

The Saussure Effect in Lithuanian^{*}

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The so-called “Saussure effect” describes the phenomenon of laryngeal loss in the following environments: **#HRo-* and **.oRHC-*. The fact that the effect is observed in several Indo-European branches suggests that it took place at the stage of Proto-Indo-European. In this paper, characteristic examples of the phenomenon in Lithuanian are presented, and an attempt is made to provide a consistent morphological explanation of the reason why no traces of the Saussure effect are observed in several seeming counterexamples where its operation is expected.

1 Introduction

The “Saussure effect” is a phenomenon where a laryngeal is lost without any trace in specific environments in the vicinity of the vowel **/o/*. Although not many examples are found, it is observed in Greek, Anatolian, Italic, Sanskrit, and Armenian. This fact suggests that the Saussure effect took place at the stage of Proto-Indo-European. Recent studies on the Saussure effect include a survey of the examples of this phenomenon in Latin and Italic in Nussbaum (1997), an investigation and a summary of the phenomenon in Greek in Beekes (1969: 74–75, 238–242), as well as in Anatolian in Melchert (1994: 49–51).¹ For Balto-Slavic, the main study of this phenomenon is by Rasmussen (1989), who provides examples of the phenomenon from Balto-Slavic in order to explain the unexpected circumflex

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¹The phenomenon was originally described in Saussure (1905: 511ff.).

tones of some forms. Unfortunately, however, the evidence for the Saussure effect in Baltic does not seem to have received the attention it deserves.

In this paper, I will examine certain examples and counterexamples of the Saussure effect in Lithuanian, thus refining the results obtained by Rasmussen (1989). Since as yet there are no good collections of Proto-Indo-European nominal roots, the data presented here in regard to the Saussure effect are largely based on the collection of Proto-Indo-European verbal roots in *LIV*. Furthermore, I will attempt to clarify the relationship between the Saussure effect and each of the seeming counterexamples. Most of these counterexamples are assumed to have been affected by legitimate analogical processes which restored the lost laryngeals.

1.1 The Saussure Effect

The Saussure effect constitutes the loss of a laryngeal in the environments indicated in (1) below:

- (1) a. **#HRo-* > **#Ro-*
 b. **-oRHC-* > **-oRC-*

The examples in (2) and (3), which are examined in Beekes (1969: 74–75, 238–242), show that laryngeals in Greek were not vocalized in the environments indicated in (1):²

- (2) Failure of vocalization of laryngeals in the environment of **# Ro-*:

- a. **h₃loig-o-* > *λοιγός* ‘decimation’: cf. **h₃lig-* > *ὀλίγ-* ‘few, small’
 b. **h₃moiǵ^h-o-* > *μοιχός* ‘adulterer’: cf. **h₃meiǵ^h-* > *ὀμείχω* ‘to urinate’
 c. **h₂nōr-* > *νωρεῖν* ‘to be active’ (Hesychius): cf. **h₂ner-* > *ἀνήρ* ‘man’
 d. **h₂uors-* > *οὐρέω* ‘urinate’, *οὐρον* ‘urine’: cf. **h₂uers-* > *ἄερσαν*, *ἄερσην* ‘dew’

- (3) Failure of vocalization of laryngeals in the environment of **-oRC-*:

²(2) and (3) are based on the summaries in Nussbaum (1997: 181–182).

- a. **torh₁mo-* > *τόρμος* ‘hole’: cf. **terh₁-* > *τερέτρον* ‘gimlet’
- b. **porh₂neh₂* > *πόρνη* ‘prostitute’: cf. **perh₂-* > *πέρνημι*, *πέρασα* ‘to sell’
- c. **tolh₂meh₂* > *τόλμα* ‘hardiness’: cf. **tlh₂-* > *τλήναι* ‘to endure’
- d. **solh₂uo-* > *ὅλος*, *ὄλος* ‘whole’: cf. **slh₂-i-* > CLuv. *šalhitti-* ‘growth’
- e. **(h₁)ouHd^h-* > *ὄθηρα* ‘udder’: cf. **(h₁)uHd^h-* > Skt. *údhar* ‘udder’
- f. (**polh₁u-* →) **polu₁ia-* > *πολλή* ‘many’
- g. thematic optatives: **-oih₁(-t)* > *-oi*,³ e.g., *ἄγροι* ‘(s)he would lead’, *ἴδοι* ‘(s)he would see’ etc.

The examples from Latin in (4) below were examined in Nussbaum (1997):

- (4) a. **solh₂no-* > **solno-* > *sollo-* ‘whole, all’: cf. **slh₂uo-* > **salu₁uo-* > **saluo-* > *salvus* or **slh₂euo-* > **salu₁uo-* > **saluo-* > *salvus* ‘safe and sound’⁴
- b. **tolHu-* > **tolu-* > **toll-* → *meditullium* ‘the interior, inland part of a country’: cf. **tlH-tos* > **tlā-tos* > Lat.

³For a detailed discussion of the examples from thematic optatives, see Nussbaum (1997: 182¹³).

⁴According to Meiser (1998: 108–109), Proto-Indo European syllabic resonants developed in Latin as follows: PIE **CRHC* > Lat. *CRā C*, e.g., **ǵnh₁tó-* > (*g*)*natus* ‘born’; PIE **CṚHC* > Lat. *CaRaC*, e.g., **pl̥h₂meh₂-* > **palama* > *palma* ‘palm’. On the other hand, Schrijver (1991: 193–197) argues that it is unnecessary to set up a phonological rule **CṚHC* > *CaRaC* and shows that most examples of the alleged change *CaRaC* < **CṚHC* can be explained in different ways. **CRHeC* is proposed by him as one of the possible sources of Latin *CaRaC* sequences: *palma* < **pl̥h₂em-*; *calamitās* ‘calamity’ < **kl̥H-em-*. Therefore, the former change from **sl̥h₂uo-* to Lat. *salvus* can be regarded as possible if we accept the development **CṚHC* > *CaRaC* mentioned in Meiser (1998: 108). At the same time, the latter change from **sl̥h₂euo-* to Lat. *salvus* is possible. As a result, **CṚHC* > *CaRaC* is rejected and an alternative explanation is provided by Schrijver (1991: 193–197). However, since it is essentially irrelevant whether the preform of Lat. *salvus* is **sl̥h₂uo-* or **sl̥h₂euo-*, this problem will not be discussed further here.

- lātus* ‘broad, wide’; **tol(H)u-* > OPru. *talus* ‘floor’;
**tol(H)u-* or **telHu-* > Skt. *tālu*
‘palate’ (< ‘*roof of the mouth’)
c. **kolH-ni-* > **kolni-* > *collis* ‘hill’: cf. **kelH-tei* > Lith. *kėlti*,
Latv. *celt*
‘to lift’
; without the laryngeal loss, the expected Latin form
would be **colnis* or **culnis* < **kolani-* < **kolH-ni-*.
d. **k^wolHso-*⁵ > **k^wolso-* > *collus* / *collum* ‘neck’⁶; cf.
Ved. *tuvi-kurmí(n)-*
‘moving strongly’ < **k^wlH-mi-*, Gk. *πλήμυη* ‘nave of a
wheel’ < **k^wlh₁-* or **k^wlh₂-*.

Melchert (1994: 49–51) gives examples from Hittite in (5) as evidence of the laryngeal loss.

⁵ While the reconstruction of **k^wolHso-* (Nussbaum 1997: 196) is phonologically sufficient, it raises a morphological question concerning the suffix **-so-*. **k^wolHso-* seems to have a morphological boundary between **k^wolH-* and **-so-*, since a root of the shape of **k^wolH-* and a suffix **-so-* can be recognized on the basis of Gk. *πέλομαι* ‘to turn (into), to be (come)’ and Skt. *cáрати* ‘to travel, to wander’ (< **k^welH-e/o-*), and so on.

However, the reconstruction of the suffix **-so-* is problematic, at least for an early stage of Proto-Indo-European, since there is no clear evidence for it. Brugmann (1906: 538ff.) showed that the suffix **-so-* is an extension of **-s-* or **-es-* by **-o-*, analogous to **-no-* as the extension of **-en-* and **-on-* by **-o-*, etc. Furthermore, even though a *so-*formation shares the same suffix and the same root, the difference in the ablaut of the root usually indicates that a shift of old *s*-stems to *o*-stems occurred in the daughter languages, e.g., Skt. *rukṣá-* ‘shining’ with zero grade and OIcel. *lióss* ‘light’ with *e*-grade suggest an old *s*-stem. There are a fair number of examples of this kind. Also, Chantraine (1933: 433–436) classifies Greek words with *-σος* into three groups: (i) loan words, (ii) expressive adjectives and action nouns, each of which can be explained as a root with a desiderative suffix, and (iii) hypocoristics. As a result, he avoids the reconstruction of the suffix for Proto-Indo-European.

Although it is clear that further research regarding this issue is needed, it is beyond the scope of the present paper. The examples of the Saussure effect with the suffix **-so-* as identified by previous studies are cited below, with the exception of the forms in **-so-* in my own examples.

⁶ However, Nussbaum (1997: 196) mentions that the possibility cannot be excluded that *collus/collum* reflects the following change: **k^wolHso-* > **k^wolaso-* > **k^wolso-* > **k^wollo-* > *collus/collum*. One of the anonymous referees suggested that the following place-name and its corresponding adjective could be counterexamples to the above-mentioned sound change since the expected assimilation of sonants following syncope does not seem to have occurred in them: *Falerii* < **Fabrior* < **Falesioi*, (adj.) *Falernus* < **Falrinos* < *Falesinos*. The investigation of these two forms will be reserved for a future time.

