

Livonian stød

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1 Stød

During a brief encounter with a Livonian sailor on the Copenhagen waterfront, Vilhelm Thomsen noticed in his speech a prosodic feature, found in no other Balto-Finnic language, which he instantly identified with the stød of his own native Danish.¹ In the few hours that he was able to spend with the seaman, Thomsen accurately identified the essentials of the Livonian stød's distribution, noting that it occurs in heavy syllables that end in what he called a "sonant coefficient" and that it interacts with quantitative gradation in morphological paradigms. His observations, which appeared as a last-minute addendum to his famous *Beröringer* (Thomsen 1890:58-63), were confirmed and extended through extensive work on Livonian by Finnish linguists in the interwar decades. They produced a magnificent Livonian dictionary, from which most of the data in my paper is drawn (Kettunen 1938), a series of instrumental phonetic studies (Kettunen 1925, Posti 1936, Posti 1937, Penttilä & Posti 1941), and two historical grammars (Posti 1942, Kettunen 1947). Vihman (1971) and Suhonen (1982) contributed additional observations on the phonetics of stød. Wiik (1989) summarizes all this previous research, and discusses the stød's phonological interpretation and origin. Unfortunately all further inquiry into Livonian prosody will have to make do with the existing data because the language is now on the brink of extinction.²

The Livonian stød appears on stressed VV or VC syllables, where C is a voiced consonant (the same configuration as the "stød base" of Danish). Following Wiik, I will write it with an apostrophe after the first vocalic mora, e.g. *ro'o* 'money', *ka'llə* 'fish' (part.sg.).

Stød is contrastive on stressed CVV and CVVC syllables, in monosyllabic as well as polysyllabic words. It is also contrastive on stressed nonfinal CVC syllables. A selection of minimal pairs is given in (1).³

¹This material was presented in 1995 at Konstanz and at the TREND phonology workshop in Santa Cruz. The present text incorporates several revisions and additions, most recently from 2006.

²In 2000 I had the opportunity of interviewing and recording three stalwart Livonian speakers, Elfrīda Žagare, Viktors Bertholds, and Pauline Kļaviņa. I am grateful to Karl Pajusalu and Tiit-Rein Viitso for making this possible, and to the National Academy of Sciences for its financial support.

³For another list of minimal pairs, see Posti 1936.

(1) Stød contrasts in CVV and non-final CVC syllables:

<i>No stød</i>		<i>stød</i>	
leeḑ	‘sphere’	le’ed	‘leaf’
niin	‘bark strip’	ni’iin	‘wide belt’
moo	‘earth’	mo’o	‘down, earthwards’
uudə	‘to fry’	u’udə	‘to strain’
puustə	‘tree’ (elat.sg.)	pu’ustə	‘to clean’
puugə	‘to hang (execute)’	pu’ugə	‘to blow’
jùodə	‘to drink’	ju’odə	‘to lead’
ka’llə	‘island’ (part.sg.)	ka’llə	‘fish’ (part.sg.)
kwo’nnə	‘frog’ (part.sg.)	kwo’nnə	‘at home’
va’nnə	‘to swear’	va’nnə	‘old’ (part.sg.)
pa’llə	‘to pray’	pa’llə	‘piece’ (part.sg.)

In monosyllabic CVC words, on the other hand, stød is obligatory, hence noncontrastive.

- (2) a. *va’l* ‘light’, *me’r* ‘sea’.
 b. Impossible words: **val*, **mer*.

Uncontroversially, stød is manifested by a combination of phonetic cues, involving at least pitch, length, and voice quality (Kettunen 1938:XXI). According to Vihman (1971), intensity is also a factor.

- (3) Phonetic reflexes of stød
- Falling pitch contour.
 - Markedly shorter duration of the stressed syllable or foot.
 - Highly variable glottalization, ranging from no audible glottal effect up to, rarely, a complete glottal stop.
 - Decreasing intensity.

