*čecan</i>	>	<i>*čēzān</i>	(> <i>*čeazēn</i> > <i>čeazi</i> 'uncle GenSg')
		<i>*ke̩nce</i>	>	<i>*ke̩nʒe</i>	(> <i>*ke̩nʒe</i> > <i>gazza</i> 'nail')
		<i>*kencen</i>	>	<i>*kenʒen</i>	(> <i>*kenʒen</i> > <i>gacca</i> 'nail GenSg')
	<i>*č</i> > <i>*ʒ̥</i>	<i>*kečan</i>	>	<i>*kežān</i>	(> <i>*keazēn</i> > <i>geaži</i> 'end, point GenSg')
		<i>*lamča</i>	>	<i>*lāmžā</i>	(> <i>*lābžē</i> > <i>lávži</i> 'rein')
		<i>*lamčan</i>	>	<i>*lāmžān</i>	(> <i>*lābžēn</i> > <i>lávžži</i> 'rein GenSg')

The lenition of short stops and affricates happened after the birth of gradation (change 1 above) which lengthened consonant centers before open syllables. The short stops and affricates were lenified irrespectively of their gradation status. As recent development, the lenition of stops resulted in spirants in some idioms (e.g. sN */tiiɖij/*, standard *dīdi* 'he knew', */juokaan/* ~ */juoyään/*, standard *juogán* 'I deal', */rapaan/* ~ */ráâvan/*, standard *raban* 'I open', sSk */vuályam/* 'I leave'). The Saami lenition is independent of the lenition of short stops in Finnic gradation.

(2) **δ* > **θ* **δōm̩e* > **θōm̩e* (> **θuom̩e* > *duopma* 'bird-cherry')

**kāδvā* > **kāθvā* (> **kāθvē* > *gádfi* 'female weasel')

This change did not affect antevocalic spirants in the consonant center, cf FS **kađa-* > PS **kuodē-* > sN *guoddi-* 'to leave behind'.

(3) **δ-* > **θ-* **δāb̩da* > **θāb̩da* (> **θāb̩dē* > *dávdi* ~ *dávvi* 'milt')

This change is posited for the initial FS **δ* in one stem only. The relative order of (2) and (3) is not critical and one could also think that **δ'* was depalatalized in FS and the reflexes of both pre-FS **δ'* and pre-FS **δ* were devoiced into **θ-* by the same sound change. However, the reconstruction of preconsonantal **θ* (from earlier **δ'* only) for sN *gádfi* (to account for the voiceless *f* of the consonant center) seems to speak against this scheme.

PS 3 > PS 4 > PS 5

- (1) **ns* > **ss* **pḕnsā* > **pḕssā* > **peàssē* (> *beas'si* 'birch bark')

This change could also have happened much earlier; the *terminus post quem* seems to be the Pre-Saamic change **ś* > **ć*, and the *terminus ante quem* the Proto-Scandinavian loanwords in which *-*ns*- was substituted with PS *-*nhc*- (e.g. *vuonccis* 'hen'); cf also the Finnic loanword *gázzi* 'companions' (from Fi. *kansa* 'people' the historical cognate of which is sN *guos'si* 'guest' < FS **kansa* < Pre-Germanic **χansa*-). The Finnish place name *Pessa* in the Häme province seems to reflect this change (cf sN *beas'si* 'birch bark' ~ Fi. *pensa-s* 'bush' < FS **pensa*).

- (2) **ηs* > **ks* **jṑηse* > **jṑkse* > **juokse* (> *juoksa* 'bow')
- (3) **ms* > **ηs* **pēmsem* > **pḕsem* > **peηsem* (> *bavssa* 'lip')

The change has been posited for this one word only in order to account for the retention of its consonant center **ηs* in South, Ume and Pite Saami (cf sS *bangseme* 'lip'); however, **ηs* may also be sporadically retained. In that case, the FS form can be reconstructed as **peηsim(i)*.