- (5) a. $*h_2wórsō > *wórsō > warša$ ‘mist steam’: cf. $*h_2wers$ ‘to rain’ > Gk. ἀέριση ‘dew’
 b. $*h_2worg-$ ‘turn, twist’ > (reduplicated) $*worg-$ → $wawarkima-$ ‘door - hinge’: cf. $*h_2urg-$ > $hurki$ ‘wheel’
 c. $*kólh_2mo-ro > kalmara-$ ‘ray, beam’: cf. $*k_lh_2mo-$ ‘stalk’ > Gk. καλάμη, $*kólh_2mo-$ ‘stalk’ > Latv. $salms$ ‘stubble’
 d. $*pólh_2ueh_2-$ → $palwa(i)-$ ‘to clap’: cf. Lat. $palma$ ‘palm’ < $*p_lh_2-meh_2-$ or $*p_lh_2-em$ ⁷; without the laryngeal loss, Hitt. $*palhwa(i)-$ would be expected.

In addition to the examples listed in (2) – (5) above, there are some examples from other languages, which are provided in Nussbaum (1997: 183), such as the ones in (6) below.

- (6) Examples from other languages
 a. $*sólh_2-o > Skt. sárva-$ ‘whole, all’: cf. (3d)
 b. $*kóuH-lo > Arm. soyl$ ‘cavity’: cf. $*kúH-$ > Av. $sūra-$ ‘hole’, Skt. $súna-$ ‘lack, absence’

As shown above, examples of the Saussure effect are observed in several Indo-European daughter languages. In the next section, I present possible traces of the Saussure effect in Lithuanian.

1.2 Expected traces of the Saussure Effect in Lithuanian

Although laryngeals do not have segmental reflexes in Lithuanian, it is well known that they have reflexes as tonal accents,⁸ as in (7) and (8) below.

- (7) a. $*VRHC > \acute{V}RC$ [acute intonation (falling tone)]
 b. $*VRC > \check{V}RC$ [circumflex intonation (rising tone)]
 (8) a. $*\acute{g}éh_1-to > žéntas$ ‘son-in-law’, $*b^hérH\acute{g}- > béržas$ ‘birch’
 b. $*\acute{g}ómb^hos > žaĩbas$ ‘sharp edge’, $*u_lk^wos > viĩkas$ ‘wolf’

Accordingly, the intonation of $*-oRHC-$ sequences, which have also undergone the Saussure effect, is expected to be

⁷See footnote for the two competing possible preforms.

⁸Lithuanian long vowels, diphthongs, and mixed diphthongs (vowel + sonorant) have two kinds of intonations when they are accented:

- a. acute intonation (\acute{V}): falling tone
 b. circumflex intonation (\check{V}): rising tone

circumflex in Lithuanian: **-oRHC-* > **-oRC-* [via the Saussure effect] > *-aR̃C-* (7b). Based on this, Rasmussen (1989: 181 – 184) gives the forms which seem to have undergone the Saussure effect.⁹ Some of these examples, which I consider plausible, are given in (9).¹⁰

(9) Examples from Lithuanian

- a. (PIE **korH-neh₂*) PB-S. **karna* > *karnà* (4)¹¹ ‘bast’: cf.
**kérH-on-s* > *kérH-ōn* → *kŕgH-ōn* > Lat. *caro* ‘meat’
- b. (PIE **sphorH-teh₂*) PB-S. **spartā* > *špartà* (4) ‘speed’: cf.
 Ved. *má apa spharīṣ* (RV 6.61.14) ‘do not spurn [us]!’ <
**spherH-* ‘to kick’
- c. (PIE **kouH-no-*) PB-S. *áaunas* > *šaiūnas*, *šaiū̀ns* (4)
 ‘brave’¹²

⁹The purpose of the analysis in Rasmussen (1989) is to utilize the Saussure effect to account for certain forms which exhibit unexpected circumflex tones but which cannot have undergone *métatonie douce* since they do not appear in the well-known environments necessary for its occurrence.

¹⁰However, since (9d) and (9e) are affected by the problem already mentioned in footnote 7, they are less plausible in comparison to the other three.

¹¹Lithuanian nominals are classified into four “accentual paradigms (AP)” according to the pattern of the stress alternation between the stem and the ending throughout the nominal paradigm. Regarding nouns with a monosyllabic stem, the tone of the stem is connected to the AP to which the noun belongs. AP1 denotes a barytone paradigm with the acute accent on the root, while AP2 is a historically barytone paradigm where the root is non-acute and the stress alternation between the stem and the ending is caused by Saussure’s law and other morphological factors. AP3 comprises mobile paradigms with the acute root, whereas AP4 denotes a mobile paradigm with the non-acute root where further stress alternation has been brought about by Saussure’s law and other morphological factors.

¹²While Rasmussen (1989: 182) considers *šaiūnas* to be related to *šáuti* ‘to shoot’, which is a descendant of the Proto-Indo-European root **keuH-* ‘to throw, push to move’ (*LIV* 330), it could also be related to Skt. *śúna-* ‘lack’, *śúsvar* (perfect form of the root *śaví* ‘to swell’: Mayrhofer 1986–96: II, 623–624) and Gk. *κυέω* ‘to bear in the womb’ as suggested in *IEW* (592–594). The Greek form suggests the existence of **h₁* in the root for ‘swell’ since it can be interpreted as a reflection of a causative form **k₁uh₁-éje-*. However, from those zero grade forms, two kinds of full grade forms, namely **keuh₁-* (following Mayrhofer 1986–1996: II, 624) and **k₁ueh₁-* (after *LIV* 339), can be reconstructed. It is difficult to judge which of the two forms represents the older shape of the root, and this problem remains open.

In addition, following the analysis of Mayrhofer, the root on which the protoform of *šaiūnas* is based is a *set* root in the case of both **keuH-* ‘to throw’ and **keuh₁-* (or **k₁ueh₁-*) ‘to swell’. Therefore, *šaiūnas* is a fine example of the Saussure effect.

- d. (PIE **norH-seh₂*, -so-) PB-S. **narsa*, -sas > *narsà*, *nařsas* (4) ‘courage’: cf. OCS *po-nrětb* ‘buried’, Lith. *nėrti* ‘to dive’ < **nerH-* ‘to dive’
- e. (PIE **b^holH-so-*) PB-S. **bàlsas* > *bařsas* (4) ‘voice’: cf. Lith. *bilti* ‘to begin speaking’ < **b^hlH-tei*, OE *bellan* ‘to ring’ < **b^helH-e-* ‘to sound’

2 Problems with the Lithuanian Examples of the Saussure Effect

Following §1.2, the examples of the Saussure effect in Lithuanian should be forms which have a circumflex accent on their respective root syllables, and whose preforms are considered to have contained **-oRHC-* sequences. However, these two criteria are not sufficient for the proper identification of the effect since there are additional factors which need to be taken into account. Therefore, I believe that some forms presented in Rasmussen (1989: 181–184) and cited below should be excluded from the list of probable examples of the Saussure effect for reasons which I will discuss in the following sections.

2.1 Uncertain reconstruction of laryngeals

For some roots, it is difficult to decide whether a root-final laryngeal can be safely reconstructed. Some researchers consider the following forms to have been derived from *set* roots, while others consider them to have been derived from *anit* roots.

2.1.1 **kor(H)meh₂* > *řarmà* (4) ‘frost’

Rasmussen (1989: 181) regards Lith. *řarmà* as one of the cognates of OE, OSax. *hrim* ‘frost’, and reconstructs PIE **kerH-*i**-. He considers that the Germanic forms reflect the zero-grade form **kriH-*, and that their long vowels provide evidence for the existence of a laryngeal. However, OE, OSax. *hrim* is related to **krei-* ‘to touch something, contact’ together with Lith. *krėnà* (4) ‘cream’ by *IEW* (618), which is modified as **KreiH-* ‘to touch’ in *LIV* (368). Yet, two problems arise from these reconstructions. The first concerns the question of whether the initial consonant of the target root was a plain velar or a palatovelar, since these two consonants have different outcomes in Lithuanian, namely *ř* (< **k̑*) and *k* (< **k*). Another problem is which shape of the root is the original, **k/kreiH-* or **k/kreH(i)-*, for only zero-grade reflexes are shown

outside of the Balto-Slavic cognates, making it difficult to determine the original shape of the root.

Furthermore, there are uncertainties regarding Lith. *šármas* and its related forms. Derksen (1996: 88–89) reconstructs a Proto-Baltic acute root for this form on the ground of the accentual correspondences between Lithuanian [*šármas* (1/3) ‘hoarfrost, lye’, *sarmà* (3) ‘id.’, *šárma* (1) ‘hoarfrost’] and Latvian forms [*sārms* ‘lye’, *sārma* ‘hoarfrost’, *sērma* ‘id.’]. He regards the accentuation of *šármas* (4) and *šarmà* (4) as the result of the analogical spread of AP4. He also discusses its cognates with a zero-grade (*šīrmas* (3) ‘grey, dapple-grey’, Latv. *siřmas* ‘grey’), which exhibit the original acute. For these reasons, he thinks the acute accent in the cognates with a **-no-* suffix (*šérnas* (3) ‘wild boar’) and with *-v-* (*šīrvas* (3) ‘grey, dapple grey’) show the original acute accent, while *šērknas* ‘hoarfrost’ and Latv. *sērnis* ‘hoarfrost’ do not show any trace of the old acute. In contrast to this, Illich-Svitych (1978: 119) reconstructs an *aniṭ* form **kernom* ‘hoar-frost’ since some of the Slavic cognates, such as Ru. *serěn* ‘crust over snow’ and Ukr. *serén* ‘frozen hard snow’, point to a non-acute root, while he relates Lith. *šárma* (1) to a *seṭ* root (**kerH-*) in PIE. Derksen states that if Illich-Svitych is right, there seem to be two almost identical roots (**ker-* and **kerH-*) in Balto-Slavic.

