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## The palaeo-Baltic substrate: a methodological exploration<sup>1</sup>

### Tiivistelmä

Substraattisanasto Itämeren alueen kielissä: huomioita tutkimusmetodeista

Useat tutkijat, tunnetuimpana Paul Ariste, ovat esittäneet, että indoeurooppalaisten kielten ohella myös alkuperältään tuntemattomat kielet ovat vaikuttaneet itämerensuomen sanastoon. Ehdotus on kuitenkin saanut suhteellisen vähän huomiota eikä sen selvittämiseen ole yleisesti hyväksytyjä kielitieteellisiä menetelmiä. Tässä artikkelissa tarkastelen erilaisia metodologisia lähestymistapoja yhdistelemällä kielihistoriallista tietoa itämerensuomalaisista ja balttilaisista kielistä. Johtopäätöksenä totean, että monet aiemmat ehdotukset perustuvat pelkkään semantiikkaan ja alkuperänselityksen puuttumiseen, mikä ei riitä perustelemaan substraattialkuperää. Epäuralilainen fonotaksi tai morfologia eivät nekään voi todistaa nimenomaan ei-indoeurooppalaisesta substraatista. Vahvana voimme pitää alkuperävääitettä vain, jos sen tuksi löytyy vähintään kaksi toisistaan riippumatonta leksikaalista todistetta ja jos keskinäinen lainautuminen tai yhteinen perimä voidaan sulkea pois. Emme voi osoittaa kantasuomen sanaa *\*siika* 'siika' lainaksi jostakin substraattikielestä, koska todisteeksi ei ole löydettävissä ainuttakaan minkään muun kielen sanaa, joka ei voisi palautua lainaan itämerensuomesta. Toisaalta kantasuomen *\*silakka*, preussin *sylecke* ja muinaisskandinaavin *sild* 'silakka' näyttävät hyviltä ehdokkailta rinnakkaisiksi substraattilainoiksi. Muita artikkelissa käsiteltyjä mahdollisia substraattilainoja ovat kulkusanoilta vaikuttavat 'tuhatta' merkitsevät kantasuomen

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\**tuhantē*-, kantamordvan \**tožəm*-, kantabaltin \**tū'stant*- jne., joitten äännesuhteet ovat ongelmallisia niin indoeurooppalaisten kuin uralilaistenkin kielihaarojen välillä, sekä 'sammalta' merkitsevät kantabaltin \**samanā*-, kantasuomen \**sammal*, pohjois-saamen *seamul* jne., jolla saamessa on useita hankalasti yhteen sovittavia variantteja, mikä viittaisi lähtömuotoon muinaisla-pissa, Aikion ehdottamassa substraattikielessä. Tämän aineiston perusteella pidän epätodennäköisenä, että koko käsitellyn sanas-ton takana olisi yksi ainoa monoliittinen lähtökieli. Luultavasti Itämeren alueen kielet ovat saaneet substraattisanastoa useista, mahdollisesti eri kielikuntiin kuuluneista kielistä.

The exact archaeological proxy of the expansion of the Finnic languages into the Baltic Sea region is still a matter of debate (Carpelan & Parpola 2001; Kallio 2006; Lang 2015, 2020; Grünthal et al. 2022; Saarikivi 2022: 36–39), but since the linguistic continuity theory (Koi-vulehto 1983; Carpelan 1999) is now all but universally rejected, we can be sure that the first languages spoken in the region were not Finn-ic. The idea that the western migration of the Uralic languages most probably involved some interaction with unrecorded, non-Indo-Euro-pean languages who would have been assimilated by Uralic-speak-ing populations has been floated about for some time (Moór 1958: 348–349; Хелимский 1982: 64–65, 2001; Напольских 1990; Wiik 1992: 89–91), but the linguistic evidence adduced in this connection has often been of a typological nature, where foreign influence is dif-ficult to prove (Saarikivi 2004: 192).

Part of the problem is that, while the problem of language shift is fundamentally linguistic, there is no generally accepted, purely *lin-guistic* methodology to tackle it. Even the concrete criteria developed by Aikio (2004: 8–9; 2012a: 83) only provide a means for testing whether a language contains a linguistic substrate, resting partially on statistical arguments. In this context, we can hardly blame Petri Kallio (forthc. [2014]) for concluding that “Finnic has no demonstrable loan-word stratum borrowed from any unknown source(s)”. In his opinion, perhaps the only substrate underlying the Finnic languages was Indo-European, or more specifically, Baltic.

On the other hand, Santeri Junntila (2015: 31) has briefly noted the possibility that some of the supposed Baltic loans in Finnic might

in fact be “parallel borrowings from a shared source, perhaps a lost substrate language”. Thus, in this article, I first and foremost aim to establish whether there is indeed any evidence for a non-Indo-European substrate language in the corpus of alleged Baltic loanwords. Since there is no currently accepted methodology, this paper will in part represent an exploration of possible methodological approaches. I will give an overview of past methodologies before embarking on three separate strands of study: after a case study on fish names, I will attempt to identify phonological criteria which might allow us to distinguish substrate lexemes, and finally examine two possible candidates in detail.

## 1. Methodology

The theory that certain words within Finnic derive from an unknown ‘autochthonous’ or substratal language is chiefly associated with the Estonian linguist Paul Ariste (1962, 1971),<sup>2</sup> whose views on the subject seem to be regarded as synonymous with the theory itself (cf. Kendla & Viikberg 2015). Essentially, Ariste observed that words of unknown etymology tended to cluster in certain semantic fields, particularly geographical terminology, “somatic words” (1962: 17) and fish names (1971: 10–11, 1975). As the only criterion for identifying substrate words was the absence of an etymology, it is not surprising that the theory failed to achieve widespread acceptance (Saarikivi 2004: 188): the clustering of etymologically obscure words in particular semantic fields may be a statistical argument in favour of a linguistic substrate (cf. Aikio 2004, Saarikivi 2004), but the suggestion becomes circular when applied on the level of an individual lexeme.

Thus, when the Finnic cognates of *saari* ‘island’ are reduced to a reconstructed Proto-Finnic *\*saari*, what we are left with is a single, isolated data point. I will call this the “single witness” problem. We may speculate in the absence of comparative data that the word is

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2. I have unfortunately been unable to access Ariste’s monographic treatment (*Keelekontaktid: eesti keele kontakte teiste keeltega*. Tallinn: Valgus, 1981), although judging by the discussions in Kendla & Viikberg 2015, it appears most of the relevant material was already discussed in his earlier articles.

of foreign origin, but this cannot be substantiated, and is destined to remain in the realm of speculation.<sup>3</sup> A proposal built on the absence of an etymology alone is naturally very vulnerable. For instance, Estonian *aed* ‘fence’, which Ariste (1962: 17) suggested to be of substrate origin, has since turned out to have an impeccable cognate in Khanty (Aikio 2014: 1–2), and there are competing etymologies for many other suggested substrate words, some of which are now widely accepted (Kendla & Viikberg 2015: 143–147; Kallio *forthc.*).

Rather little evidence from Finnic has been adduced beyond the lists presented by Ariste. For instance, K. Häkkinen (2004) discusses the possibility of a “proto-European” origin where Ariste had previously suggested it (thus s.v. *helmi* ‘pearl’, *liha* ‘meat’, *saari* ‘island’) but does not expand the corpus, even though many words are otherwise labelled as lacking an etymology and could, at least as far as the semantics are concerned, be decent candidates (*hiki* ‘sweat’, *mahla* ‘sap’, *tavi* ‘teal (a bird)’, etc.).

Support for a substrate loan origin has been furnished in specific cases by internal evidence, such as unusual phonotactics or morphology (J. Häkkinen 2009: 37–38; Aikio 2012a: 84; ЖИВЛОВ 2015), but even suggestions of this kind may be vulnerable. For instance, J. Häkkinen and Zhivlov (*loc. cit.*) both cite the internal cluster *-mm-* as evidence of non-Uralic origin, yet Aikio (*in prep.* 12) has argued in favour of such a cluster in native vocabulary. Furthermore, even if a word’s phonotactics would indeed rule out an inherited origin, we can still not in principle exclude that the word’s source will be later identified in an attested language.