The published data shows particularly clearly that syllables with and without stød contrast in pitch and duration. Figure 1 reproduces the Penttilä & Posti’s (1941) cathode ray oscillograms of the minimal pair *leeḑ* ‘sphere’ (above) and *le’ed* ‘leaf’ (below). Figure 2, from Wiik (1989), gives the average three-point F₀ contour for Penttilä & Posti’s (1941) eight stød (*katkointonaatio*) and six non-stød (“rising”, *nousuintonaatio*) cases, measured at the beginning of the stressed nucleus, at its highest point, and at its end.

However, pitch and duration have most often been considered secondary features of Livonian stød. Posti (1941) considered glottal constriction to be its distinctive feature. More recent structuralist approaches tend to shift the focus from the stød’s phonological substance to its structural and functional role in the system. Vihman (1971:76)

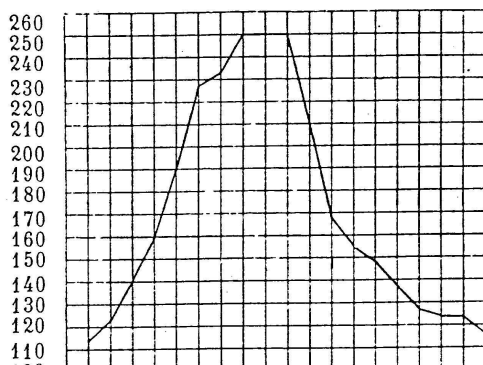
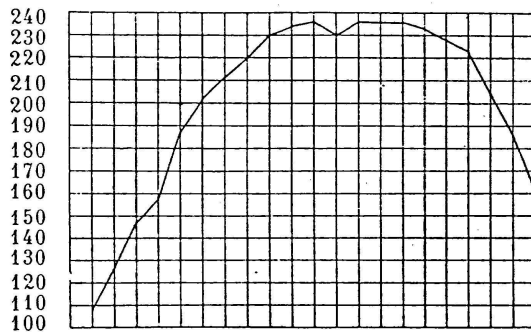


Figure 1: *leed* versus *le'ed* (from Penttilä & Posti 1941)

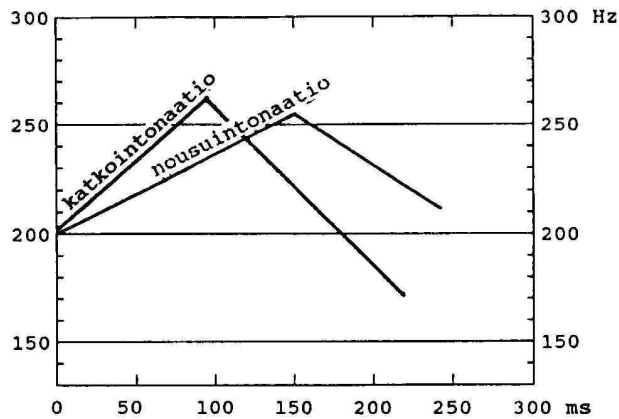


Figure 2: Averaged three-point contours of stød and non-stød nuclei (from Wiik 1989)

argues that *stød* is “an inherent or underlying feature of Livonian, occurring in the lexical shape of roots. Wiik (1989), on the other hand, claims that it is predictable from underlying representations. He considers it a prosodic signal that serves to mark a syllable boundary, or the site of a former or underlying syllable boundary.⁴

The question of the phonetic and phonological nature of *stød* is of course intimately related to the question of its origin, and the notion of the phonological primacy of its glottal component may be rooted in hypotheses about its history. Thus, Kettunen and Vihman suggest that *stød* first arose as a reflex of *h* in words like *raha* > *ro'o* ‘money’. And, in line with a popular account of Danish *stød*, Posti suggests that it developed as a glottal stop from rising pitch which arose when the following syllable was lost. On Wiik’s account, *stød* arose by phonologization of syllable boundaries, though he is non-committal about exactly what phonological entities the syllable boundaries were phonologized as.