Thus, if we postulate that all the forms quoted above are derived from the same root in PIE, it is extremely difficult to determine whether the original root in PIE was an *aniṭ* or a *seṭ* root, since some cognates (*šármas* (1/3), Latv. *sārms*, *šīrmas*, Latv. *siřms*, etc.) suggest an original acute, or a *seṭ* root, while others (*šērknas*, Latv. *sērnis*, Ru. *serěn*, Ukr. *serén*, Slk. *sriěň*) imply a non-acute, or an *aniṭ* root. For this reason, the problems surrounding the root **ker(H)-* should be reserved for a later research.

2.1.2 **moī(H)neh₂, -os > maĩnas*, dial. *mainà* (4) ‘exchange’

Rasmussen (1989: 199) reconstructs a *seṭ* root **meiH-* on the grounds of Latv. *mīt* ‘to exchange’ and Ved. *máyate* ‘to exchange’. The Latvian correspondences to Lith. *maĩnas* are *maĩņa*, *maĩna*, and *maĩna* ‘change’, which exhibit acute accentuation.¹³ However, the cognates of Lith. *maĩnas* include

¹³Būga (1923/1924: 272) thinks that Lith. *maĩnas* would have been formed beside **maĩna* on the analogy of *vaĩnas* : *várna*, on which the denominative

Ved. *apa-mitya-* (< *-mi-) ‘charges’, which suggests an *aniṭ* root **mei-* in Proto-Indo-European (Mayrhofer 1986–1996: II, 314–315). SCr. *mijèna* ‘change (of the moon)’ also points to an *aniṭ* root. Consequently, although the intonation of Latvian forms certainly presents a problem, it is nonetheless clear that the root itself is of the *aniṭ* type.

2.1.3 **uor(H)tā* → *vaṛtai* (2) ‘gate’

An *aniṭ* root **uer-* ‘to ward off’ is reconstructed in *LIV* (684), while Rasmussen (1989: 183) reconstructs a *seṭ* root **uerH-* beside the *aniṭ* form (**uer-mṇ*). Rasmussen (1989: 82) assumes two more structures for the root, namely **uerHu-m⁰* and **uruH-m⁰*, where the former produced ἔρῦμα ‘cover’, whereas the latter gave rise to ῥῦμα ‘cover’.

The cognates of this root include Gk. ἔρῦμαι < **uer-u-* ‘to check (from doing something)’ (*LIV*684), Ved. *vr̥tá-* ‘enclosed’ < **ur̥-tó-*, *var̥tár-* ‘inhibitor’ < *ver-tór-*, *-vr̥t-* (e.g. *ar̥no-vr̥t-* ‘obstructing the flood’) and *varū⁰* (e.g. *varutár-* ‘defender’, *várutha-* ‘umbrella, protection’) (Mayrhofer 1986–1996: II, 512–513). Mayrhofer (1986–1996: II, 513) thinks that *varū⁰* does not necessarily indicate a *seṭ* root since Ved. *vr̥tá-*, *var̥tár-*, and *-vr̥t-* suggest an *aniṭ* root, contrary to the assumption of **uerH-* proposed in Rasmussen (1989).

As briefly surveyed, there are a number of forms which suggest an *aniṭ* root **uer-* for PIE. For this reason, this form will be excluded from my discussion.

2.1.4 *pol(H)uos* > *paĩvas* (4) ‘pale’

Rasmussen (1989: 184, 306) reconstructs an unspecified laryngeal for the root **pelH-* ‘pale’. On the other hand, Nussbaum provides a discussion on the root relevant to Lith. *paĩvas*. He distinguishes between the two forms (i) PIt. **pallo-* (< **pal-uo-*), identical in formation to Gmc. *falwa-* ‘pale’ (OIcel. *fólvr*, OHG *falo*) and with Lith. *paĩvas*, and (ii) PIt. **pollo-* ‘dark, gray’, which is continued by Lat. *pullus* ‘dark, gray’. These two

mainyti (*maĩno* [3p.]) was formed. Thus, he regards the acute intonation as original for the Baltic words meaning ‘exchange.’ On the other hand, Derksen (1996: 266) proposes an alternative idea that the *métatonie rude* in *a*-stem agent nouns in Baltic was analogical to the derivation of nomina agentis from iterative (or intensive or durative) verbs with the suffix *-*a*. Later, this type of derivation became productive and *a*-stems with fixed stress on an acute root were derived from verbal roots even if there were no such verbs. Although *maĩna*, *maĩna*, and *maĩna* ‘change’ are not agent but abstract nouns, they might be the result of the derivation mentioned above.

reconstructed forms could be descendants of one and the same stem, although there are difficulties regarding this assumption: “one is that **pal-* and **pol-* are not easily reconciled (**ph₂e/ol-* being excluded by Gk. *πελιός* ‘gray’ etc. and **polH-/ *pl̥H-* by e.g. OIr. *líath* ‘gray’ < **pl-ei-* and not **pl̥H-ei-*)” (Nussbaum 1997: 191⁶²); the other is that **pallo-* denotes a pale color while **pollo-* denotes a dark color. Considering these points, Lith. *paĩvas* seems to be semantically and morphologically akin to a group of words which have descended from **pallo-* (< **pal-uo-*) ‘a pale color’ rather than from **pollo-* ‘a dark color’. Furthermore, following the view of Nussbaum that the sequence **-ll-* in **pallo-* is more likely to reflect **-lu-* than a syncopated **-l̥u-*, **pallo-* is not likely to show the vocalized root-final laryngeal, and the shape of its ancestral root would be **ph₂e/ol-*, without a root-final laryngeal. However, there remains a complicated etymological problem, namely whether there is a proper way to reconstruct one PIE root reconciling **pal-* and **pol-*, which Lith. *paĩvas* should be based on, as well. This is why *paĩvas* is omitted from the following discussion.

2.2 Etymological problems

The forms listed in the following sections face etymological problems in the sense that there are competing etymologies, one of which allows the reconstruction of a root-final laryngeal, while the other one does not.

2.2.1 *spaĩnas* (4) ‘wing’

Rasmussen (1989: 182) regards Lith. *spaĩnas* as connected with Lith. *spĩrti*, Latv. *speĩt* ‘to kick’, which are cognate with Ved. *sphuráti* ‘to push, to kick away’ [< **sp^hṛH-é-* (LIV 585)]. However, at the same time, there is another possibility, namely **(s)per-* ‘to traverse’ [**spor-no-* > *spaĩnas*], which is related to Skt. *parṇá-* ‘wing’, OHG *farn*, and OE *fearn* ‘fern’ in *IEW* (850).¹⁴

¹⁴According to *IEW* (850), the origin of the initial *s* in the Lithuanian form could be the verbal root **sp^(h)erH-*. I further note that both Illich-Svitych (1963 [1979]: 38) and Southern (1999: 36) mention Lithuanian *spaĩnas* as a variant with *s*-mobile, although they set up **(s)pern-* for the Proto-Indo-European root. Since “*(s)*+ plain voiceless stops” is the “home territory” of *s*-mobile, as described in Southern (1999: 20–21), the view of Illich-Svitych (1963 [1979]: 38) and Southern (1999: 36) is not implausible.

Both of the possible root etymologies work well with Lith. *spařnas*, while the one based on **per-* is preferred in respect to Skt. *parṇá* since the root with aspiration, i.e., **sp^(h)erH-* (> *spharⁱ-* ‘to kick away’) and the other without, i.e., **per-* (> *par-* ‘to bring through, pass’), are clearly distinguished in Sanskrit. So, if **sp^(h)erH-* is adopted as the root etymology of *spařnas*, it should not be derived from **(s)per-*, which allegedly gave rise to the rest of the forms, namely Skt. *parṇá*-, OHG *farn* ‘fern’ etc. However, it might be difficult to suppose that *spařnas* is not etymologically related to Skt. *parṇá*-, OHG *farn* ‘fern’ etc., since both their phonological shapes and their meanings are closely related. As further discussion on the etymology of *spařnas* is beyond the scope of this paper, this case will be left aside.

2.2.2 *tařnas* (2 > 4) ‘servant’

On the one hand, Rasmussen (1989: 183) reconstructs **terHu-* ‘young, delicate’ as the root on which the protoform of Lith. *tařnas* is based. He further notes that **terHu-* is not necessarily identical to **terh₁u-* ‘to wear away’, but does not explicitly show any evidence for a root-final laryngeal. On the other hand, according to *IEW* (1070), *tařnas* is derived from an adjectival *aniř* root **ter-* ‘delicate, weak’. It is not certain that a morphological procedure for building a *no*-formation on the basis of an adjectival root existed at an early stage of Proto-Indo-European. Consequently, this form will be excluded from the source list for the discussion below.