It is only in the last decade that we have seen a real surge of interest in pre-Uralic substrates (*cf.* ЖИВЛОВ 2015; Kendla & Viikberg 2015; Aikio 2015a: 45–47; Soosaar 2020), and the results achieved in this area by Uralicists seem to have been largely independent of those achieved by Indo-Europeanists. Admittedly, the criteria for identifying substrates developed by Aikio (2004: 8–9; 2012a: 83) do indeed follow from the work of the American scholars Edgar Polomé (1989: 54–55) and Joe Salmons (1992: 267), which were first brought to the

3. Formally, there is no reason why *\*saari* could not be inherited; *cf.* *\*kaari* ‘curve; rib of a boat’ < *\*кеһәрә* (UEW 126; Aikio 2015a: 58), and the semantics alone are naturally not enough to prove a loanword origin.

attention of Uralicists by Kallio (1997: 126–128).<sup>4</sup> Like the work of these scholars, the focus has largely remained on the phonological and phonotactic properties of substrate words.

An important innovation is the identification of cases (and later patterns) of irregular correspondence between Saami varieties (Aikio 2004: 14–16; 2012a: 85). This is important, as it allows us to move beyond the “single witness” problem, in that multiple reconstructed proto-forms can be treated as independent comparanda in support of a substratal origin. Only rarely has any Indo-European evidence been adduced. An exception is Soosaar (2020: 299), who notes the suggestion that Finnish *leivo*, Estonian *lõoke* ‘lark’ and the family of Old English *lāwerce* ‘lark’ may represent parallel loans from an unknown language (Schrijver 1997: 309). Aside for the aforementioned comment by Junttila, the potential relevance of the Baltic evidence to this debate has not been recognized.

Combining Baltic and Finnic evidence could be a further way to resolve the “single witness” problem, and allow us to substantiate proposals of substrate origin based on comparative evidence. However, the Baltic evidence can only be considered an independent witness of a shared substrate word where a direct loan relationship with Finnic can be ruled out. Where a Finnic word can, on phonological grounds, be treated as a Baltic loanword, then the former cannot constitute independent evidence, and while the possibility that the word was loaned into Finnic and Baltic from a third unattested source remains a theoretical possibility, this cannot be substantiated.

To summarize, in order to find reliable evidence for a shared substrate in Finnic and Baltic (which I will refer to here as the “palaeo-Baltic” substrate), we will need to identify words which are clearly related but which cannot be considered direct borrowings from one attested language to the other, thus presupposing the involvement of some third source. Where this source cannot be identified, we might assume the source language is one that went extinct before being written down.

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4. Napólskix (Напольских 1990: 129; 1997: 200, fn. 5) refers to some outdated literature from the first half of the 20<sup>th</sup> century, namely Feist’s theory of a lexical substrate in Germanic and Pokorny’s theory of a non-IE substrate in Celtic.

## 2. Fish names

One possible way of searching for “palaeo-Baltic” words would be to look at semantic fields where loanwords would be expected *a priori*. One such semantic area is that of fish names: the Baltic Sea represents a particular ecosystem featuring species that would not have been familiar to speakers of Indo-European or Uralic languages before they reached the Baltic coast, such as the whitefish, Baltic herring, Atlantic salmon, and sea mammals like whales and seals. It has in fact long been suspected that some Baltic fish names are loanwords: the Latvian ethnologist Pēteris Šmits (see Schmidt 1930: 87) noted that a substantial number of the fish names in the region were of unclear origin, and he attributed these to an ancient autochthonous fishing population. This idea was noted in Benita Laumane’s monograph on Latvian fish names (1973: 14; cf. Лаумане & Непокупный 1968: 76; Ariste 1975: 468), and this semantic field has been the focus of a number of devoted studies (Герд 1970, 1981; Ariste 1975; Sausverde 1996).

Aside from an old inherited term for ‘fish’ (Lith. *žuvis*, Latv. *zivs* ‘fish’ = Gr. *ἰχθύς*, Arm. *jukn*), very little of the fishing-related vocabulary in Baltic can be traced even as far as Proto-Balto-Slavic. A common term for ‘eel’ can be reconstructed on the basis of Lith. *ungurỹs* (→ Finnic \**anķerjas*), PrE *angurgis*, Ru. *ýгорь*, Cz. *úhoř*, Slv. *ugór* ‘eel’,<sup>5</sup> but beyond this only a couple more common fishing terms can be cited, each having an obscure ultimate origin.<sup>6</sup> This situation can be explained in at least two ways. On the one hand, we might simply assume that early Balto-Slavic speakers did not engage much in fishing and did not distinguish many kinds of fish. A more probable solution, however, is that an originally rich fishing terminology has largely been replaced as a result of changing subsistence practices and language contact.

5. Based on the inherited word for ‘snake’: Lith. dial. *angis*, Latv. *uõdze*, Pl. *wąż* ‘snake’, Lat. *anguis*, Skt. *áhi-*, etc. (LEW 1163).

6. The best example is Lith. *šãmas*, Latv. *sams* ~ Ru. *сом*, Cz. *som*, SCr. *sòm* ‘Wels catfish’. Beside this, we find Lith. *lýnas*, Latv. *lĩnis*, PrE *linis* ~ Ru. *лннь* (GEN.SG. *лннѣ*), Cz. *lín*, Slv. *línj* ‘tench’ (but there is a mismatch in intonation between Baltic and Slavic). See Pronk (2022: 270). Some other equations, such as Lith. dial. *ežegỹs* ~ Pl. *jazgarz* ‘ruffe’ and PrE *esketres* ~ SCr. *jěsetra* ‘sturgeon’ are phonologically irregular and might represent parallel loanwords. On the word for ‘salmon’, see below.

Unlike Baltic, Finnic has inherited a relatively rich range of fishing terms from its linguistic parent. As well as the generic noun Fi. *kala*, Est. *kala*, Liv. *kalā* ‘fish’, there are inherited words for specific fish species (Fi. *särki* = MdM *šārgā* ‘roach’, Fi. *säyne* ‘ide’ = Hungarian *őn* ‘asp’, Est. dial. *tõtkes* = Tavda Mansi *tāxt* ‘tench’), and vocabulary related to fish (e.g. Fi. *kute-* ‘spawn (of a fish)’, *suomus* ‘scale’ = Vakh-Vasjugan Khanty *kōj-*, *sam* ‘id.’) and fishing (Fi. *pato* ‘fishing weir; dam’ = Vakh-Vasjugan Khanty *pāl*); cf. Aikio (2022: 24). It therefore cannot be stated that Finnic has undergone massive lexical replacement in this semantic field to the same extent as Baltic.

The question now is whether any fish names shared by Baltic and Finnic fulfil our criteria. Although most of the Finnic fish names mentioned by Šmits (Schmidt 1930: 87) are also present in Latvian, the majority of these are transparent loanwords from southern Finnic. On the other hand, a couple of the fish names he cites do have a wider distribution, and might potentially be candidates for shared substrate words:

- a) **‘whitefish’**. Fi. *siika*, Est. *siig*, Liv. *sīgōz* (< \**siika*) ‘whitefish’ ~ Lith. *sỹkas*; ON *sīkr* (attested in kennings) whence Norwegian, Swedish *sik* ‘whitefish’ — Already before Šmits, the word for ‘whitefish’ had been labelled as a possible loanword from “an aboriginal people” by Būga (RR II: 561). The word also featured among Ariste’s lists of substrate words (1971: 11; 1975: 470–471), and was treated as such in a separate article by Gerd (Герд 1981: 52).<sup>7</sup> The question is whether there is any positive evidence that the word was adopted from a palaeo-Baltic source.

Several sources have treated ON *sīkr* as an inherited cognate of Ru. *cuз* and Latv. *sīga* ‘whitefish’ (Falk & Torp 1910–11: 965; REW II: 621; de Vries 1962: 475), implying Finnic \**siika* was borrowed from Norse. However, the dialectal distribution of the word within Russian clearly favours the interpretation as a Finnic loanword (Kalima 1919: 217; Thörnqvist 1948: 247–248; Герд 1981: 52), and the Latvian word is also generally explained from Finnic, which indeed seems likely (Thomsen 1890: 279; ME III: 851). Thomsen (loc. cit.) has considered Lithuanian *sỹkas*

7. Janne Saarikivi has made the same suggestion at the 13<sup>th</sup> Finno-Ugricist Conference in Vienna, August 2022.

to be a loan from Baltic German *Siek* ‘whitefish’ (with voiceless /s-; cf. Kiparsky 1936: 181–182), itself probably from Estonian *siig* (Anderson 1938: 148), and SKES (1013) would even take the Norse word from Finnic, which LägLoS (III: 231) acknowledge as a possibility.