In my view, Livonian *stød* is a fundamentally tonal phenomenon. I analyse it as a falling (HL) tone, and show how it is regularly derived in any of several ways, the common thread of which is that a short High-toned syllable acquires a second, Low-toned mora. On this interpretation, the glottal constriction and shortening that often accompany *stød* are phonetic enhancements of the distinctive falling pitch contour. After showing how this hypothesis handles the simpler cases, I address the relation between *stød* and other prosodic alternations of Livonian, specifically the quantitative gradation processes which lie at the heart of the language’s morphophonology.

Throughout this article, my transcription of Livonian essentially follows that of Wiik (1989).

- (4)
- Length without *stød*: VV, CC. E.g. *uudə* ‘to fry’, *pəərənd* ‘floor’, *oppəttə* ‘teach’.
 - Length with *stød*: V’V, V’C. E.g. *ro’o* ‘money’, *ka’llə* ‘fish’ (part.sg.).
 - Half-length: \tilde{V} , \tilde{C} . E.g. *kalà* ‘fish’, *oppəttə* ‘teach’, *virbə* ‘rod’ (part.sg.), *villə* ‘wool’ (part.sg.), *pəp* ‘flax chaff’.
 - Palatalization: $\check{s}, \check{z}, \check{d}, \check{t}, \check{n}, \check{l}, \check{r}$. E.g. /puu+d+i/ → *puuđi* ‘tree’ (part.pl.), /puu+st+i/ → *puušđi* (elat.pl.), /jalga+d+i/ *jalgđi* ‘foot’ (illat.pl.).

2 Deriving *stød*: the simple cases

In this section I show that the core generalizations about the distribution of Livonian *stød* follow from three assumptions.

- (5)
- A voiced moraic segment is tone-bearing.
 - The *stød* is a falling tone (HL).

⁴In an extensive treatment of the Danish *stød*, Liberman (1982:286) comes to the conclusion that it marks a boundary between the two moras of a long syllable.

- It arises when a short stressed syllable, bearing High tone, acquires a second tone-bearing mora which bears Low tone.

Let us review the various paths by which the HL tone that constitutes the distinctive property of *stød* can come about. What syllables would be High, and what syllables would be Low? In what ways can a short syllable acquire a second tone-bearing mora? And how does this originally redundant tonal contour become contrastive?

I begin with the assumption that redundant tone is assigned to tone-bearing (voiced) segments on the basis of stress.

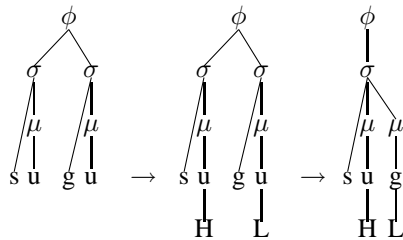
- (6) A tone-bearing segment is High in a stressed syllable, Low otherwise.

Diachronically, the assignment of these tones took place before the operation of a series of sound changes that profoundly affected the syllable and foot structure of the language. These sound changes resulted in the reassignment of unstressed (and hence Low-toned) segments to stressed (and hence High-toned) syllables. *This is the origin of stød.*

Perhaps the simplest case is apocope, the loss of a word-final nonlow vowel. The rise of *stød* by apocope can be illustrated with the derivation of monosyllabic noun forms, such as Nom.Sg. *su'g* 'relative' and *pi'ŋ* 'dog'. They come historically from disyllabic bases, such as /sugu/, /pini/. A case can be made that they are underlyingly disyllabic synchronically as well. Their second syllable surfaces in inflected forms, e.g. Nom. Pl. *sugūd*, *piŋid* (where the palatalization of the nasal, and the half-length on the second syllable, are due to obligatory phonetic processes). However, nailing down this synchronic analysis would require a more thorough treatment of the morphophonological alternations than I am able to offer here. For now, what follows is intended primarily as a historical account of the genesis of Livonian *stød*.

The derivation of *su'g* according to the proposed analysis is given in (7).