2.3 A form derived from an *s*-stem

The form in question is **tom(H)seh₂* > *tamsà* (4) ‘darkness’, which is derived from Proto-Indo-European **temH-* ‘to become dark’. We also have an adjective *tamsùs* ‘dark’ in Lithuanian. According to *IEW* (1063), there is a Vedic cognate of this word, namely *támas-* ‘darkness’. Mayrhofer (1986–96: I, 626) reconstructs an *s*-stem paradigm **témH-es/*témH-s-* for the protoform of Ved. *támas-* and Lat. *temere* ‘at random, by chance’ (< ‘in darkness’ = Ved. *támas-i* [loc.sg.]), which clearly points to an *e*-grade in the protolanguage, as well as OHG *demar* ‘dim’ (< **temHsó-*). Thus, these materials suggest an *s*-stem paradigm containing an *e*-grade. Furthermore, except for a few examples (Gk. *ὄχος* ‘a chariot’, Lat. *pondus* ‘a weight’, *foedus* ‘foul, ugly’, OCS *kolo* ‘a chariot’), *s*-stems usually do not have an *o*-grade in

their roots (Schindler 1975: 265). Therefore, it does not seem likely that the *o*-grade in the Lithuanian forms is primary. At the same time, there are examples, including several ones outside Balto-Slavic, of *u*-stem adjectives built on *s*-stems with an *o*-grade, which is completely parallel to *tamsùs* (< **tomH-s-u-*), such as Gk. ὀξύς ‘sharp’, whose protoform can be reconstructed as **h₂ok-s-u-*. This suggests that there might have already existed a morphological process where *s*-stems changed the *e*-grade of the root vowel to an *o*-grade in the protolanguage. However, since the age of this reformation is not certain, this example should also be left aside.

2.4 Forms which Underwent Metatony

2.4.1 Metatony

Metatony refers to the replacement of one intonation with another in Baltic languages, for example, in the case of *u*-stem adjectives: *saldùs* (3) [Daukša’s Postilė (1599)¹⁵] (cf. Latv. *sa lds*) → *saldùs* (4) ‘sweet’, which took place in the relatively recent history of Lithuanian (Stang 1966: 160). Also, some groups of words containing certain morphological suffixes frequently underwent metatony, for example, *púodas* (1) ‘pot’ → *puōdžius* (2) ‘pottery’ [nominal suffix with *-iū-*], *sveīkas* (4) ‘healthy’ → *svėikinti* ‘to greet’ [verbal suffix *-inti*]. As shown, metatony obfuscates the original tone. Metatony is classified into two classes in accordance with the resulting intonation. *Métatonie rude* refers to a change from circumflex to acute intonation, and *métatonie douce* refers to a change from acute to circumflex intonation. Compared to *métatonie rude*, *métatonie douce* is much more frequent, especially in forms with suffixes containing **-i-* (e.g., *u*-stems in *-ius*, *io*-stems, etc.).¹⁶ Thus, it is clear that forms with suffixes containing **-i-*, such as

¹⁵The accentuation of the words in Daukša is adopted from Skardzius (1935).

¹⁶According to Stang (1966: 145–147), **-iūs* (> *-ius*), **-iūs* (> *-is* [*io*-stem]) or **-iā* [or **-iē*] (> *ē*) shifted the ictus on *-i-* to the immediately preceding syllable at an early stage of Proto-Baltic. If the syllable which received the ictus had a long vowel or a diphthong, it received a circumflex intonation. Derksen (1996: 375) concluded that this retraction of stress took place at the East Baltic stage. This view of accent retraction, which brought about *métatonie douce*, seems to have been accepted as a standard: “...the sequence **-i-* in medial stressed position lost its ictus to the preceding syllable. This caused the syllable to change an original acute tone into a circumflex, i.e., the retraction caused *métatonie douce* on a preceding syllable. This rule has been accepted as a major source of Baltic metatony” (Larsson 2004: 162).

baĩnis (2) ‘quarrel’ (PIE **b^herH-* ‘to work on something with a sharp tool’), *kraĩtis* (2, 4) ‘dowry’ (PIE **k^wreih₂-* ‘to exchange’), *kaĩnius* (2) ‘mountaineer’ (PIE **kelH-* ‘to raise’), etc., should be excluded from the list of proper examples. However, the situation is not so simple with nominals of other stems. Since *mētatonie douce* in other forms, such as *o*-stems and *a*-stems, is not regular, it is necessary to examine whether a circumflex intonation in a particular stem is original or the result of *mētatonie douce*.

2.4.2 Distinguishing between original and secondary intonation Endzelĩns (1899: 263ff.) observed a correspondence between Lithuanian accentual paradigms and Latvian intonation patterns in word-initial syllables. The correspondence is as follows:

- Lith. acute (AP1) ~ Latv. sustained tone (\tilde{V})
e.g. Lith. *výras* ‘man’ ~ Latv. *viĩs* ‘id.,’ Lith. *dúona* ‘bread’ ~
Latv. *duõna* ‘id.,’
- Lith. circumflex (AP2) ~ Latv. falling tone (\hat{V})
e.g. Lith. *rankà* (*raĩka* [sg.acc.]) ‘arm’ ~ Latv. *riõka* ‘id.,’
Lith. *iẽšmas* ‘spit’ ~ Latv. *iesms* ‘id.’
- Lith. acute (AP3) ~ Latv. broken tone (\hat{V})
e.g. Lith. *núogas* ‘naked’ ~ Latv. *nuõgs* ‘id.,’ Lith. *širdis*
‘heart’ ~ Latv. *siĩds* ‘id.’
- Lith. circumflex (AP4) ~ Latv. falling tone (\hat{V})
e.g. Lith. *baĩsas* ‘voice’ ‘id.,’ ~ Latv. *bãlss*, Lith. *draũgas*
‘friend’ ~ Latv. *drãugs* ‘id.’

Also, Illich-Svitych (1963 [1979]: 52–53) presents the following argument regarding the chronological relationship between Lithuanian and Latvian accentuations:

The process of accent retraction to the initial syllable in Latvian took place at an early date: it is a proto-Latvian process, (...) the tone contrast of $\tilde{}$ and $\hat{}$ in initial syllables in Latvian reflects an older distribution of nominals by accent class than does modern Lithuanian (...)

Thus, Lith. *ieva* ‘bird-cherry’ (< PIE **õiuā* or **ẽiuā*) occurs in AP1, 2, and 4, while Latv. *iẽva* ‘id.’ preserves the original accentuation, and Lith. *jėgà* ‘thought, mind, wit’ (< PIE **iēg^uā*) occurs only in the secondary accentuation AP4, while Latv. *jėga* exhibits the original accentuation (Illich-Svitych 1963 [1979]: 53). The studies by Endzelĩns (1899) and

Illich-Svitych (1963 [1979]) show the importance of the intonation of Latvian forms which correspond to Lithuanian ones, since it preserves the older accentual patterns. Consequently, the following examples in (10) should be excluded from the possible examples but included in the counterexamples, since the accentuation of the Latvian correspondences points to the original acute.

- (10) a. (PIE **kólH-neh₂>*) PB-S. **ćalna > šalnà* (4) ‘frost’ :
 PIE **kélH-* ‘to be cold’
 cf. Latv. *sa^ˆlna*
- b. (PIE **kolH-eh₂>*) PB-S. **kalva > kalvà* (4) ‘hill’ : PIE
**kélH-* ‘to be elevated’
 cf. Latv. *ka^ˆlva*

(10a) and (10b) will be discussed in §4.

3 Possible Examples of the Saussure Effect

The problems with some of the examples of the Saussure effect provided in Rasmussen (1989) were briefly discussed in the previous section. The following three points have emerged from this discussion:

- Ensure the reconstruction of a root-final laryngeal and the etymology of each root is reliable and clear.
- Ensure the original *o*-grade can be reconstructed for Proto-Indo-European. (for example, an *o*-grade of a reflex derived from an old *s*-stem should be excluded since the age of its formation is not certain as already discussed in §2.3).
- Ensure the intonation of the form in question is the original one.

Taking these points into consideration, I present some possible examples in this section in addition to those listed in (9) after Rasmussen (1989). Most of them have environments which allow for the shape of the form to be derived on the basis of either the Saussure effect or another rule for laryngeal loss with equal possibility. As we will see in the following sections, the rule **CH.CC > *C.CC* discussed in Hackstein (2002) could share the same environment as that which triggered the Saussure effect if the sequence occurred in the environment **oRH.CC* (where the context of the Saussure effect **-oRH.C-* is

followed by another consonant). Also, Pinault's law [$*H > \emptyset$ in internal syllables before yod (Pinault 1982: 268–269)] is a rule that could share the environment with the Saussure effect when it operated on the sequence $*-oRH_i-$ (where the consonant following the laryngeal is a yod in the sequence of the Saussure effect). For this reason, the possible examples listed below fall short of being certain. The intonation of the Latvian forms is based on Mūlenbachs (1923–32) and Endzelīns (1934–46), whereas the accentual paradigms of the Lithuanian forms are based on *LKŽ*.