As a result, depending on our analysis, all of the evidence can be explained as ultimately deriving from Finnic, or from Norse. In other words, we return to the “single witness” problem, and no positive data can be presented in favour of the substrate hypothesis. In this particular case, the Baltic evidence is indeed most probably irrelevant to the word’s ultimate origin. Although the word remains without a convincing etymology, that is insufficient to substantiate a hypothesis of palaeo-Baltic origin.<sup>8</sup>

- b) **‘herring’**. Fi. *silakka*, Est. dial. (rare) *silakas* ‘Baltic herring; salted herring’ ~ PrE *sylecke*, Lith. *siļkė*, Latv. dial. (?) *silce* (see ME III: 840) ‘herring’ — Est. *silk* (GEN.SG. *silgu*) ‘(salted) herring’ and Liv. *siļk* (NOM.PL. *siļkōd*) ‘herring’ are usually quoted here, but due to the awkward syncope<sup>9</sup> and mismatch in stem vowel, a direct equation with Fi. *silakka* is phonologically problematic. Most probably, Liv. *siļk* is loaned from Latv. *siļķe*, which is itself from Lithuanian (ME III: 840), and Est. *silk* has presumably come by a similar route.

In view of the trisyllabic PrE *sylecke*, it is attractive to assume that Lith. *siļkė* has arisen through syncope from *\*silekē* or *\*silikē* (Būga 1916: 143). Trautmann (1910: 426) has assumed

8. An anonymous reviewer points out that the combination of a long vowel and second-syllable low vowel is considered atypical of the inherited vocabulary (Plöger 1982), which would speak against an inherited origin in Finnic. While this distribution has been partly explained by the secondary lengthening of *\*a* and *\*ā* in *\*ə*-stems (Aikio 2012b), it is unclear why the high vowels *\*ii* and *\*uu*, which probably go back to the PU sequences *\*Vj* and *\*Vw* (Aikio 2012b: 241–243) should show the same phonotactical restriction. It is possible that some *\*ii*-a nouns are indeed inherited, even though their number is very low: Fi. *piira* beside SaaN *birrin* ‘crop (in birds)’ might suggest *\*pijra* (UEW 378–379), while the *i*-stem Fi. *piiri* ‘circle’ is potentially innovated to an earlier *A*-stem given the preserved second-syllable vowel in Moksha *peřā* ‘fenced enclosure’ ?< *\*pijrā* (Pystynen 2020). This question requires further research, but the Finnic vowel combination itself cannot be considered sufficient proof of a substrate origin.

9. Contrast Est. *harakas*, dial. *arak*, VS *harak*, Liv. *arāgōz* (= Fi. *harakka*) ‘magpie’.



*svarabhakti* here, but there is simply no other evidence for such a phenomenon in Prussian. This also rules out Brückner's (1877: 131) preform *\*sildkē* and derivation from Slavic.<sup>10</sup> Other etymologists have derived the Baltic words from ON *sild* 'herring', Old Swedish *sildh* 'herring' (e.g. Solmsen 1904: 585; Smith 1910: 141; Falk & Torp 1910–11: 966), but this requires an entirely unparalleled and phonetically unexpected development *\*ld > lk* (Smoczyński 2016: 1168). In sum, all existing loan etymologies require unjustified assumptions, and cannot be upheld.

Šmits (Schmidt 1930: 87) also noted the similarity of ON *sild*, and assumed that these words were independently borrowed from a substrate source (similarly Преображенский 1910–16 II: 274; Būga RR II: 561; Герд 1980; Кузьменко 2013: 514–515, fn. 4). As lengthening is not regular before *\*ld* (Noreen 1894: 320–322), the long *\*ī* in Norse either implies a disyllabic preform *\*silid-* or *\*siled-* (cf. Falk & Torp 1910–11: 966; Kroonen 2013: 436) or a metathesis from *\*sīplō-* (Smith 1910: 141; Noreen 1923: 172).<sup>11</sup> In favour of the former option speak the early loanwords into Saami (SaaN *sallit*, L *sallet* 'herring' < *\*selētē*) and Slavic (Ru. *сельдь*, Pl. *śledź* 'herring' < *\*silidi-*).<sup>12</sup>

The disagreement between Baltic *\*silek-* ~ *\*silik-* and Norse *\*siled-* ~ *silid-* would favour the interpretation of these words as parallel loans from an unknown source. The irregularity is reminiscent of that between ON *hnot*, OHG *nuz* 'nut' (?< *\*knud-*) and Lat. *nux* (?< *\*knuk-*) 'nut' discussed by Kroonen (2012: 248) and van Sluis (forthc.). One possible explanation for such a phenomenon could be a word-final neutralization of stops in the source language, such as we find in North Saami (cf. *mádjit*, GEN.SG.

10. The preform is itself anachronistic, as the Russian diminutive *селёдка* must derive from a virtual *\*silid-ukā-* (or *-ikā-*), which should have turned up in Baltic as *\*silidukē* or the like. Mažiulis (IV: 107) indeed starts with a preform *\*sildikē*, but then the loss of *\*d* is completely unmotivated.

11. Note the parallels in Icelandic *bildur* (since 17<sup>th</sup> c.) 'lancet, device for blood letting' = OHG *bihal* 'axe' < *\*bīpla-* (cf. EWAhd II: 36–37 with lit.), and ON *sáld* 'sieve' < *\*sēpla-*, cf. OCS сѣти 'sift' (see Kroonen 2017: 105, fn. 1 and 108, fn. 8).

12. For the Slavic reconstruction, cf. Mikkola (1903: 28), Būga (1916: 143) and Thörnqvist (1948: 78). I fail to understand the alternative reconstruction *\*sildi-*, favoured by Vasmer (REW II: 606–607), which ought to have yielded Ru. *\*\*солдь*, Pl. *\*\*śludź(?)*.

*mádjiga* ‘beaver’). However, this is merely a typological parallel. Other possible explanations can no doubt be suggested, but as we have no criteria to decide between them, we may limit ourselves to the observation that the correspondence is irregular.

Likewise, the Finnic words are not easy to explain as loans from Baltic, primarily because of their back vocalism. Already Mikkola (1903: 28) compared the Finnic and Baltic words, but stated that the direction of loaning is unclear. Since Posti (1962), however, the Finnic words have generally been derived from Middle Swedish *\*sill-laka* (cf. *sill-lake* 1700) ‘herring brine’ (cf. SSA III: 180; LägLoS III: 237). There are serious problems with this explanation, the most important being the single *\*-l-* in Finnic. If even Swedish *sill* ‘herring’ has been loaned into Finnish with a geminate (cf. Fi. *silli*), it is difficult to conceive of how *sill-lake*, where the geminate is further reinforced by a morpheme boundary, could turn up with a singleton /l/. There is no reason to suspect an original geminate would have been shortened in Swedish or Finnic (*pace* Posti 1962: 285).<sup>13</sup> Thus, we are only left with a rescue solution such as the assumption of a contamination with Fi. *salakka*, Est. dial. *salak* ‘bleak (type of fish)’, itself of unclear origin (SSA loc. cit.).

On the face of it, we have three similar preforms — Baltic *\*silek-* (~ *\*silik-*), Norse *\*siled-* (~ *\*silid-*) and Finnic *\*silakka* — whose relationship cannot adequately be accounted for either by cognancy or by borrowing. I would therefore argue that this is a good candidate for parallel borrowing from a palaeo-Baltic source language.

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13. The Swedish compound does not appear to have ever been very frequent, and was probably never fully conventionalized, while the occasional spelling with *-ll-* in older Finnish sources could be due to Swedish *sill*. Secondly, the semantics are possible, but awkward, as a two-stage metonymical shift must be assumed from ‘herring brine’ (unattested in Finnic) to ‘salted herring’ (unattested in Swedish) followed, in several languages, by a further generalization to ‘Baltic herring’. However, see Posti (1962: 286) for a possible parallel.