- (4) **ηp* > **vd* **ṑηpe* > **ṑhpe* > **vuovde* (> *vuovda* 'cavity')
- **ηj* > **vj* **lā̀ηjā* > **lā̀hja* > **lāvžē* (>> *lāvžá* 'horsefly')
- (5) **pp* > **hp* **ṑppe* > **ṑhpe* > **vuohpe* (> *vuohppa* 'father-in-law')
- **tt* > **ht* **ṑttā-* > **ṑttē-* > **vuohte-* (> *vuohhti-* 'to find tracks')
- **kk* > **hk* **ńḕkkā-* > **ńḕkkē-* > **ńḕhkē-* (> *njahkki-* 'to hiccup')
- **ćć* > **hć* **koććō-* > **koććē-* > **kohćē-* (> *gohćču-* 'to invite')
- **cc* > **hc* **kṑccek* > **kṑccek* > **kuohcek* (> *guohca* 'rotten')
- **Ctt* > **Cht* **pṑrttā* > **pṑrhtē* > **poarhtē* (> *boarti* 'birchbark basket')

The preaspiration of geminate stops and affricates developed into a separate segmental phoneme /h/ already in Proto-Saami. This happened in unstressed positions as well, cf Kildin Saami *eł | ha : eł ä't* (= /*jiełχa*/ : /*jiełχaht*/) 'to sustain Sg1Pres : Sg3Pres' < PS **ealēhtām* : **ealēhtā* < FS **elä-ttä-m* : **elä-ttä(-jä)*.

Proto-Saami > Common Western Saami:

- (1) **p̥* > **h̥p̥* **kepe* > **ke^{h̥}pe* (> *gahpa* 'cream')
- **t̥* > **h̥t̥* **koatē* > **koa^{h̥}tē* (> *goahti* 'hut')
- **k̥* > **h̥k̥* **vuokē* > **vuoh^{h̥}kē* (> *vuohki* 'way, method')
- **ć̥* > **h̥ć̥* **ćeaćē* > **ćea^{h̥}ćē* (> *ćeahci* 'uncle')
- **č̥* > **h̥č̥* **keacē* > **keah^{h̥}ćē* (> *geahči* 'end, point')

The preaspiration of the strong grade of single stops and affricates has spread to Inari Saami (as postaspiration) and Skolt Saami (as preaspiration). In Kildin and Ter Saami the single stops show no aspiration.

- (2) **ηm* > **mm* **cā̀ηmē-* > **cā̀mmē-* (> *cábmit* 'to beat up')
- (**nm* > **mm* **kienmē* > **kienmmē* > *giebmi* [~ *giedbmi*] 'kettle')

The change **nm* > **mm* is sporadic: the word for 'kettle' has three different forms in Saami: sN *giebmi* (with the assimilation in 2 above), *giedbmi* (with denasalization and spirantization of the preconsonantal **n* > **D* > **δ*) and *gievdni* (with the metathesis **nm* > **mn* and the subsequent denasalization and spirantization of the preconsonantal **m* > **B* > **v*).

- (2a) **mD* > **BD* **toṁDę-* > **toḅDą-* (>> *dovdat* 'to know')
 **mG* > **BG* **čęmGę-* > **čąBGA-* (> *čavga* 'tight')
 mǰ > **Bǰ* **lāmǰē* > **lāBǰē* (>> *lávži* 'rein')
- (2b) **mn* > **BN* **kiemñē* > **kieḅñē* (>> *gievdni* 'kettle')
 **nm* > **DM* **kieñmē* > **kieḅmē* (> *giedbmi* 'kettle')

This change (2a&b) is probably separate from the Common Western Saami denasalization (cf change 3 above). Secondary denasalization has spread down to South Saami but has not reached the southernmost dialects: Vilhelmina *dåbtedh* vs. Røros *damtijh* 'to know'. In the east, the change 2a has reached Inari and Skolt Saami as well as the extinct dialects of Kemi Saami (Sompio, Savukoski, Sodankylä and Kuolajärvi).