- (7) Apocope: /sugu/ → *su'g*



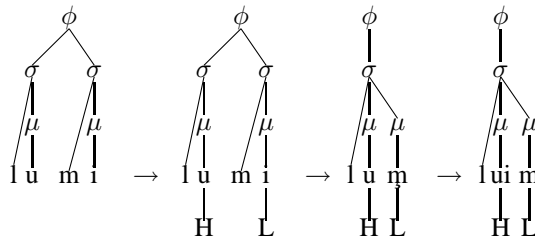
The idea is that apocope causes the onset of the second syllable to become a coda, which is tone-bearing since it is voiced, and gets Low tone by default. The resulting HL combination is *stød*.

When the apocopated vowel is *-i*, a copy of it can be retained *before* the consonant if that consonant is a velar, labial, or palatal (Kettunen 1938: XXVIII).

- (8) a. **susi* > *su'iž* or *su'ž* 'wolf'
 b. **joki* > *jo'ig* or *jo'g* 'river'
 c. **lumi* > *lu'im* or *lu'm* 'snow'

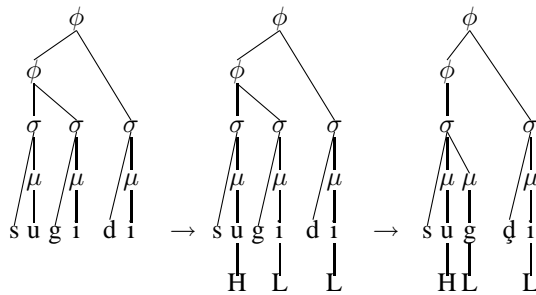
In Livonian, coronals are palatalized before *-i*, and the resulting palatalized fricatives become ordinary palatals *š*, *ž*. Therefore the metathesis in (8) is probably really a migration of the palatal gesture from the *-i* to the palatalized consonant, and, when the consonant becomes depalatalized, optionally onward to the preceding nucleus as a transitional glide, viz. *lumi* → *lu'm̥* → *lu'im*. This of course assumes that palatalization at an earlier stage applied to labials and velars as well as coronals. On these assumptions, stød formation in “metathesis” reduces to the apocope case described above.

- (9) “Metathesis”: *lumi* → *lu'm̥* → *lu'im*



Medial syncope works essentially in same way as final apocope. An example is the addition of the Partitive Plural ending */-idi/* to vocalic stems. The combination */sugu-idi/*, undergoes vowel contraction and the resulting medial vowel is optionally deleted: */sugu-idi/* → *sugidi* → *su'g̥di* ~ *sugiđi* 'of relatives'. Let us consider the two pronunciations in turn. On the first option, where medial syncope applies, stød is obligatorily assigned to the first syllable. The reason is that, as a result of syncope, the first syllable contains two tone-bearing moras, of which the first has High tone and the second has Low tone.

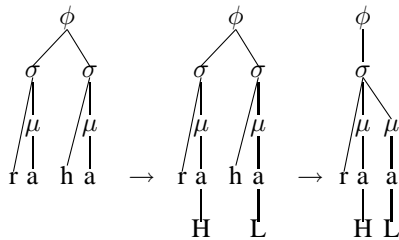
- (10) Syncope: */sugu-idi/* → *sugidi* → *sugiđi* ~ *su'g̥di*.



On the second option, where medial syncope does not apply, the first syllable remains monomoraic, and no stød occurs. In this variant, the second syllable is lengthened (it becomes “half-long”, in traditional Fennist terminology). The conditions that trigger this lengthening will be specified below.

Another way in which a Low-toned mora can become adjoined to a High-toned syllable is the deletion of a medial consonant. A medial *h* is regularly deleted, and contraction of the resulting hiatus yields a heavy syllable with stød:

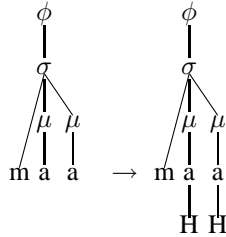
(11) *h*-deletion in medial onset: *raha* → *ro'o*



On this understanding, the stød is not at all a laryngeal reflex of the lost *h* (as Kettunen supposed), but rather a continuation of the word’s pre-contraction tone contour.