Some additional terms relating to fishing are shared between Baltic and Finnic and lack a plausible Indo-European etymology. At least the following can be cited:

- Fi. *seipi*, Est. *teib* ‘dace’, Liv. *teib* ‘ide’ (? < \**stāipi*, OBL. \**stāipe-*) ~ Latv. obs. *stiepatš* ‘Alantsbleyer’, probably ‘chub’ (Nuutinen 1987).<sup>14</sup> The Baltic stem \**stēp-* has no apparent further etymology (no attempt is made in ME IV: 1079; Laumane (1973: 79) speculates on a connection with Latv. dial. *stipt* ‘to become rigid’).
- Fi. *toe*, Vo. *tōgõ*, Liv. *tōgõz* (< \**toķeh*) ‘fishing weir’ ~ Lith. *takišỹs*, Latv. *tacis* ‘fishing weir’; PrE *takes* ‘(mill) weir’ (Thomsen 1890: 226).<sup>15</sup> Some connection with Lith. *tekėti* ‘to flow’ is often assumed (Miklosich 1886: 348; LEW 1052; PKEŽ IV: 181), but the formation has remained problematic (cf. the speculative analysis as \**tak-kiš-* with the root of Lith. *kišti* ‘to stuff’ in Smoczyński 2016: 1441).

There is nothing in these comparisons which would rule out a transmission of the word into Finnic through Baltic,<sup>16</sup> meaning that we have no positive evidence for a palaeo-Baltic origin, although there might potentially be some statistical significance if numerous shared fishing terms turn out to be of unclear origin. We may tentatively add the word for ‘salmon’ to this list (cf. Laumane 1973: 116; Ariste 1975: 468), a word whose semantics would make a loanword very probable a priori:

- Fi. *lohi*, Est. *lõhe*, *lõhi* (< \**lohi*, OBL. \**lohe-*); SaaN *luossa*, Sk *luõss* (< \**luose*) ‘salmon’ ~ Lith. *lašišà*, Latv. *lasis* ‘salmon’ (Thomsen 1890: 194)

14. Nuutinen (op. cit. 109–110) points out that the suffix *-ats* has had some productivity in fish names, e.g. *šķaunats* ‘carp’. On initial \**st-* in Finnic, see Heikkilä 2013, Jakob 2024: 74–75.

15. The Latvian word is much more easily explained from \**tacsis* < \**tacišỹs* with syncope than, as often suggested, through reanalysis of the NOM.SG. \**taciss*. Prussian *takes* must, however, be taken as an orthographical representation of underlying \*/takiss/ (= Lith. dial. *tākišas*).

16. While \**o* ← \**a* seems only to be found in the neighbourhood of a labial in the most certain Baltic loanwords (\**oinas* ← \**avinas* ‘ram’, \**torvi* ← \**taurē* ‘horn’ and \**morcijan* ← \**martja-n* ‘bride’), the data is insufficient to rule out a chance correlation. See Jakob 2024: 63.

The Baltic word has further comparanda in PrE *lalasso* \*/lasasā/, Ru. *лосось*, Pl. *łosoś*, and ON *lax*, OHG *lahs* ‘salmon’, which cannot strictly be combined under a shared proto-form. Generally, Lith. *lašišà* has been considered a derivative of dial. *lāšis* (Skardžius 1941: 317; Specht 1947: 31), but it seems more probable that this form and Latv. *lasis* have arisen through syncope from an earlier *\*lašišīs* as Latv. *tacis* beside Lith. *takišỹs* ‘fishing weir’ (see footnote 12), Lith. *lopšỹs* beside Žem. dial. *lopišỹs* ‘cradle’ and Lith. dial. (Žem.) *vėčas*, Latv. *vęcs* ‘old’ against Lith. obs. *vetušas*. The underlying Baltic form *\*lašiš-* (?< *\*lokis-*), if correctly reconstructed, does not match that of Slavic (?< *\*lokos-*) or Germanic (?< *\*loks-*). A potential irregularity in the Finnic transmission could be the absence of any reflection of the second *\*š* (the existence of a Proto-Baltic form with syncope is questionable). However, this evidence remains rather tenuous and open to interpretation.

### 3. Finnic short *\*ä*, *\*a* vs. Baltic long vowels

Even if the word for ‘herring’ seems to be a reasonable candidate for a palaeo-Baltic substrate word, it would be nice to find some patterns that would help to identify such parallel borrowings in Finnic and Baltic more easily, for example correspondence patterns which do not occur in direct loanwords. In this context I would like to examine the Baltic vowels *\*ā* (= traditional *\*ē*) and *\*ā* which appear to show two distinct substitution patterns in the Finnic loanword material.

The usual substitutions we find for Baltic *\*ā* (= traditional *\*ē*) and *\*ā* in words with a clear Indo-European pedigree are Finnic *\*ee* and *\*oo*, as shown by the following examples (see Jakob 2024: 61–62 and Jakob forthc.):

- *\*seemen* (Fi. *siemen*, Est. *seeme*, Liv. *sīemt*) ‘seed’ ← *\*sā’men-* (Lith. *sėmuõ*, OBL. *sėmen-* ‘linseed, seed’; PrE *semen*) ‘seed’
- *\*veelä* (Fi. *vielä*, Est. *veel*, VS *vīļl*) ‘still, yet’ ← *\*vā’l-* (Lith. *vėl*, Latv. *vēl*) ‘still, yet’
- *\*soola* (Fi. *suola*, Est. *sool*, Liv. *sūol*) ‘salt’ ← *\*sāl-* (Latv. *sāls*, GEN.SG. *sāls*) ‘salt’ (cf. Būga 1924: 104)

- \**voohi*, OBL. \**voohę-* (Fi. *vuohi*, Vo. *voho*) ‘goat’ ← \**ā’žē-* (PrE *wosee* ‘she-goat’; cf. Lith. *ožỹs*, Latv. *āzis* ‘he-goat’)

On the other hand, several examples of short \**a* as a substitution of Baltic long \**ā* have been collected by Koivulehto (1990: 152, 2000: 105–106 and *passim*; cf. also Kallio 2008a: 207). In his opinion, these loanwords must belong to an earlier layer predating the rounding of Proto-Baltic \**ā*, a development he assumes to explain the (supposedly later) substitution with Finnic \**oo*. However, it has now become evident that Finnic is the language which has innovated here, as Finnic \**oo* has been shown to have developed from an earlier \**aa* (Lehtinen 1967: 150–151; Aikio 2012a: 232). As noted by Pystynen (2018: 72–75), this points to the opposite conclusion, namely that the loanwords showing short \**a* must be later, postdating the raising of Early Proto-Finnic \**aa* (> \**oo*) but predating the emergence of a new phoneme \**aa* (Table 1):

(a) Early		(b) Later		(c) Post-Baltic	
ii üü	uu	ii üü	uu	ii üü	uu
		ee	oo	ee	oo
ää	ee			ää	aa
PB * <i>ā</i> → PF * <i>ää</i>		PB * <i>ā</i> → PF <i>ä</i>			

Table 1. Development of the Proto-Finnic long vowels.

While Pystynen’s account does indeed explain the facts, it seems unattractive to view the raising of original \**ää* and emergence of a new \**ää* as unrelated phenomena. The two developments seem to be interpretable as a push shift caused by the loss of intervocalic \**ŋ* and \**x*. The resulting contractions (e.g. \**kaŋərə* > \**ka.ərə* > \**kaari* ‘curve; rib of a boat’) can be seen as having motivated the raising of the earlier low vowels. In this context, the two developments can be seen as part of the same process, and it is unnecessary to assume that Proto-Finnic went through a stage in which \**aa* was completely absent, as in (b).