- (3) **ck* > **sk* **počkę* > **poška* (> *boska* 'Angelica plant')
 **ǰm* > **šm* **reaǰmē* > **reašmē* (> *reašmi* 'rope of net')
 **čk* > **šk* **ručķęḅē* > **ruškaḅ* (> *ruškat* 'brown')

This change has spread south to Ume Saami and east to Inari Saami and the northern dialect group of Skolt Saami as well as to the extinct dialects of Kemi Saami (cf sU *gaasskiedh*, sL *gássket*, sN *gáskit*, sI *käskid* 'to bite'; cf. sS *gaetskedh*, sSk N *kä'skķed* vs. sSk S *kä'čķķed* 'to bite').

- (4) **ηs* > **vs* **peṅsem* > **pavsam* (> *bavssa* 'lip')
 **peṅsemęk* > **pavsamąh* (> *baksamat* 'lips')
- (5) **Ĉ* > **CC* **pāñē* > **pāññē* (> *bátņi* 'tooth')
 **kuolē* > **kuollē* (> *guolli* 'fish')
 **ke^hpę* > **kaḅpa* (> *gahpa* 'cream')
 **koa^htē* > **koahtē* (> *goahti* 'hut')
 **vuoh^hkē* > **vuohkē* (> *vuohki* 'way, method')
 **čea^hčē* > **čeahcē* (> *čeahci* 'uncle')
 **kea^hčē* > **keahčē* (> *geahči* 'end, point')

This change coalesced the weak grade of the original geminates and the strong grade of the original single consonants and reduced the contrasting quantities of the consonant center from four to three. The change reached the Ume Saami dialect of Northern Tärna in the beginning of the 20th century which was the last with a four-degree system of consonantal length. The present Ume Saami has three degrees of length. In the east, Inari, Skolt and Akkala Saami show an overall coalescence of the weak grade of the original geminates and the strong grade of the original single consonants. The developments of the quantity systems further east (in Kildin and Ter Saami) are probably independent of the western ones.

- (6) **nn* > **ʔn* **pāññē* > **pāʔñē* (> *bátņi* 'tooth')
 **mm* > **ʔm* **sāmmē* > **sāʔmē* (> *sápmi* 'Saami')
 **ńń* > **ʔń* **pońńą-* > **poʔńą-* (> *botņjat* 'to twist')
 **ηη* > **ʔη* **jiηηą* > **jieʔηą* (> *jiekņa* 'ice')

The prothetic stop in the strong grade of original single nasals has spread to present Ume Saami: in the beginning of the 20th century the strong grade of single nasals had no prothetic stop after a long vowel in the Ume Saami dialect of northern Tärna (eg. *liemme*, GenSg *liemen* 'broth' but *eattņie*, GenSg *ietņien* 'mother').

- (7) **Ĉhk* > **Ĉ^hk* **lāvḅhkē-* > **lāv^hkē* (> *lávki* 'step')

<i>*luoyhtan</i>	>	<i>*luovhtan</i>	(> luovtta 'bay, GenSg')
<i>*lāγžē</i>	>	<i>*lāvžē</i>	(> lāvži 'rein')
<i>*lāγžē</i>	>	<i>*lāvžē</i>	(> lāvžži 'rein GenSg')

This change has spread to Lule Saami in the south-west and into the eastern Saami languages where it is reaching Ter Saami.

(5)	<i>*br</i> > <i>*βr</i>	<i>*eβrē</i>	>	<i>*aβrē</i>	(> arvi 'rain')
	<i>*bl</i> > <i>*βl</i>	<i>*tāβlē</i>	>	<i>*tāβlē</i>	(> dāvli 'spot')
	<i>*bd</i> > <i>*βδ</i>	<i>*θāβδē</i>	>	<i>*tāβδē</i>	(> dāvdi [~ dāvdi] 'milt')
(6)	<i>*βr</i> > <i>*rv</i>	<i>*aβrē-</i>	>	<i>*arvē</i>	(> arvi 'rain')
	<i>*βδ</i> > <i>*δβ</i>	<i>*taβδē</i>	>	<i>*tāδβē</i>	(> dāvdi [~dāvdi] 'milt')