3.1 *gaudūs* (4) 'sonorous'

gaudūs (4) 'sonorous': $*geuh_2-$
'to call' (cf. *LIV* 189) $\rightarrow *gouh_2d^h h_1- > *gou-d^h h_1- > gaudūs$

The cognates of Lith. *gaudūs* include Gk. $\gamma\acute{o}\omega$ 'I wail' and OHG *kūma*. The long vowel in *kūma* ($< *guh_2-mo-$) indicates the existence of a root-final laryngeal, and $\gamma\acute{o}\omega$ ($< *gouh_2-éie-$) is suggestive of a root-final $*h_2$. The accentuation of the corresponding Latvian form *gāuds* 'miserable' shows that the circumflex intonation of Lith. *gaudūs* is the original intonation rather than a secondary intonation derived by *métatonie douce*. Here, it is necessary to assume that the laryngeal in $*gouh_2-d^{(h)}$ -disappeared at the Proto-East-Baltic stage at the latest.

However, there still remains the problem with the *o*-grade in *gaudūs*, since *u*-stem adjectives are known to be of the proterokinetic type (Pinault 2003: 162ff.), where *o*-grade roots do not appear. In order to explain this *o*-grade in *gaudūs*, a verbal form related to *gaudūs*, namely Lith. *gaudžiù*, *gaūsti* 'to resound', can be taken into consideration. The present paradigm of the verb can be interpreted as being built on the stem $*gouh_2-d^h h_1-i\acute{o}-$, which is extended by two suffixes, i.e., $*-d^h(e)h_1$ ¹⁷ and $*-ie/o-$, just as in Ved. *yá-dh-ya-te* '(he) fights' and Lith. *sker-d-žiù* 'I slaughter' (Brugmann 1892: 1103). Since $*-d^h(e)h_1$ can be added to a root of any grade, as in the case of Lat. *verbum* ($< *uerh_1-d^h h_1-o-$) 'word', Lith. *vardas* ($< *uorh_1-d^h h_1-o-$) 'name' and Goth. *waurd* ($< *urh_1-d^h h_1-o-$) 'word', the *o*-grade of $*gouh_2-d^h h_1-$ is morphologically compatible. Also, as the suffix $*-ie/o-$ was added directly to nominal stems to

¹⁷Following Brugmann (1892: 1045ff.; 1906: 467), the $*-d^{(h)}$ -element could be a suffix $*-d^h(e)h_1$, which originated from a verbal root $*d^h eh_1$ 'to put, do'.

derive denominative verbs, as in Gk. $\delta\nu\omicron\mu\alpha\acute{\iota}\nu\omega$ (< $*h_1nh_3m\eta\text{-}ie/o\text{-}$ ‘to name’¹⁸), $*gouh_2\text{-}d^h h_1\text{-}$ can be interpreted as a nominal stem. In Lithuanian, *u*-stem adjectives are productive (Skardžius 1943: 55ff.) and can be secondarily formed on the basis of *o*-stem nouns, for example, *godūs* ‘covetous’ : *gōdas* ‘covetousness’ ; *draugūs* ‘friendly’ : *draūgas* ‘friend’. This suggests that the adjective might have been formed on the basis of a nominal stem $*gouh_2\text{-}d^h h_1\text{-}o\text{-}$, although it is not attested as a noun. Consequently, $*gouh_2\text{-}d^h h_1\text{-}$, the protoform on which *gaudūs* is based, can be interpreted as satisfying the condition of both environments of the Saussure effect ($*oRH.C > *oR.C$) and $*CH.CC > *C.CC$. Accordingly, there are two possible causes for the laryngeal loss. Since it is difficult to set up a relative chronology for these two rules, the possibility cannot be excluded that $*gouh_2\text{-}d^h h_1\text{-}$ might have undergone the rule $*CH.CC > *C.CC$. For this reason, it should be regarded as a possible example.

3.2 *garbē* (4) ‘honor’

garbē (4) ‘honor’ : $*g^w erH\text{-}$ ‘to express one’s approval’ (cf.

LIV 210–211) $\rightarrow *gorH\text{-}b^h (h_2)\text{-} > *gor\text{-}b^h (h_2)\text{-} > garbē$ ¹⁹

The root-final laryngeal is reconstructed on the basis of Ved. *gūrtá-* ‘blessed’, Lat. *grātus* ‘id.’ < $*g^w rH\text{-}t^o\text{-}$. Although there is no information regarding the accent in Latvian, there is accentual information in Daukša’s “Postilē where most of the instances appear with AP4. Following this, Derksen (1996: 208) reconstructs another form $*g^w er\text{-}b^h\text{-}$ for *garbē* (4) in addition to $*g^w erH\text{-}$ (> Lith. *girti*, Latv. *dziirt* ‘to praise’ and Ved. *gūrti-* ‘praise’). However, assuming the Saussure effect, the reconstruction of a separate root is not necessary. In fact, if the

¹⁸Although the Proto-Indo-European paradigm of ‘name’ has been disputed, here I follow the suggestion presented in Kim (2002: 29) that Gk. $\delta\nu\omicron\mu\alpha$ is derived from the generalized weak stem of a proterokinetic paradigm $*h_1n\acute{e}h_3m\eta\text{-}/*h_1nh_3m\text{-}\acute{e}n$ remade from the original acrostatic paradigm $*h_1n\acute{e}h_3m\text{-}\eta\text{-}/*h_1n\acute{e}h_3m\text{-}n\text{-}$ because of phonetic resemblance to *nomina actionis* in $*m\eta\text{-}/*m\acute{e}n\text{-}$.

¹⁹According to Brugmann (1906: 386), $*bho\text{-}$ possibly belongs to Skt. *bhati* ‘to shine’, whereupon Ved. *ṛṣa –bhá-* ‘bull’, which is now reconstructed as $b^h eh_2\text{-}$ (LIV 68–9) on the basis of Gk. $\acute{\phi}\acute{\alpha}\nu\tau\alpha\text{:}\ \acute{\lambda}\acute{\alpha}\mu\pi\omicron\nu\tau\alpha$ (*Hesychius*) ‘aglow’, etc. Later, Bessemerger (1973: 131¹⁰) suggested that this suffix belongs to a PIE root $*bh\acute{u}\text{-}$ ($b^h ueh_2\text{-}$ ‘to be’). However, Hyllstead (2008) presents a counterargument which is discussed in the following part of this section.

Saussure effect is not considered, then it is necessary to propose two almost identical roots, namely **gerH-* and **ger-*, with the same meaning.

On the other hand, the etymology of the suffix **-b^ho-/-eh₂-* should be taken into account here in order to examine the plausibility of *garbe15* as an example of the Saussure effect. The suffix **-b^ho-* was first identified with a PIE root **b^heh₂-* ‘to shine’ in Brugmann (1906: 386), and has been widely accepted since then. This suffix occurs in a considerable number of abstract nouns and adjectives without any connection to colors or animals. Hyllested (2008) considers the original function of this suffix to be to form verbal nouns. Furthermore, he expresses doubt over the traditional identification of the suffix with the root **b^heh₂-* ‘to shine’ inasmuch as the phonetic similarity between the suffix and the root is limited to a single, very frequent consonant and the modifying effect of **-b^ho-* should lie in the modifying nature of derivation itself. What follows is that the suffix **-b^ho-* might not necessarily be connected to the PIE root **b^heh₂-*.

However, if the possibility of the suffix **-b^ho-* going back to the root **b^heh₂-* cannot completely be denied, the laryngeal loss could be caused by the sound change **CH.CC > *C.CC*, making this form short of being certain.

3.3 *tárpas* (1) ‘hole’

tárpas (1) ‘hole’ : **terh₁-* ‘to bore, drill, rub’ (cf. LIV 632–633) → **torh₁-p-* > **tor-p-* > *taĩpas* *tárpas*

Evidence for the root-final laryngeal includes the Greek form *τέρετρον* ‘gimlet’ < **terh₁-tro-*. The accentual correspondence between Latv. *tārps* ‘worm (as a creature boring a hole)’ and dial. Lith. *taĩpas* (4/2) ‘hole’ suggests that the acute intonation in *tárpas* must be secondary, where originally it must have had a circumflex intonation. Therefore, it is possible that this form is the result of the Saussure effect.

3.4 *kraūjas* (4) ‘blood’

kraūjas (4) ‘blood’ : **kreu_h₂-* ‘clot, bloody flesh’ → **krou_h₂-jo-* > **krou-jo-* > *kraūjas*

An important piece of evidence for the specified root-final laryngeal is provided by Gk. *κρέας* ‘flesh’ < **kreu_h₂-s-*. According to Fraenkel (1962–65: I, 290), the Latvian word corresponding to Lith. *krajas* is **kraujš* ‘blood’. However, it disappeared for two

reasons.²⁰ One point is that this form constituted a homonym with Latv. *krāujš* ‘steep, steep edge of shore’. As a result, **kraujš* for ‘blood’ might have been replaced with another item. The second reason is that the “other item” which replaced **kraujš* actually existed. This item is Latv. *asins*, which is a cognate of Skt. *ásrj-*, Hitt. *ešhar*, and Gk. *ῥαρ*, *ῥαρ* (*Hesychius*) ‘blood’. *asins* would have accelerated the shift from **kraujš* to *asins* for ‘blood’. Therefore, the accentuation of Latv. *krāujš* could provide circumstantial evidence which suggests that the circumflex accent of the Lithuanian form is original.

The intonation of the Lithuanian form reflecting an *aniṭ* root is explainable in terms of both the Saussure effect and Pinault’s law since **krouh₂-iō-* meets the structural description of both of these rules. Interestingly, Ved. *kravyá-* (< **kreuiō-* < **kreuh₂-iō-*), which is an *e*-grade cognate of Lith. *kraũjas*, does not show a reflex of the laryngeal either, which is best explained by Pinault’s law. Nevertheless, it might be interesting to mention *kraũjas* since the environment meets both of the two rules regarding laryngeal loss.