If we examine the examples which supposedly show short reflexes of Baltic \**ā* and \**a*, it is notable that none of them have a

completely evident Indo-European etymology. In five cases, the Baltic word lacks any plausible comparanda entirely:<sup>17</sup>

- 1) Est. *vāhk*, GEN.SG. *vāhi*, Liv. *vē'jōz* (< \**vāhi*)<sup>18</sup> ~ Lith. *vėžys*, Latv. *vēzis* 'crayfish' (Thomsen 1890: 241). The Baltic word has no clear etymology (cf. LEW 1235–1236; ALEW 1419).<sup>19</sup>
- 2) Liv. *vāgāli* 'burbot' ~ Lith. *vėgėlė* (ACC.SG. *vėgėlę*), Latv. *vėdzele* 'burbot' (Thomsen 1890: 77). Although limited to Livonian, the assumption of a later loan from Žemaitian (Thomsen 1890: 141–142) or Curonian (Endzelin 1914: 102; Nieminen 1957: 199) does not help to explain the short first-syllable vowel. The Baltic word has no clear etymology (cf. LEW 1212; ALEW 1392).
- 3) Fi. *apila*, dial. *apelias* (?< \**apeila* ~ \**apelja*)<sup>20</sup> ~ Latv. *ābuōls*, cf. PrE *wobilis* 'clover' (Thomsen 1890: 156; Kalima 1936: 94 with "?"). The Baltic forms cannot be separated from Latv. *dābuōls*,

17. The substitution \**ā* → \**ā* has also been alleged in Estonian *nāri* 'fishing weir', which Vaba (1992a) has derived from a Baltic \**nārija*-. However, since there is no attested Baltic form with the appropriate form and meaning, it is unclear why a donor form specifically with lengthened grade must be assumed. Koivulehto (2001: 51) has compared Fi. *päre* 'splinter' with Lith. *pėros* 'boards used to cover the outside of a house', which is semantically unconvincing. The substitution \**ā* → \**a* has also been alleged in Fi. *haava* 'wound; crack; time' ~ Lith. *šovà* 'hollow, crack (in a tree)' (Vaba 1992b: 222), but this is better explained from Germanic, cf. ON *hoggr* 'strike, blow' (LägLoS I: 63). Already in 1992, Koivulehto (*apud* Kallio 2016: 459) suggested to derive Fi. *kavuta*, dial. *kabia*, Est. dial. (Vaivara) *kabuma*, *kabima* 'climb' from Lith. *kópti*, Latv. *kāpt* 'climb', an etymology which was taken over by Holopainen & Junttila (2022: 115–116). The etymology seems possible, but the semantics require further elucidation: cf. Karelian (Uhtua) *kavuta* 'embrace; climb' (cf. Veps *kabarta*, dial. *kabuta* 'embrace, wrap, swaddle'); Est. (Kodavere) *kabima* 'start (an activity); climb'.

18. The *i*-stem may indicate a very recent origin (Junttila 2015: 181), but it could also be secondary (compare Est. *kurt*, GEN.SG. *kurdi* 'deaf' beside Mulgi *kurre*, Ve. *kurdeh* < \**kurīeh* ← Baltic, cf. Lith. *kuřčias* 'deaf'; Kalima 1936: 71). The Livonian form appears on paper to suggest something like \**vāhjes*, which could suggest a different original inflectional type. Salaca Livonian *vāji* PART.SG. 'crayfish', in any case, probably represents a loan from Estonian (cf. Pajusalu & Krikmann & Winkler 2009: 293).

19. The connection with New Persian *gazīdan* 'bite, sting' is formally impossible (Cheung 2007: 117–118) and that with Skt. *vāhaka*- 'a kind of insect' very uncertain (Mayrhofer KEWA III: 198).

20. VKS cites Vo. *apila* from the botanical notes of Gustav Vilbaste. Perhaps this is a Finnish loan.

Lith. *dóbilas* ‘clover’, with an unclear initial *d-*.<sup>21</sup> If the word is not of Indo-European origin, the *\*d-* : *\*Ø-* alternation might be attributed to the source language(s). A potential (partial) parallel is found in the plant name ME *doder*, MHG *toter*, *totter* ‘dodder’ beside Lith. *jùdros*, Latv. *idra*, dial. *judras*, VS *judõr*, (Hargla) *jutr*, Liv. *ju’ddõr* ‘false flax, *Camelina*’.<sup>22</sup>

- 4) Est. *hakata* ‘begin; grasp’, ?Liv. *akkõ* ‘grasp, catch’ ~ Latv. *sákt* ‘begin’, Lith. *šókti* ‘jump, spring (into action)’ also dial. ‘start suddenly (esp. of weather phenomena)’ (Vaba 1992b: 222; Holopainen & Junttila 2022: 97). The original meaning is probably ‘jump’: compare ME *sterten* ‘jump, spring (up, forth); come suddenly into a state or condition’ > modern *start* (16<sup>th</sup> century) ‘begin’. The connection with Gr. κηκίς ‘ooze, viscous liquid (of blood, pitch, fat, etc.)’ (LIV 319; ALEW 1213) is semantically unconvincing.
- 5) Fi. *varhainen*, dial. *varas*, Est. *varane*, VS *varahinõ*, Liv. *varāz*, *va’rri* ‘early’ (< *\*varas*, *\*varahinen*);<sup>23</sup> SaaN *vuoras* ‘old; old man’, Sk *vuõrás* ‘old man; grown up (e.g. of a reindeer calf)’ (< *\*vuores*) ~ Lith. obs. *voras*, PrIII *urs*, ACC.PL. *urans* *\*/urá-/* ‘old’ (Liukkonen 1999: 151–152). No cognates are suggested by LEW (1274), PKEŽ (IV: 211) or Smoczyński (2016: 1695).

21. It is generally assumed that the *d-* was lost due to contamination with the word for ‘apple’ (Latv. *ābuõls*; PrE *woble*) and/or influence of Latv. *āmulis* ‘mistletoe’ (ME I: 235; LEW 99; ALEW 26–27). However, the similarity of Baltic *\*dābila-* and *\*ābōla-* seems hardly sufficient motivation for the former to lose its initial stop, which is an unusual kind of change. Koivulehto (2000: 107) suggests that the *d-* forms could instead be secondary, but since he does not provide any explanation for the *d-*, this cannot be considered a fully-formed hypothesis.

22. The relationship between the Baltic and Võro/Livonian words is unclear (LEW 196). A loanword is conceivable in either direction (cf. Sommer 1914: 197), as well as in a relatively recent timeframe (Junttila 2012: 273).

23. Liukkonen (1999: 152) suggests a semantic shift ‘old’ >> ‘long ago’ >> ‘early’, citing as a parallel Hungarian *rég* ‘long ago’ (Old Hungarian *reg* ‘morning’) and its derivative *régi* ‘old’ (but this shows the opposite development). Another possibility could be to start from the sense ‘fully grown, ripe’ (cf. Kildin Saami *vüras* ‘large (of fish)’), with a subsequent development to ‘timely, in good time’ as in SCR. *dõspijeti* ‘ripen, mature; be on time’.

Even though the latter example has an equivalent in Saami, the second syllable vowels do not correspond, meaning that no common proto-form can be set up (Liukkonen loc. cit.).<sup>24</sup> Likewise, the remaining examples have comparanda in Slavic, but in two of three cases, the comparison is phonologically irregular, suggesting the words in question postdate Proto-Balto-Slavic:

- 6) Fi. *lapio*, dial. *lapia*, Est. *labidas*, Liv. *lä'bđi* (< \**lapitā*) 'spade' ~ Lith. *lópezeta*, PrE *lopto* 'shovel, spade' (Thomsen 1890: 197 with "?"). The Baltic forms are clearly related to OCS лопата '(winnowing) shovel', but the vocalic correspondence is irregular.<sup>25</sup> Note that if we start from Baltic \**lā'petā-*, the Finnic second syllable vowel \**i* is also unexpected, especially if we consider that the suffix \*-*EtA* is frequent in Finnic, while \*-*itA* is otherwise unknown (cf. Koivulehto 2000: 110–111).<sup>26,27</sup>
- 7) Fi. *lava* 'platform, deck', Est. *lava* '(sleeping) platform; bench (in a sauna)', Liv. *lovā* 'bed; bench (in a sauna)' (< \**lava*); SaaN *luovvi*, Sk *lue'vv* 'raised platform (for storing meat)' (< \**luovē*) ~ Lith. *lóva*, Latv. *lāva* 'sleeping bunk; bench in a sauna' (Wiklund 1896: 45–46; Kalima 1936: 131). The Baltic word is cognate with

24. It is unlikely that Saami shows suffix replacement. On the contrary, we would expect retention of the suffix \*-*ēs* to have been encouraged by the synonym \**poarēs* 'old' (> SaaN *boaris*, Sk *puā'res*).

25. There is no indication that the Baltic word represents a derivative with lengthened grade (*pace* LEW 339–340; Smoczyński 2016: 724), and the comparison with Lith. *lāpas* 'leaf' is better abandoned.