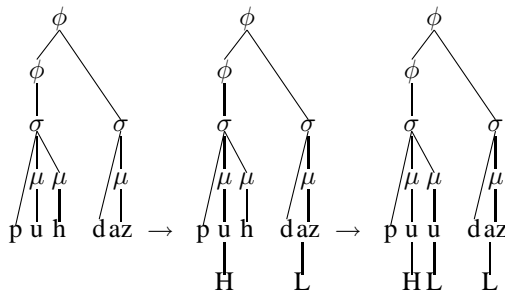
It should now be obvious why an original long vowel *never* receives stød. Its two moras will always have the same pitch, which will be High in a stressed syllable:

(12) Original long vowel: *maa*



Yet another source of stød is assimilation of coda *h* (or its deletion with compensatory lengthening of the nucleus):

- (13) *h*-deletion in coda: *puhdas* → *pu'udəz*, *vihma* → *vi'ima* (→ *vi'im*)



The *h* is unvoiced (at least phonologically), and therefore not tone-bearing. When it is replaced by the moraic *u* (whether this happens by assimilation or by deletion plus compensatory lengthening is immaterial for the analysis) it instantly becomes tone-bearing, at which point it acquires a default Low tone, which combines with the preceding *H* into HL as before.

Slightly more complex is the explanation for words of the type *ka'ggəl* 'neck', *a'ddərz* 'plow', *ka'ggər* 'oats', *ka'bbər* 'goat', *da'ggəl* 'tinder'. They are historically from CVCRV stems: **kagla*, **adra*, **kagra*, **kabra*, **tagla*. The -CR- cluster was apparently first syllabified as an onset, to which gemination then applied, accompanied by reduction of the second syllable.

- (14) **kagla* → *ka'ggla* → *ka'gglə* → *ka'ggl* → *ka'ggəl*

Recall that CVC monosyllables have predictable stød. We now have the explanation for this regularity in hand. Monosyllabic CVC words, if they existed, would have to be derived from basic CVC words, without apocope. But these were not possible

words in Balto-Finnic (and are still not possible in Finnish, function words excepted), because word-final -C was never weight-bearing, and so /CVC/ words did not satisfy foot minimality.

I now turn to the harder cases, which involve the interaction of stød with quantitative gradation in inflectional paradigms.

3 Quantitative Gradation

The examples in (15) show that a consonant after an originally short stem vowel is lengthened in the partitive singular.

(15)	Nom.Sg.	Part.Sg.	
a.	vorà	vo'rrə	'pin'
	vadà	va'ddə	'trawling net'
	vigà	vi'ggə	'fault, disease'
b.	metsà	metsə	'forest'
	mustà	muštə	'black'
	vakkà	vakkə	'bushel'
c.	viirba	vi'rbə	'rod'
	voontsa	vo'ntsə	'forehead'
	uurma	u'rmə	'rapids, stream'
	kùoltta	kwòl'ttə	'shore'
d.	siig	siigə	'whitefish'
	riist	riistə	'dish'

When the postvocalic consonant is an onset, as in (15a), this lengthening takes the form of gemination: a moraic copy of it gets affiliated with the preceding syllable as a coda. Since all short intervocalic consonants in Livonian are voiced, the geminate is always voiced, and thus capable of bearing tone; hence the resulting heavy syllable gets stød. The postvocalic consonant is also lengthened when it is a coda. In a coda, the lengthening is manifested as so-called half-length, marked with the traditional grave accent in (15b,c).

In those forms where this consonant lengthening does not apply, such as the nominative in (15), a vowel lengthening process takes effect instead. In (15a,b), it applies to the word-final vowel, rendering it half-long (marked by a grave accent), and hence unreduced. A different site of vowel lengthening is seen in (15c), when the coda is a sonorant. Where the sonorant is not lengthened, as in the nominative, the vowel before it is lengthened instead.