3.5 *kaĩdas* (4) ‘echo’

kaĩdas (4) ‘echo’ (cf. LIV 353) : **kerH-* ‘to admire’ →
**korH-d^(h)-* > **kor-d^(h)-* > *kaĩdas*

The root-final laryngeal is reconstructed on the basis of Ved. *kĩrti-* ‘fame’ < **k_rH-ti-*, ON *hrōðr* ‘fame’ < **kroH-tro-*. Unfortunately, there is no corresponding form in Latvian, which is why this example falls short of being certain. However, since there is no evidence for *métatonie douce* in Lith. *kaĩdas*, the circumflex intonation of this form could be the result of the Saussure effect.

4 Potential Counterexamples and Their Analysis

In this section, I present some seeming counterexamples of the Saussure effect and explain why these examples do not show any reflexes of the Saussure effect in environments where it is expected to occur. There is no clear distinction in phonological environment between the examples which show the Saussure effect and the ones which do not. This has led me

²⁰A more detailed discussion can be found in Endzelins (1921) *Filologu bierdribas raksti*. However, since I was unable to obtain a copy of this work, the discussion here is based on the citations in Fraenkel (1962–65: I, 290).

to think that it is more feasible to seek a morphological explanation than to set up a new criterion for the Saussure effect, since many of the examples which do not show the Saussure effect are derived from *to-* or *no-* formations with an *o*-grade, as shown below.

I also discuss the fate of the original forms and their paradigms in Proto-Indo-European from which the forms in §4 descended. There are two main possibilities for the original type of the paradigms of the counterexamples, one of which is the thematic type, and the other is the athematic type. In the following sections, both cases will be discussed in this order.

4.1 Forms derived from thematic stems

First, I will provide an explanation for each thematic counterexample. Interestingly, cognate forms that escaped the operation of the Saussure effect are found for each of them. The cognate form is either a verb or, less often, a noun. The discussions below include those cognate forms. Since there is an etymological problem in general with sets of words with different vowel grades which share the same root, as in the case of **suep-no-/*suop-no-/sup-no-* ‘sleep’, **uēs-no-/*uos-no-* (/ **ues-no-*²¹) ‘purchase’, and **ueĝ-no-/*uoĝ-no-/*uĝ-no-* ‘wagon’, the explanations given here are provisional.

4.1.1 *káltas* (1) ‘chisel’ : *kálti* ‘to forge’

káltas (1) ‘chisel’ : **kelh₂* ‘to beat, hit’ (cf. LIV 350)

**kolh₂-to-* > *káltas*

Possible support for the specified root-final laryngeal includes the Greek form: *κλᾱ-* ‘break’ < **k_lh₂*. There is a Latvian form corresponding to Lith. *káltas*, namely *káltas* ‘chisel’. The sustained tone in the Latvian form suggests that the acute accent in *káltas* (1) must be the original tone. No trace of the Saussure effect is found in this form.

Apparently, *káltas* is a *to-* formation with an *o*-grade built on a verbal root **kelh₂*.²² Therefore, it is helpful to look into the

²¹Ved. *vasná-* m. ‘purchase price’, n. ‘fee, pay’ could be from the *e*-grade or the *o*-grade.

²²Since *to-* formations with an *o*-grade, for example, Gk. *νόστος* ‘return’, *χόρτος* ‘enclosure’, Lat. *hortus* ‘garden’, are known as abstract nouns, or at least requiring this function as nouns (Brugmann 1906: 420, Risch 1937: 22, Schwyzler 1953: I, 501), the instrumental meaning of *káltas* calls for a semantic explanation.

verbal paradigm derived from the root **kelh₂-*. Jasanoff (2003) has proposed a new type of present verbal paradigm in Proto-Indo-European, the so-called “*molō*-type”, which allegedly had the *o*-grade in strong forms and the *e*-grade in weak forms as well as perfect-like endings. Verbs in daughter languages which have present forms either with persistent *e*-grade or with persistent *o*-grade belong to this type; for example, **molh₂-/*melh₂-* ‘to grind’ [Hitt. *mall(a)i-*, Lith. *málti*, Goth. *malan* < **molh₂-* in contrast to OIr. *melid*, OCS *meljo* < **melh₂-* (Jasanoff 2003: 64)]. Furthermore, Jasanoff (2003: 76) argues that the verbs which can be ascribed to the *molō*-presents show ‘evidence for an *o*-grade present in more than one language, but no unambiguous reflex of the *e*-grade weak stem.’ Following this assumption, **kelh₂-* is included in this type on the basis of Lith. *kalù*, *kálti* and OCS *koljo*, *klati*. The following paradigm can be reconstructed for **kelh₂-*; cf. Jasanoff (2003: 71ff).

1sg. <i>*kólh₂-h₂e</i>	1pl. <i>*kélh₂-meH</i> (?) ²³
2 <i>*kólh₂-th₂e</i>	2 <i>*kélh₂-(H)e</i> (? ?)
3 <i>*kólh₂-e</i>	3 <i>*kélh₂-(s)</i>

In the 1st person singular, **kólh₂-h₂e* is phonologically in one of the two environments of the Saussure effect. Consequently, the root-final laryngeal might have been lost due to the Saussure effect. Likewise, 2sg. **kólh₂-th₂e* might have lost the root-final laryngeal as a result of the Saussure effect.²⁴

A semantic parallel to the case of *káltas* is found in Balto-Slavic, that is, **dōlb-to-* ‘chisel, pointed iron’ (< **d^holb^h-to-* ← PIE **d^helb^h-* ‘to burrow, dig’). The reflexes of this form have instrumental meaning, as in OPruss. *dalptan* ‘a pointed tool to burrow with’, Bulg. *dlató* ‘chisel’ (Derksen 2008: 112). Also, Gk. *κοῖτος* ‘bed, couch, a going to bed, sleep’ (cf. *κεῖμαι*) could be regarded as a semantic parallel to the case discussed here, for one of its meanings ‘bed’ is suggestive of the development of the original meaning as an abstract noun (‘sleep’) into a secondary meaning ‘bed’. Therefore, the semantic change from an abstract to an instrumental meaning can be presupposed also for the meaning of *káltas*.

²³These question marks are given by Jasanoff (2003: 32) due to the fact that the situation with the endings in the plural is less clear.

²⁴Although it might seem conceivable that the laryngeal was lost due to another sound law **CH.CC* > **C.CC*, the accent in this case falls on the preceding vowel. Since this sound law operated when the accent was on the following vowel (Hackstein 2002: 2), its operation in this environment would have been impossible.

Since the 3rd person singular form and the plural forms are not in the environment of any rules for laryngeal loss, they would not have lost their root-final laryngeals theoretically.

strong forms: (1, 2sg.) $*kolh_2-C > *kol-C$
 (3sg.) $*kolh_2-e > *kolh_2-e$ [vacuous operation]
 weak forms: $*kelh_2-C > *kelh_2-C$ [vacuous operation]

Thus, in this case the paradigm would have comprised both stems, one with a root-final laryngeal ($*kólh_2-$ / $*kélh_2-$) and the other without a root-final laryngeal ($*kól-$). Then, a theoretically possible morphological interaction between them might have occurred, producing the following results:

phonological results: (i) $*kol-$, (ii) $*kelh_2-$, (iii) $*kolh_2(-e)$
 analogical results: (iv) $*kolh_2(-C)$, (v) $*kel-$

It is not inconceivable that one of the above forms was subsequently generalized in each of the daughter languages. Thus, Lithuanian generalized the stem $*kólh_2-$ as $kálti$, on the basis of which $*kólh_2-to-$ would have been formed. As Russ. *kolótb* ‘to break, crush’ also points to a Proto-Slavic acute accent, the generalization of $*kolh_2-$ must have occurred at an early stage which involved both Baltic and Slavic. This is why $káltas$ does not seem to show any trace of the Saussure effect. Therefore, $káltas$, which can receive a morphological account, is not a counterexample of the phenomenon.

4.1.2 *šáltas* (3) and *šalnà* (4) : *šálti* ‘to be cold’

šalnà (4) ‘chill of early morning, hoarfrost’ : $*kelH-$ ‘to become cold’ (cf. LIV 323) $\rightarrow *kolH-n- > *šalnà$ (3) $\rightarrow šalnà$ (4) *šáltas* (3) ‘cold’ : $*kelH-$ ‘to become cold’ $\rightarrow *kolH-to- > šáltas$

These two forms are cognates, and therefore they are treated together here. A laryngeal is reconstructed on the ground of the accents of the Baltic cognates, for example, Latv. *saĺna* ‘frost’, *saĺt* ‘to be frozen’, Lith. *šálti* ‘to be cold’, etc., and Skt. *śísira-* ‘early spring, cold season of the year’ $< *ki-k_lH-o-$. The broken tone of Latv. *saĺna* corresponds to Lithuanian AP 3. This suggests that the accentuation of Lith. *šalnà* (4) is not primary but secondary, and that this form has undergone *métatonie douce*, thereby not showing the expected trace of the Saussure effect. Lith. *šáltas* is a cognate of *šalnà* above, and its

corresponding form in Latvian is *saĻts* ‘cold’. The broken tone of this Latvian cognate suggests that the accentuation of *šāltas* (3) is not the result of *métatonie rude* but is rather the original accent. No trace of the Saussure effect is found here either.