26. On the other hand, it is possible that a variant with \*-*i-* existed in Baltic, as in Lith. dial. *vedigà* 'adze' (LKA I: 87), *mēdiga* 'material' (for *vedegà*, *mēdžiaga*), and this might underly Prussian *lopto*, cf. PrE *wedigo* 'Carpenter's axe', Latv. *vēdga* 'adze' (an anonymous reviewer suggests that the suffix \*-*EtA* might have been avoided in a substantive, as it is typically adjectival). The Latvian correspondent of Lith. *lópezeta* appears to be Latv. *lāpsta*, which perhaps shows suffix substitution (cf. Lith. *kūpeta* beside *kūpstas* 'heap'). A Proto-Baltic age for the Latvian word is doubtful, and thus Liukkonen's (1999: 83–84) derivation of Finnish *lasta* 'spatula' from Baltic \**lā'pstā-* is dubious.

27. Koivulehto (2000: 114) also discusses Fi. *lapa* 'shoulder blade' as a Baltic loanword, but this is rather inherited and cognate with Inari Saami *lyepi* and Konda Mansi *lūplā* 'shoulder blade' (Aikio 2015b: 13).



- Ru. dial. *лáва* ‘bench, platform for washing clothes’, Cz. dial. *lava* ‘bench (along a wall)’, but has no further etymology.<sup>28</sup>
- 8) Fi. *vakka*, Est. *vakk* ‘oval container made of bark; dry measure’, Liv. *vakā* ‘woven basket; dry measure’ ~ Lith. *vókas* ‘(eye)lid; woven grain basket’, Latv. *vāks* ‘lid’, DIM. *vācele* ‘woven grain basket’ (Koivulehto 2000: 114–115). The Baltic forms must be connected to Ru. *вѣко* ‘eyelid’, dial. ‘lid of a basket or wooden vessel; grain basket’, Cz. *víko* ‘lid’; however, the vocalic relationship between the Slavic and Baltic words is irregular.<sup>29</sup>

As a result, we are faced with a situation where all of the Baltic loanwords whose Indo-European background is certain show long reflexes of Baltic *\*ā* and *\*ē* in Finnic, which is actually what we should expect in the case of direct loanwords, while all the plausible etymologies in which Finnic shows short vowels lack an Indo-European etymology, being at best common Balto-Slavic. In this context, we might venture the conclusion that the two different substitution patterns do not represent different chronological layers, as was previously assumed, but rather betray a distinction between direct and indirect contacts. A possible explanation for this could be that the substrate language underlying Baltic had undergone a sound change (such as open-syllable lengthening) which resulted in phonetically long vowels, while a related substrate underlying Finnic retained the short reflexes.<sup>30</sup>

28. LEW 387 suggests a derivation from the root of Lith. *liáutis* ‘be cut off’; however, the connection between this verb and the meaning ‘platform, deck’ is by no means trivial. Furthermore, one would anticipate the palatal onset of the verb to be preserved in such a derivation, as in *paliová* ‘respite’ < *pa-liáuti*.

29. From an o-grade *\*uohik-*, I would anticipate Lith. *\*úoka-*; cf. the discussions in PЭС VI: 196 and Derksen 2015: 509. MdE *vakan* ‘vessel, bowl’, as already noted by Paasonen 1896: 36, is hardly from Ru. *вазан* ‘wooden bowl, trough’. Contra van Linde’s (2007: 177) claim that *\*-k-* is a usual substitution for foreign *\*-g-*, such a substitution seems to be highly exceptional. The only generally comparable example listed in Paasonen (1903: 17) is Moksha dial. *avkās* ‘August’. The Erzya word could instead be seen as cognate with the Finnic word, with a suffix as in MdE, M *kućkan* ‘heron; eagle’ < PU *\*koćka*.

30. Perhaps a similar lengthening could underlie the long *\*ē* in Lith. *prėskas*, Ru. *прѣсный* ‘fresh, unleavened’ as against the *\*i* in OE *fersc*, OHG *frisc* ‘fresh (etc.)’. This attractive comparison has long been abandoned due to the mismatch in vocalism (cf. Trautmann 1923: 231; LEW 652; REW II: 429–430; Smoczyński 2016: 1018), but it hardly seems likely that the exact correspondence in meaning and of all four consonants could be coincidental. See Jakob 2024: 271.

On the other hand, it must be acknowledged that this theory is to a large extent built on the theoretical postulate that Proto-Finnic always had a phoneme *\*aa*, and can be viewed as a potential house of cards. Should we prefer to classify any one of the Baltic source words as inherited, we would be forced to accept a Baltic → Finnic loanword, and with it, the possibility of a substitution *\*ā* → *\*a*. In that case, we would be compelled to accept an alternative solution, such as Pystynen's chronological one, and we might as well apply that explanation to all of the examples. Thus, although the theory potentially carries more weight than Ariste's in that it identifies a linguistic pattern in the data, its vulnerability is only exacerbated, as it depends not only on a single word lacking an etymology but on a whole set of words lacking one.

In the following, I will tackle the question from a slightly different perspective, and treat two case studies in detail.

#### 4. The word for 'thousand'

First, we will examine the word for 'thousand', which is generally accepted to be a Baltic loanword in Finnic (Thomsen 1890: 232–233; Kalima 1936: 170–171; SSA III: 318). The data are as follows:

- Fi. *tuhat* (OBL. *tuhante-*), Est. *tuhat*, Liv. *tū'ontō* (< *\*tuhat*, OBL. *\*tuhante-*) 'thousand' ~ Lith. *tūkstantis*, Latv. *tūkstuōtis* 'thousand'

Despite the consensus, it has always been clear that the East Baltic forms do not represent a suitable source as attested. As a result, one has instead operated with a hypothetical Baltic *\*tū'samti-* (Būga 1908: 138; Nieminen 1957: 190; Lühr 1993: 124; Liukkonen 1999: 15),<sup>31</sup> a reconstruction based primarily on the Finnic form and unsupported by the comparative data. If the alleged Baltic *\*š* reflects IE *\*k*, then it remains to be explained why no trace of this phoneme is found in

31. The *\*m* is reconstructed on the basis of PrIII *tūsimtons* ACC.PL. 'thousand', but this, like ON *pús-hund* 'thousand', is most probably a folk-etymological distortion after the word for 'hundred' (cf. Lith. *šimtas*; Hirt 1896: 345–347). Indeed, we would expect an old *\*-m-* to have been preserved in East Baltic (Stang 1966: 100).

Go. *pusundi*, ON *púsund* ‘thousand’.<sup>32</sup> If the alleged \*š reflects IE \*s, showing retraction after \*u (the RUKI law), then it remains to be explained why we find \*s in Slavic (cf. OCS тысѡци ‘thousand’), as opposed to \*x, as we would expect in this position. Moreover, in both scenarios, the actually attested East Baltic data is unexplained.

The only way to reconcile the Germanic and Slavic evidence is to reconstruct a medial cluster \*-ts-: the \*t would be lost in Germanic, and would block the effects of RUKI law in Slavic. From this starting point, however, there is no room for a Baltic form with \*-š-. Instead, the Baltic evidence can only be accounted for by assuming an irregular metathesis to -st- (Pijenburg 1989: 104–105). In view of the problems in reconstructing a common proto-form, Stang (1966: 282; 1972: 49) has suspected the word for ‘thousand’ is in fact of non-IE origin. Indeed, we can find a couple of parallels for the irregular correspondence between Baltic st- and a Slavic sibilant, both of which might plausibly be of foreign origin (cf. Jakob 2024: 219–224):

- Lith. *stirna*, Latv. *stīrna* ~ Uk. *сєрнá*, Sln. *sína* ‘roe deer’. Although normally taken as inherited (Trautmann 1923: 260; Derksen 2015: 429), the Baltic st- is not satisfactorily explained, and the word is limited to Balto-Slavic.
- Lith. *stumbras* ‘bison’ ~ Ru. *зѡб*, Pl. obs. *zqbr* ‘bison’. Due to the obscure relationship with OE *wesend*, PrE *wissambs* ‘bison’, a non-IE origin has previously been suggested (Kroonen 2012: 253; Šorgo 2020: 455–456), and this indeed seems quite probable.

If the Indo-European word cannot be analysed as inherited, we may suggest that the Finnic word likewise represents a borrowing from a non-Indo-European source, rather than a direct loan from an Indo-European one. Note that there are a couple of other cases where Finnic shows \*h as against Baltic \*s, neither of which have a generally accepted IE etymology:

32. A reconstruction with \*k̑ has usually been suggested based on a notion (in my view misguided) that this word contains the Indo-European word for ‘hundred’ (Bugge 1888: 327; Leumann 1942: 126–128; Kroonen 2013: 554), against which see Hirt (1896: 343), Pijenburg (1989: 101) and Gorbachov (2006: 8).