The upshot is that any word whose stressed vowel is short gets lengthened somewhere. Which of the three sites of lengthening is chosen depends on the conditions just stated. Every stressed CVR syllable (R = a sonorant) is superheavy at least phonetically, with the extra length residing either on the R or on the V, depending on the gradation environment.

After a long vowel, no consonant lengthening occurs, as illustrated in (15d).

To discern the processes that underlie these length alternations, and to see how they relate to the *stød*, let us examine the additional data in (16), where the original forms of the stems and endings are also indicated. The table gives the partial inflectional paradigms of some representative nouns (based on Kettunen 1938).

(16)			*kala	*jalka	*suku	*pini	*lampas	
	Sg.	Nom.	*-∅	kalà	jaalga	su'g	piŋ	laambaz
		Dat.	*-na	kalàn	jaalgan	su'ggən	pi'ŋŋən	laambən
		Part.	*-ta	ka'llə	jalgə	su'ggə	piŋ'ŋə	laambast
	Pl.	Nom.	*-t	kalàd	jaalgad	sugùd	piŋìd	laambəd
		Dat.	*-ten	kalàdən	jaalgadən	sugùdən	piŋìdən	laambədən
		Part.	*-iti	ka'lđi	jalg(đ)i	sugđi	piŋđi	laambiđi
				'fish'	'foot'	'relative'	'dog'	'lamb'

The data in (16) reveal two general processes, one of them morphophonological from the synchronic point of view, the other phonetic. Both are restricted to disyllabic and polysyllabic words whose first (stressed) syllable has a short vowel. By the morphophonological process, a consonant is lengthened immediately after a stressed short vowel if the following syllable has a long vowel, which is then itself reduced. This consonant lengthening process is manifested in two ways. If the consonant is intervocalic (and hence an onset), it is geminated, and if that geminate is voiced, it receives a *stød* (17a). If the consonant is a coda, it becomes “half-long”, always *without stød* (17b,c).

- (17) a. *kala-ta → kalaa → ka'llaa → ka'llə
 b. *jalka-ta → jalgaa → jalgaa → jalgə
 c. *lampase-na → lambazena → lambahena → lambaana → lambaan → lambən

The second, phonetic process applies to vowels, *without ever causing stød*. This phonetic lengthening is superimposed on the output of the morphophonological processes described in the preceding paragraph. Unlike it, it is not motivated by foot structure. In fact, it tends to undo the prosodic regularities established by the morphophonological lengthening. Phonetic lengthening has again two versions. It applies to a stressed vowel before a tautosyllabic short sonorant. There is no vowel lengthening before half-long consonants such as (17).⁵

- (18) a. *jalka → jalga → jaalga
 b. *jalka-na → jalgan → jaalgan
 c. *lampas → lambaz → laambaz

⁵In Estonian, this lengthening process applies not only to CVR syllables but also to CVV syllables, resulting in “overlong” vowels (“Q3”). While words of the shape *siigə* ‘whitefish’, *riistə* ‘dish’ are not lengthened in Livonian, their Estonian counterparts are.

Otherwise, it applies to the next syllable, making its vowel half-long.

- (19) a. **kala* → *kalà*
 b. **kala-na* → *kalàn*
 c. **pini-ten* → *piṅìdən*

This lengthening applies mechanically regardless of whether the unstressed vowel is in a closed or open syllable, and regardless of whether it is word-final or medial. The following additional examples illustrate this prosodic indiscriminacy.

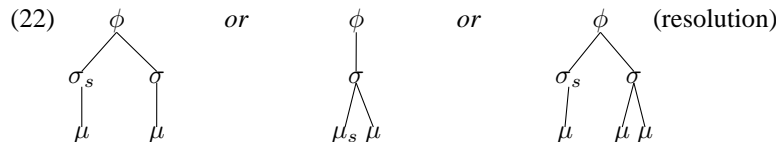
- (20) a. *paḡàṅəz* ‘heathen’, *aràḡəz* ‘crow’, *alàbi* ‘made of willow’ (Nom.Sg.), *sižàlikìži* ‘lizard’ (Part.Pl.)
 b. *jumàl* ‘god’, *vazàr* ‘hammer’, *agàn* ‘chaff’, *parànttə* ‘to heal’, *peràst* ‘afterwards’

Why does stød arise from lengthenings like those in (17a)? And why does it not arise from lengthenings such as those in (17b,c), (18), and (19)? The analysis presented above suggests an answer to these questions.