This change has spread to Inari Saami and with some stems to Skolt and Lule Saami as well: sN *searvi*, sI *servi* 'society' < PS **seabrē* (cf sSk *seä brr*, sL *siebrre* id.), sI *arve*, sL *harvve* 'rain' < PS **eβrē* (cf sSk *á brr* id.), sN *čárvut*, sI *čárvud*, sSk *čärvvad* 'to squeeze' < PS **čāβrōdēk* (cf sL *tjābrrot* id.). The dialectal variants of PS **θāβδē* 'spleen' (western Finnmark *dāvdi*, eastern Finnmark *dāvdi*) suggest, that the change originated in the eastern Finnmark dialects: the Common Lule-Pite Saamic change **-Cδ-* > **-Cd-* (below) reached the western Finnmark dialects before the innovation **βδ* > **δβ* and the conditions for the meta-thesis in (6) were no longer met in this part of North Saami.

(7)	<i>*-v̄s-</i> > <i>*-k̄s-</i>	<i>*ruov̄sē-</i>	>	<i>*ruok̄sē</i>	(> ruoksi 'udder')
		<i>*pav̄s̄am̄ah</i>	>	<i>*pāk̄s̄am̄ah</i>	(> baksamat 'lips')
	<i>*-v̄š-</i> > <i>*-k̄š-</i>	<i>*kāv̄šō</i>	>	<i>*kāk̄šō</i>	(> gákšu 'she-wolf')

This change has spread south-west to Lule Saami and to the eastern Saami languages.

(8)	<i>*-sn-</i> > <i>*-st-</i>	<i>*ā̀sn̄a-</i>	>	<i>*ā̀st̄a-</i>	(> ástat 'to wither')
	<i>*-śn-</i> > <i>*-st-</i>	<i>*kàśn̄ē-</i>	>	<i>*kàst̄ē-</i>	(> gastit 'to sneeze')
	<i>*-sn̄-</i> > <i>*-sk-</i>	<i>*kuòsn̄e-</i>	>	<i>*kuòsk̄a-</i>	(> guoskat 'to touch')
	sporadically also:				
	<i>*-sm-</i> > <i>*-sp-</i>	<i>*lùsm̄ē</i>	>	<i>*lùsp̄ē</i>	(> luspi [~ lusmi] 'river outflow')
	<i>(*-sm- Œ</i>	<i>*vàsm̄ē</i>			> <i>vasmi</i> 'light snow')

North Saami is the only group of Saami idioms where this change has been completed consistently and thus it can be concluded that the innovation spread from here to the south-west and to the east with individual word stems (e.g. the reflects of PS **kes̄n̄es* 'juniper' and **vuos̄n̄ōn* 'perch' show *-sk-* from Ume to Kildin Saami; the reflects of PS **rùsn̄e* 'frost-mist' show *-st-* from North to Skolt Saami; the reflects of PS **lùsm̄ē* 'river outflow' show *-sp-* from North to South Saami). The only word in Inari and Skolt Saami seems to be the reflects of PS **tā̀sn̄ē* 'star' (sI *tāsni*, sSk *tā́snn* id.) which is related (by way of nasal transference?) to the South Saami – North Saami **nā̀st̄ē* id. (cf sN *násti* id.).

(9)	<i>*-d-</i> > <i>*-δ-</i> / <i>V_V</i>	<i>*koav̄ēn</i>	>	<i>*koad̄ēn</i>	(> goadi 'hut GenSg')
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This change has spread east to Inari and Skolt Saami (parts of the latter also has **δ > d*).

(10)	<i>*-θv-</i> > <i>*-δf-</i>	<i>*kāv̄θv̄ē</i>	>	<i>*kād̄δf̄ē</i>	(> gádfi 'female weasel')
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This change has may also have happened in Common North-Western Saamic: Lule Saami has *-rf-* (< either **θv* or **δf*) in the reflects of PS **koav̄θv̄ē* < FS **kod̄va* 'period' (cf Finnish