- Fi. *laiha*, Est. *lahja*, Liv. *lajā* (< \**laiha*) ‘thin, lean’ ~ Lith. *liesas*, Latv. *liēss* ‘thin, lean’. Regarded to be etymologically obscure (ALEW 670; Smoczyński 2016: 698–699).<sup>33</sup>
- Fi. *lahto*, Ve. dial. *lahk*, *-on* (< \**lahto*) ‘bird trap’ ~ Lith. *slāstai* PL., Latv. *slasts*, *slasti* ‘trap, snare’. Etymology uncertain (LEW 827; Smoczyński 2016: 1219).

The former has also been explained as showing a reflex of Baltic \*š due to RUKI law (Kallio 2008a: 267).<sup>34</sup> While it appears likely that the RUKI law must have applied after \**u* and \**i* at some point in pre-Proto-Baltic, the more typical attested reflex is *-s-* (Endzelin 1911: 29–60; Stang 1966: 99). As the exact nature of the prehistoric developments is difficult to establish, it cannot be ruled out that Finnic reflects an earlier Baltic \**laiša-*. In this context, we might favour the comparison of the Baltic word with OE *lāes* adv. ‘less’, OHG *līso* ‘mild, soft’, ?Gr. *λιαρός* ‘mild, warm’ (Osthoff 1910: 325–326; Kroonen 2013: 324), which I think cannot be ruled out.

However, the \**h* in Finnic \**lahto* can hardly be blamed on RUKI law, and the irregularity in this word might therefore be compared with that found in the word for ‘thousand’, and assumed to be an indication of shared substrate origin. Still, given that the substitution \**s* → \**h* is well known from Germanic loanwords (Koivulehto 1984: 193–195), an alternative way out might be to suggest that the word for ‘thousand’ is of Germanic origin, a solution which has almost never been suggested.<sup>35</sup> True, the Baltic suffixal syllable \**-ant-* does come closer to the Finnic data than Germanic \**-und-* (but see Koivulehto 1981: 193).

An obstacle to both the Germanic and Baltic etymologies could be the short \**u* in Finnic. This has not usually been viewed as a problem,

33. Lith. *lāibas*, Latv. *laībs* ‘thin, lean’ cannot be linked by any known derivational process (*contra* LEW 329–330; Derksen 2015: 268–269).

34. Older explanations based on consonant gradation (Kalima 1936: 58–59; Posti 1953: 61–62) can be regarded as obsolete.

35. Viitso (1992: 188–189) has derived the word from pre-Slavic, citing several supposed parallels for a substitution \**s* → \**h*. However, despite the tantalizing similarity of Fi. *tahdas* and Ru. *mécmo* ‘dough’, I doubt that any of these etymologies are correct.

or even remarked upon.<sup>36</sup> Such short reflexes have been attributed to the idea that long vowels were originally only possible in *e*-stems (Koivulehto 1981: 193). However, if such a phonotactic limitation did once exist (see footnote 8), there is plenty of evidence the Baltic loanwords postdated it (cf. Plöger 1982: 93). Compare the following etymologies:

- Fi. *tuulaalla*, Ve. dial. *tulhuuda* (< \**tuulahela*-) ‘spear-fish by torchlight’ ~ Latv. *dūlis* ‘torch for night fishing’, also ‘torch to fumigate beehives’ (cf. Hitt. *tuhhaezzi* ‘produce smoke’)
- Fi. *tuura*, Est. *tuur* (< \**tuura*) ‘ice chisel’ ~ Latv. dial. *dūre* ‘ice chisel’ (from the verb Lith. *dūr̃ti*, Latv. *dũrt* ‘stab, poke, prick’)
- Fi. *luuta*, Est. *luud*, Liv. *lūdō* (< \**luuta*) ‘broom’ ~ Lith. *šlūota*, Latv. *sluōta* ‘broom’ (to Lith. *šlūoti* ‘sweep’)

The substitution of Baltic \**ō* as Finnic \**uu* in the last example can only be understood if this loanword predated the raising of early Proto-Finnic \**aa* to \**oo*, demonstrating that this word must belong to a chronologically earlier period (see above). We might suggest that Finnic \**tuhat* belongs to an even earlier layer, but this feels *ad hoc* without other supporting evidence. Aside from ‘thousand’, there is another possible example of the substitution of \**ū* as \**u* among the Baltic loanwords:

- Fi. *kulo* ‘wildfire; last year’s grass’, Est. *kulu*, Liv. *ku’l* ‘last year’s grass’ ~ Latv. *kūla* ‘last year’s grass; old hair of an animal’, Lith. dial. *kūlymas* ‘last year’s grass’

Here again, the Baltic source word is of uncertain origin,<sup>37</sup> and the direction of loaning has often been declared uncertain (Thomsen 1890:

36. Thomsen (1890: 99) simply remarks that both long and short \**u* are substituted as short \**u* in Finnic, while Kalima (1936: 71) passes over the short reflexes in silence (similarly Kallio 2008a: 272). Nieminen (1957: 190) writes dryly: “Das *ū* der ersten Silbe wurde bei der Entlehnung durch *ü* ersetzt”.

37. The Lithuanian word looks deverbal, which suggests a comparison with West Aukštaitian *iš-kūlyti* ‘dry up, deteriorate’, but the latter itself looks to be denominal (cf. 3PRES. *-ija*). Nieminen (1934: 26) connects Latv. *kāl̃st* (1SG.PRET. *kāltu*) ‘dry out, wither’, but the vocalism and intonation are prohibitive. The further connection with Gr. (Homer) κηλέος ‘burning (of fire)’, καίω ‘kindle; (MED.) burn’ (ALEW 617; Smoczyński 2016: 625) is formally possible but not compelling.

190; Kalima 1936: 121–122; SKES II: 234–235).<sup>38</sup> Therefore, there is no solid evidence to support the substitution  $*\bar{u} \rightarrow *u$  among the Baltic loanwords. Even if such a substitution is accepted, this is still not the only problem with a direct derivation from an Indo-European source.

Next, we have to address the words for ‘thousand’ in Mordvin and Mari. While the vocalism in MdE *íožań*, M *íožäń* ‘thousand’ seems to match that of Finnic, Mordvin  $*\acute{i}$ - normally only occurs in words of affective or obscure origin (Bartens 1999: 46). In view of Mari  $*t\ddot{u}\acute{z}em$  (> MaE *tüžem*, W *tážem*) ‘thousand’, we might assume that Mordvin  $\acute{o}$  results from a ‘breaking’  $*\ddot{u} > \acute{o}$  (cf. E. Itkonen 1946: 300–301; Mägiste 1959: 174–175; Keresztes 1986: 170; the usual reflex of  $*\ddot{u}$  in Mordvin is *e*). At first sight, a close parallel would appear to be found in MdE dial. *śokś* ‘autumn’ <  $*s\ddot{u}k\acute{c}\acute{a}$ , but the initial palatal in the latter is evidently due to a secondary assimilation from the more usual form *sokś*, and cannot be associated with the palatal in the word for ‘thousand’. At any rate, Mordvin  $-\acute{n}$  might also be derivable from an earlier  $*-m$ , which seems to be strongly supported by the form *íožəm*, GEN. *íožməń* recorded by Paasonen (MdWb 2411–2412) for the Erzya village of Senkino.<sup>39</sup> The result is that the Volgaic forms could possibly go back to a common proto-form  $*t\ddot{u}\acute{s}\acute{a}m(\acute{a})$ , but cannot be compared directly with the Finnic forms. Since a derivation directly from Baltic involves a similar issue with regard to the medial  $*\acute{s}$  and an additional issue by way of the final  $*-m$ , these forms can be adduced as further support for an unknown source language.

To summarize, there are several indications that the word for ‘thousand’ has been loaned independently into the individual Indo-European (and Balto-Slavic) branches, and the Finnic and other Uralic forms cannot be derived either from a common preform, or be explained as direct loanwords from Indo-European sources without accepting a

38. A reviewer suggests a further comparison with MdE *kulov*, dial. *kuloj*, M *kulu* (<  $*kul\acute{a}j$ ) ‘ashes’ as a parallel loanword, starting from the sense ‘burnt grass’. In any case, the Finnic–Mordvin comparison would not be possible in a Uralic context since Finnic  $*u \sim$  Mordvin  $*u$  is not a regular vowel correspondence.