The prosodic system of Livonian (like that of the other Balto-Finnic languages, such as Finnish, Estonian, Vot, and Veps) is based on syllable weight. The basic foot in these languages is the MORAIC TROCHEE. All these languages also share the undominated constraint that words are stressed on the initial syllable. But the combination of initial stress and moraic trochee parsing harbors a built-in conflict which becomes apparent, among other places, in every word-initial LH sequence. These require sacrificing either the prosodic structure, or the lexically specified quantity.⁶

- (21) a. RESOLUTION: standard Finnish and most dialects of Finnish form an initial LH foot, the RESOLVED MORAIC TROCHEE;
 b. LENGTHENING: Southwestern Finnish dialects, Estonian, and Livonian lengthen LH to HH (two feet), e.g. SW Finnish *kalaa* → *kallaa*.

Thus, there are three forms of the moraic trochee, two basic ones shared by every language that uses this foot, and a third, the resolved moraic trochee, found only in some of them — for example, in Finnish, but not in Livonian.

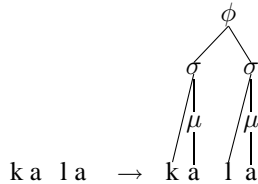


⁶There is a third resolution, of sacrificing stress. An example is Malayalam, where words beginning LH receive stress on the second syllable, rather than on the first, as other words do (Mohanani 1986). As far as I know, no Balto-Finnic language resorts to this solution.

Those languages which reject the third foot type, such as Livonian, cope with initial LH sequences in other ways, specifically by geminating the medial consonant so as to make the first syllable heavy. In Livonian, this lengthening has, among other effects, a tonal reflex: the occurrence of *stød* on syllables which are lengthened in response to the metrical parsing problem just described.

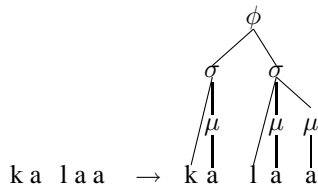
We are now in a position to explicate the quantitative alternations in (15) and (16). Starting with CVCV stems in *-a*, the derivation of Nom.Sg. /kala/ is straightforward. The final vowel is low, hence not subject to apocope. It becomes half-long at the phonetic level by the obligatory process described above (not indicated in the phonological representation).

(23) CVCV: Nominative /kala/ → *kalà*



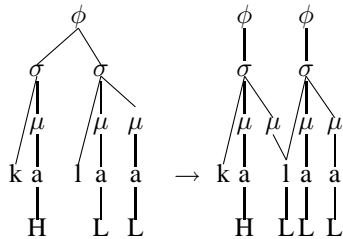
The Partitive /kala+a/, however, (which historically comes from **kala+da*) cannot be parsed as a canonical moraic trochee. The initial stressed syllable must either be a degenerate (one-mora) foot of its own, or the head of a resolved (three-mora) foot comprising the whole word. Either analysis will yield the desired result for us. Evidence from other Balto-Finnic languages indicates a resolved foot (Hanson and Kiparsky 1996), so let us assume that this is what Livonian originally started out with.

(24) CVCV+V: Partitive /kala+a/



What then happened in Livonian (as well as in some other Balto-Finnic dialects, such as Southwestern Finnish) is that this marked prosodic structure was repaired by stretching the word into two two-mora syllables, each of which is parsed as a moraic trochee.