As shown above, *šāltas* and *šalnā* do not show any trace of the Saussure effect, even though their preform had an *o*-grade. In order to see how these forms are related to the Saussure effect in their prehistory, it would be informative to look into the problem surrounding the root **kelH-*, which is mentioned in Derksen (1996: 84). The problem concerns the fact that some reflexes of **kelH-* mean ‘warm’, such as Lat. *calēre* ‘to be warm’ (< **kelH-eh₁-*), OIcel. *hlær*, OHG *lāo* ‘tepid’ (< **kleh₁-o-*), etc., while others mean ‘cold’, as in the case of Lith. *šāltas*. For this reason, Schrijver (1991: 206–207) suggests that there was an *aniṭ* variant of **kelH-*, whereas LIV (323) reconstructs **kelH-* ‘to become cold’ and **kel-* ‘to become warm’. The case can be summarized as follows²⁵ :

reflexes of <i>set</i> root			<i>aniṭ</i> root
Lith.	<i>šālti</i> ‘to be cold’	<i>šāltas</i> ‘cold’	<i>šālnā</i> ‘hoar-frost’
Latv.	<i>saĻt</i> ‘id.’	<i>saĻts</i> ‘id.’	<i>sana</i> ‘id.’
Skt.	<i>śśīra-</i> ‘early spring’		
Lat.		<i>calēre</i> ‘to be warm’	
Wel.			<i>chyd</i> (?) ²⁶ ‘id.’ (< <i>*kel-tō-</i>)
Gmc.		OIcel. <i>hlær</i> , OHG <i>lāo</i> ‘tepid’ (< <i>*kleh₁uo-</i>)	

The table above shows a contrast between Baltic forms in *o*-grade for ‘cold’ and forms in zero-grade for ‘warm’. On the

²⁵ Although Lith. *šālti* ‘to become warm’ and Latv. *siĻt* ‘id.’ certainly belong here, these two verbs are excluded from the following table. Since both verbs occur with a *sta*-present, which often induces the acute intonation (*métatonie rude*; see Būga 1923/1924: 257; Derksen 1996: 84), a speculation regarding their original intonations can be made on the basis of the intonations of their respective adjectives (Lith. *šāltas* and Latv. *siltas*), although by themselves they do not constitute evidence for the existence of a root-final laryngeal.

²⁶ However, the homonymic root **kel-* ‘to bury, hide, cover’ draws attention, which is reconstructed for Proto-Indo-European on the basis of OE *helan* ‘to bury’ (LIV 322), OIr. *ceilid*, *-ceil* ‘to hide’ (Schumacher 2004: 394). Taking the homonym into consideration, Wel. *chyd* can be derived from **kel-tō-* ‘*covered (space) > warm’, hence the question mark in this table.

other hand, the fact that the forms for ‘warm’ (Lat. *calēre*, OIcel. *hlær*, OHG *lāo*, Lith. *šiltas*, Latv. *silts*, Wel. *clyd*) comprise both *aniṭ* and *seṭ* forms suggests that at an early stage of Proto-Indo-European there was a confusion between *aniṭ* and *seṭ* forms. A possible reason for this might be that the verbal paradigm based on **kelH-* had both the *o*-grade and the *e*-grade. In this case, the forms with the *o*-grade would have undergone the Saussure effect, while the forms with the *e*-grade would have retained the laryngeal. This, in turn, would have produced *aniṭ* and *seṭ* variants within a single paradigm. This speculation may allow one to assume a *molō*-type present paradigm for **kelH-* with *o/e* ablaut. If the verb **kelH-* belonged to the *molō*-type, the laryngeal of the *o*-grade forms, once lost by means of the Saussure effect, would have been restored under the morphological influence of the *e*-grade *seṭ* variant **kelH-*. Thus, Lith. *šáltas* and the preform of *šalnà* [**šalnà* (3)] can be regarded as the descendants of the restored *seṭ* root **kolH-*.

The view shown above suggests that the root for ‘warm’ originally may have been a *seṭ* root *kelH-*, which is identical with the root for ‘cold.’ What follows this is that *kelH-* may have been a common root for ‘cold’ and ‘hot’, and it must have undergone a semantic change from ‘cold’ to ‘warm’ in some languages, for example, Lat. *calēre* and OIcel. *hlær*, or from ‘warm’ to ‘cold’ in Baltic languages. Although this kind of semantic change in opposite directions is not very common, an instance can nevertheless be pointed out. While some reflexes of the root *meġ-h₂-* mean ‘great’ (Mayrhofer 1986–1996: II, 338) as in Gk. *μέγα-*, Ved. *máhi-*, the Baltic reflexes mean ‘small’ [for further details about their etymology, see Fraenkel (1962–65: I, 422–423) and Mülenbachs (1923–32: II, 574)], just as in the case of Lith. *māžas* and Latv. *mazs*.²⁷

This still raises semantic problems with regard to whether the original meaning of **kelH-* was ‘cold’ or ‘warm’, and of how the original meaning changed into the opposite one. Some cognates which mean seasons, or which are linked to the

²⁷One of the anonymous referees suggested that the opposite meaning of the Baltic forms can be explained if it is supposed that the root **meġ(-h₂-)* meant ‘to grow’ (cf. OIr. *mogaid* ‘to grow’), and that the Baltic forms underwent a semantic change from ‘still in growth’ to ‘not big enough, small’, while the cognates in other branches underwent a semantic change from ‘to grow’ to ‘grown fully, big.’ The following discussion in this section is also indebted to the insightful comments of the referee.

change of seasons, can provide clues for solving this problem. Some of the descendants of **kelH-* have meanings linked to seasons, viz. *śśira-* ‘early spring’, and OIcel. *hlána* ‘to thaw’ [*<* PGmc. **xlēwanōjanan* ← **xlēwaz* (Orel 2003: 176)]. OIcel. *hlána* can be linked to seasons, for ‘thaw’ is an event taking place in early spring, when the weather gradually becomes milder. Thus, both the Vedic and the Old Icelandic words indicate the season of the year when the weather becomes milder, although it is still rather cold. These items could lead one to establish the original meaning ‘to be(come) mild’ for the root **kelH-*. Although it seems the Germanic forms kept the meaning ‘mild,’ this original meaning might have contributed to the development of the meaning from ‘to become mild’ into ‘warm’ in Lith. *šiltas*, Latv. *silts*, Lat. *calēre*, while it developed from ‘to be(come) mild’ into ‘cold’ via ‘not warm enough’ in the rest of the forms. This is my present understanding of this semantic problem, although further discussion is necessary.

4.1.3 *kálnas* (3) ‘mountain’ : *kélti* ‘to raise’

kálnas (3) ‘mountain’ : **kelH-* ‘to soar’ (cf. LIV 349)

**kolH-no-* > *kálnas*

A root-final laryngeal is reconstructed since the intonations of some descendants of the root, namely Lith. *kélti* and Latv. *ceļt* ‘to lift’, suggest its existence. Since no decisive evidence points to a specific laryngeal, the coloring of the laryngeal in this case remains unknown.²⁸

The Latvian form *kaļns* ‘mountain’, which corresponds to Lith. *kálnas*, has a broken tone on the root vowel which corresponds to Lithuanian AP3. Hence, the acute accent on *kálnas* (3) must be primary, and it does not show the result of the Saussure effect.

At least two possibilities can be proposed for the morphological background of *kálnas*. First, it can be interpreted as a thematized *n*-stem. Neri (2003: 273⁹⁰⁴) proposed an amphikinetic *n*-stem paradigm **kélh₃-ō(n)/*k_lh₃-n-és/ *k_lh₃-ón ± i*

²⁸In this section, I provisionally follow the reconstruction of the unspecified laryngeal in LIV while I admit that the root-final laryngeal is most likely **h₃* as the Greek form *κωνός* ‘hill’ suggests. LIV (349¹) mentions that this is not decisive since vowel assimilation has often taken place in Greek, which indicates that the specification of the laryngeal needs further discussion. However, since it is not essentially relevant which kind of laryngeal could be reconstructed for this root, this problem will not be discussed further here.

on the basis of Gk. *κολώνη*, whereby two steps would be needed to derive **kolh₃-no-*: **k_lh₃-n-* **k_lh₃-n-o-* [via thematization] and **k_lh₃-n-o-* **kolh₃-n-o-* [with change of the grade of the root vowel]. Since there are no identical formations of **kolh₃-n-o-* outside the Baltic languages, these processes must have taken place in the inner history of the Baltic branch. Therefore, it is not likely that **kolh₃-n-o-* existed in the early stages of Proto-Indo-European, when the Saussure effect was still operating. Thus, this form is likely to be irrelevant to the present discussion. Furthermore, the *ad hoc* change of the grade of the root vowel assumed here presents a problem.

Second, **kolH-no-* can also be interpreted as a *no* formation with an *o*-grade, as Skardžius (1943: 217) notes. Assuming this, the acute intonation of *kálnas* can be explained by considering the influence of the verb *kélti*, as suggested in Nussbaum (1997: 196). If this view is accepted, then the change must have taken place at an early stage, when it was still possible for speakers to combine the verbal paradigm with the nominal paradigm. Thus, this scenario is possible, although not certain since there might be another source of the morphological influence on **kolH-no-*, as will be mentioned below.

It is noteworthy that there is a debate regarding the set of words **suep-no-/ *suop-no-/ *sup-no-* ‘dream’, etc. Although little is known about this, it is possible that if **kelH-no-* or **k_lH-no-*²⁹ existed, it might have influenced **kolH-no-*. However, since no direct descendants of such forms are found, this possibility lacks convincing support.