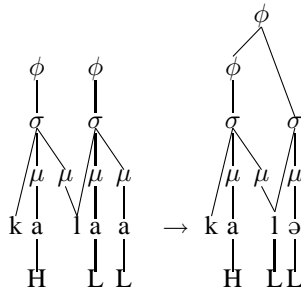
(25) CVCV+V: Partitive /kala+a/ → ka'llə (first stage)



Here is the familiar scenario for derived HL contours again, reached by yet another route. The originally non-moraic onset consonant spawns a moraic coda, which, being voiced, is tone-bearing and so must be specified for tone. Having no High tone, it is assigned Low tone by default.

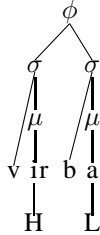
In Livonian, however, the new coda triggered an independently motivated constraint of the language which requires defooting after a heavy initial syllable.

(26) CVCV+V: Partitive /kala+a/ → ka'llə (second stage)



As an example of medial consonant clusters, we take /virba/ ‘stick, pole’. In the derivation of the nominative *viirba*, I assume that the bimoraic foot requirement imposes a non-moraic parse on the coda consonant.

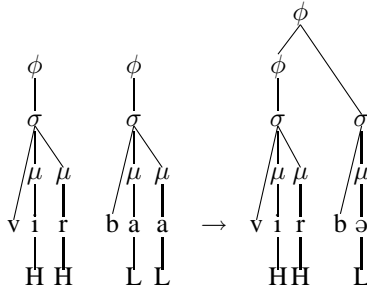
(27) CVCCV: Nominative /virba/ → *viirba*



The stressed vowel is then lengthened at the phonetic level as outlined above. The analysis correctly predicts that this lengthening does *not* trigger stød.

In the derivation of the partitive *virbə*, from **virbaa* < **virba+da*), the second syllable is long. In this case, the bimoraic foot requirement is satisfied by making the first syllable's coda moraic, so that each syllable can be parsed as a foot. The coda consonant is then lengthened, and the second foot reduced, as discussed above.

(28) CVCCV+V: Partitive /virba+a/ → *virbə*



Again, these changes have no tonal repercussions, as predicted. The derivation of Nominative *metsà* from /metsa/ and Partitive *metsa* from /metsa+a/ is entirely parallel as far as the morphophonology is concerned. The only difference is that here the postvocalic consonant is voiceless, so that the phonetic vowel lengthening applies to the second syllable rather than to the first. This lengthening has no tonal effect either.

The upshot is that quantitative gradation is the result of imposing the bimoraic foot template at the phonological level. This is achieved by parsing a syllable with a short vowel as

- monomoraic if the following syllable is light, and
- bimoraic if the following syllable is heavy.

The phonetic (half-)lengthenings mask this simple system of quantitative gradation on the surface.

Finally: what is the historical relationship between the Livonian *stød* and the identical or at least very similar “Stosston” intonation of the coterritorial Latvian language? Almost certainly one of them got it from the other. The languages have influenced each other in many ways, in both directions.⁷ But which way did the influence go in this case? Scholarly opinion on this question is divided. Thomson (1890: 59) and Kettunen (1925: 4) thought that Livonian had borrowed the *stød* from Latvian, whereas Posti (1942: 325) thought that Latvian got it from Livonian. My conclusion that the Livonian *stød* is a tonal feature is more consonant with the former view. Livonian is the *only* Finno-Ugric language known to have a tonal or pitch accent, while it is a feature of several branches of Indo-European, including Balto-Slavic in particular. On the hypothesis that Livonian got its *stød* under the influence of Latvian, we account for the Livonian *stød* by language contact, and for the Latvian *stød* as a Baltic inheritance. On the reverse hypothesis, Livonian just happened to phonemicize its redundant falling pitch as *stød*, for no particular reason. This is, of course, possible. Tonal contrasts sometimes do arise by secondary split through syllable structure changes without either “priming” (Kiparsky 1995) or language contact — an example is Barra Gaelic (Bosch & de Jong 1997). However, the phonemicization of a redundant pitch contrast is not an everyday event, and a motive or trigger for such a change should always be sought.

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⁷The Livonians were a powerful nation in medieval times; on old maps, the entire Baltic region is labeled “Livonia”.

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