The discussion above shows that so far the second view (**kolH-no-*) is more likely to be true than the first one (**kolH-n-o-*). However, even in the case of the second view, the prehistory of the form needs to be reexamined since the problem with the thematic formation still remains, as briefly mentioned above.

²⁹There might have been a descendant of **k_lH-no-* in Greek. Vine (2006: 510³⁸) suggests the possibility that Gk. *κολώνη* ‘hill’, as well as *κολωνός* ‘hill’ and *κλωμακ-* ‘pile of stones’, might have originally represented a contamination involving thematic stems, in other words, **k_lh₃-nó-/ *k_lh₃-mó-* and **kol[h₃]-no-*. Vine (p. c.) further notes that it can also be interpreted as a result of the morphological interaction between **κλω-νó-* (< **k_lh₃-nó-*) and *κόλων* (< **κέλων* < **kélh₃-ōn-*). In both cases, there might have existed a descendant of **k_lh₃-no-* in the prehistory of Greek.

4.2 Forms derived from acrostatic paradigms

In this section, I will discuss a possible scenario in which a seeming counterexample of the Saussure effect could be derived from an athematic paradigm, although, in fact, most of the counterexamples mentioned in § seem to have been derived from thematic formations. Such a scenario can be invoked as a parallel to the case which will be discussed in the next section.

If a counterexample of the phenomenon can be derived from an athematic paradigm, the ablaut type of the paradigm would most likely be acrostatic with *o/e* ablaut since the counterexamples of the Saussure effect naturally have the *o*-grade. In an acrostatic paradigm with *o/e* ablaut, the strong forms, which had *o*-grade roots, would have undergone the Saussure effect, while the weak forms with *e*-grade would have been exempt from it.

strong cases: *CoRH-C > *CoR-C
 weak cases: *CeRH-C > *CeR-C [vacuous operation]

As a result, the paradigm would have had both *aniṭ* and *seṭ* variants, which would have subsequently interacted with each other, and the theoretically possible forms would be as follows:

phonological: (i) *CoR-C (> Lith. CaṘC-), (ii) *CeRH-C (> Lith. CēRC-)
 analogical: (iii) *CoRH-C (> Lith. CāRC-), (iv) *CeR-C (> Lith. CēṘC-)

Eventually, one of these forms must have been generalized in the paradigm. In the case where the *o*-grade variant with the restored laryngeal is generalized, then a seeming counterexample is found. Note that it is necessary to assume a consequent thematization when the attested form has a thematic vowel.

4.3 An analysis of *kalvā* (4) 'hill'

kalvā (4) 'hill' : *kelH- 'to soar' (cf. LIV 349) *kolH-u- > *kalva (1 (or 3?)) *kalvā* (4)

This form is derived from the the same root as Lat. *collis* in (4c) and *kālnas* in § 4.1.3 above. Lith. *kalvā* belongs to AP4 and has a circumflex accent on its root vowel (as in *kaṭva* [acc. sg.]), which seems to indicate that it has undergone a laryngeal loss in the environment *-oRHC- through the Saussure effect. However, the accentuation of the cognate Latvian form *kaṭva*

points to an original acute intonation. This suggests that the original accentuation of *kalvā* must have been acute, and that it has undergone *métatonie douce* in the prehistory of Lithuanian rather than the Saussure effect at the Proto-Indo-European stage. This possibility makes it plausible to regard *kalvā* as a counterexample of the Saussure effect.

There is a discussion regarding the etymology of the Germanic forms related to **kelH-* in Neri (2003: 273–275). He reconstructs a neuter acrostic paradigm **kólH-u-/*kélH-u-* for Proto-Indo-European on the basis of Proto-Gmc. **χalluz*. Considering this reconstruction, Lith. *kalvā* can also be related to the acrostic paradigm since its protoform **kolH-ueh₂* contained a **-u-*, which was a conditioned allophone of **-u-* in certain environments. Acrostic *u*-stems reconstructed in the protolanguage are well known as a neuter category. Therefore, the feminine Lith. *kalvā* must have been derived secondarily by adding the feminine suffix **-eh₂-*, while the neuter gender would have turned into masculine in Goth. *hallus* ‘rock’. Thus, Lith. *kalvā* might have been derived from this paradigm via (thematization and) feminization: **kolH-u-* (→ **kolH-o-*) → **kolH-eh₂*. A morphological parallel can be found in **dóru-/*déru- *deru-eh₂* (> Lith. *derivā* ‘resin’); **deru-o-* (> OCS *drěvo*, SCr. *drěvo* ‘wood’), **h₂óiu-/*h₂éiu-* → **h₂oíu-eh₂/*h₂eíu-eh₂* (> OHG *ēwa* ‘age, eternity’); **h₂oíu-o-/*h₂eíu-o-* (> Goth. *aiws* ‘id.’). A possible factor contributing to the formation of the feminine form can be a functional thematization. If the preform underwent a functional thematization, which created adjectival derivatives, then it certainly must have undergone feminization at the same time, for adjectives usually have feminine forms as well. Thus, the feminine form of the adjectival derivative should be the preform of *kalvā*.³⁰ Since the

³⁰The case of Gk. *ὅλος/ὅλος* ‘whole’ [cf. (3d), also Lat. *salvus* ‘safe and sound’ (4a), Skt. *sárva-* ‘whole’ (6a)] might be a morphological parallel since Gk. *ὅλος/ὅλος* and Skt. *sárva-* can be explained as a functionally thematized neuter *u*-stem [**sol(H)-uo- ← *solH-u-*], and Lat. *salvus*, as well as Lat. *salūs* ‘hail’, suggests an original *u*-stem paradigm [**s_lH-uo-* or **s_lH-uo- ← *selH-u-*]. Schrijver (1991: 196) notes that Lat. *salūs* is derived from a lost verbal stem **salue/o-*, which was probably based on a *u*-stem **salu- < *s_lHu-*. Considering this, an original *u*-stem paradigm **solH-u-/*selH-u-* can be reconstructed for Proto-Indo-European, from which **solH-uo-* (> Gk. *ὅλος/ὅλος*, Skt. *sárva-*), **s_lH-u-* and **s_lH-uo-* (> Lat. *salūs*, *salvus*) were derived. For the derivational process of **selH-u- *slH-u-*, a change of acrostic ablaut to that of R (o) / R

process of functional thematization is rather old, and might have originated already at the Proto-Indo-European stage, the preform of *kalvā* might have undergone the Saussure effect as well. However, the Baltic items point to an original acute intonation, which means that the form prior to the Proto-Baltic stage would have had a long vowel in its root as a result of compensatory lengthening following the loss of the laryngeal. This discrepancy can be explained if the schema presented in the previous section is taken into account. As the original paradigm of **kolH-u-/*kelH-u-* had both *o*-grade and *e*-grade forms, there could have been a competition between two thematized forms, namely **kolH-uo-* and **kelH-uo-*.

thematized *o*-grade form: **kolH-uo-* > **kol-uo-*

thematized *e*-grade form: **kelH-uo-* > **kelH-uo-* [vacuous operation]

As mentioned previously, a morphological interaction between *set* and *ani* variants might have restored the lost laryngeal in the *o*-grade form, where the Saussure effect operated regularly. This would explain why the Baltic forms point to an original acute intonation.³¹

5 Conclusion

While the investigation presented in this paper cannot be considered exhaustive, § and § show that there are at least a few examples and counterexamples of the Saussure effect in Lithuanian. However, as there are no clear phonological differences between the environments of the examples and the counterexamples, we cannot set up a new criterion for the operation of the Saussure effect.

(Ø) [for example, Ved. (**dóru* >) *dāru* / (**dér-u-* **dr-éu-s* >) *dróh* ‘wood’] can be recalled.

³¹The suffix **(e)h₂-* can be regarded as a collective suffix as well. This assumption provides a semantic explanation of the original meaning of **kol[H]-ueh₂* (‘*a pile of rocks’), which later came to mean ‘a hill’. As the collective suffix is observed in several branches [cf. Hitt. *alpaš* ‘cloud’, *alpeš* ‘clouds’, *alpa* ‘group of clouds’; Gk. *μηρός* ‘thigh’, *μηροί* ‘thigh-pieces’, *μηρα* ‘group of thigh-pieces’; Lat. *locus* ‘place’, plural *loci* and collective *loca*], the collective formation is regarded as old. Consequently, at the stage of Proto-Indo European, the paradigm of **kolH-u-/*kelH-u-* could have had variants, namely **kolH-u-* (> **kolu-*) for collective forms (**kolH-u-eh₂*, etc.) and **kelH-u-* for oblique forms, for only strong cases had collective forms. The explanation involving the restoration of the laryngeal in **kol[H]-ueh₂* as provided above can also be applied in this case.

Nevertheless, for most of the counterexamples, it is possible to provide morphological explanations as to why they do not show any traces of the Saussure effect in Lithuanian. In most cases, morphological factors can be assumed to have triggered the restoration of the lost laryngeal.

These explanations suggest the possibility that although originally the Saussure effect itself was a regular sound change, the traces of its operation became unrecognizable in many cases due to the various morphological changes that occurred between the early stages of Proto-Indo-European and Lithuanian. This can be considered quite natural if the long span of time between the early Proto-Indo-European stage and the period of the earliest Lithuanian attestation (16C AD) is taken into account.

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