39. The regular outcome of word final  $*-m$  is apparently  $*-n$ , as shown by the 1SG.PRES. ending MdE, M *-an* (<  $*-Vm$ ) (Bartens 1999: 50). In other instances,  $-m$  has been restored from other case forms, e.g. MdE *udem*, M *udəm* ‘brain, marrow’ (? <  $*wVd\acute{a}m$ ).

number of awkward and poorly paralleled substitutions. As a result, it would seem that this word cannot be satisfactorily explained without assuming the involvement of an unknown language or unknown languages, and the word might have entered the Indo-European and Uralic languages independently from an unattested source.

Given the broad distribution, we are perhaps dealing with a *Wanderwort*, whose trajectory and original source are difficult to identify. However, we might also suggest some kind of connection with the so-called “West Uralic substrate”. In support of this idea, we can note that the phoneme \*š has been considered characteristic of West Uralic words showing morphological and phonological irregularities (Живлов 2015; Aikio 2015a: 45–47). On the other hand, as the word is present already in Proto-Germanic, it must have spread into Europe fairly early, and drawing any conclusions on the basis of a single phoneme would be premature.

## 5. The word for ‘moss’

Thomsen (1890: 214) compared Fi. *sammal*, Est. *sammal*, Liv. *sōmal* (< \**sammal*) ‘moss’ with Lith. *sāmanos* PL. ‘moss’, but considered the equation questionable. Although Vaba (2011: 757) still labels the comparison as possible, it has rarely featured in discussions of Baltic loanwords, being omitted from Kalima’s treatment of the subject (1936). Later on, without reference to the Baltic data, Ariste (1971: 10) labelled the Finnic word as a probable loan from an unknown substrate. The most obvious issue with the loan etymology is the geminate *-mm-* in Finnic, which cannot be explained on the basis of the Baltic evidence. A loanword in the opposite direction would in theory be possible, but the very existence of such loanwords has been considered doubtful (Junttila 2015). At any rate, there is no clear IE etymology (LEW 761; Smoczyński 2016: 1130).

However the relationship with Baltic is interpreted, it is clear that the Finnic words cannot be divorced from a group of similar Saami words referring to various mosses (cf. SSA III: 151). Not only do none of these correspond regularly to the Finnic word, they also show irregular correspondences within Saami. As many as four different groups must be distinguished:

- a) SaaN *seamul* ‘spikemoss; house moss’, L *sämol* ‘(a kind of) peat-moss’ (< \**seamōl*)  
 b) SaaIn *siävñul* ‘a kind of peatmoss’ (< \**seavmōl*)  
 c) SaaSk *sââu’ñel* ‘hairmoss’ (< \**sevmēl*)  
 d) SaaK *sōvñal* (сәүñал) (T.I. Itkonen 1958: 487) ‘hairmoss’ (< \**sevmel*)

The surface cluster *-vñ-* in Eastern Saami could reflect a number of possible preforms,<sup>40</sup> but *-vm-* seems to be the most suitable compromise with the Western data. For \**-vm-* > \**-vñ-*; compare SaaS *saajmie* ~ In *sävñi*, Sk (sāũñ<sup>é</sup>), K (sãũñ<sup>é</sup>) (T.I. Itkonen 1958: 478; modern SaaSk *säu’nnj*, SaaK *saa’vvn*) ‘seam’, of Norse origin; cf. Icelandic *saumur* ‘seam’ (Kallio 2008b, fn. 3).

This is a very interesting case, as the high level of irregularity within Saami clearly suggests that our word belongs to a relatively recent palaeo-Laplandic substrate layer, entering the individual Saami dialects independently (cf. Aikio 2004: 14–16; 2012a: 85). On the other hand, the word’s robust presence in Finnic and even as far south as Lithuanian brings the centre of gravity far away from the Arctic Circle.<sup>41</sup> As a possible solution, we could speculate that the word was loaned into palaeo-Laplandic from further south (palaeo-Baltic?), and only from there into Saami. On the other hand, as Saami represents a centre of diversity, we might assume an ultimately Laplandic origin, in which case we would have to assume that the word was carried south. Given that we are hardly dealing with a trade word, this would probably imply an actual (southward) migration, presumably by speakers of another unattested language, took place prior to the arrival of Finnic-speakers in the Baltic region. This could potentially suggest a genetic relationship between palaeo-Laplandic and at least one palaeo-Baltic language.

40. Other possibilities are \**-vñ-*, \**-vñ-* or probably \**-mñ-* (E. Koponen p.c. May 2022).

41. Note, perhaps, the similar distribution of SaaN *suolu* ‘island’, Ter Saami *sjelaj* ‘island’ (< \**suolōj*), Fi. *salu* ‘dense forest; island’, Lith. *salà*, Latv. *sala* ‘island’, which have been suggested by several authors to represent parallel loanwords from an unknown source (Saarikivi 2004: 208; Aikio 2004: 24; J. Häkkinen 2009: 48; Holopainen & Kuokkala & Junttila 2017: 129).



## 6. Conclusion

In the above, I have attempted to substantiate the hypothesis that a certain proportion of the shared vocabulary between Baltic and Finnic may not represent mutual loanwords, but rather parallel borrowings taken by the two language families from an unattested source. For the most part, evidence adduced in favour of this hypothesis in the past cannot be further substantiated, as it depends only on the absence of an etymology. In theory, unusual morphology or phonology could favour a non-native etymology, but it is difficult to use this evidence to support a specifically non-Indo-European source. Nevertheless, in the course of this paper, I have gathered some material which could provide some concrete linguistic support for the hypothesis.

Although I have tried to identify substitution patterns which could betray such parallel loanwords, a more robust argument can be built on etymologies for which there are simultaneously multiple indications of palaeo-Baltic origin. In this paper, I have identified three words for which I think to such an origin is highly probable, presented in Table 2 below (the reconstructed forms correspond to the approximate time of Baltic-Finnic contacts).

	Baltic	Finnic	Other comparanda	
			IE	Uralic
'herring'	<i>*silek-ē- ~</i> <i>*silik-ē-</i>	<i>*silakka</i>	Gmc. <i>*sileT- ~</i> <i>*siliT-</i>	
'thousand'	<i>*tū'stant-(i)-</i>	<i>*tušaŃt(ə)</i>	Sl. <i>*tū(t)sant-ī-</i>	Md./Ma. <i>*tüşäm-</i>
			Gmc. <i>*tū(t)sunt-ī-</i>	
'moss'	<i>*saman-ā-</i>	<i>*sammal</i>		Saa. <i>*se(w)mol</i>
				Saa. <i>?*siwma/əl</i>

Table 2. Possible shared borrowings from unknown sources in Baltic and Finnic.

It is interesting to note that the three words point to a rather different contexts of borrowing. The word for 'moss' must be connected to the palaeo-Laplandic substrate and with some kind of physical migration

either into or out of Lapland, the word for ‘herring’ shows a more localized distribution, and perhaps points to an autochthonous fishing community around the Baltic coast, similar to the one surmized already by Šmits. Finally, the word for ‘thousand’ is widely distributed, and must either be considered an old *Wanderwort*, or perhaps be associated with a group of other widespread loanwords identified in West Uralic.

Although we should hesitate before drawing far-reaching conclusions on the basis of just a handful of words, the overall impression is of a rather complex language contact situation involving multiple donor languages. It seems unlikely that the pre-Indo-European and pre-Uralic languages of north-eastern Europe represented a monolith, and it is probable that multiple source languages contributed to the substratal lexicon of the attested languages.

Some support for this argument could be the words for ‘seal’ in Baltic, Finnic and Saami, which all appear to derive from different foreign sources:

- Lith. *ruõnis*, Latv. *ruõnis* ‘seal’, which is clearly related to, but not regularly cognate with, Old Irish *rón*, Breton *reunig* ‘seal’ (Ariste 1971: 10; Sausverde 1996: 139; Stifter 2023: 183)
- Fi. *hylje*, Est. *hüljes*, Liv. *īlgaz* (< \**hülkes*) ‘seal’, which seems to be connected to, but is hardly loaned from, ON *selr*, OHG *selah* (< \**selha-*; Iversen & Kroonen 2017: 519; Saarikivi 2020: 273)
- SaaS *nâervie* (< \**noarvē*) ~ Sk *nue’rjj* (< \**nuorjē*) ‘seal’, which are perhaps irregularly connected to Finnish *norppa* ‘ringed seal’ (Aikio 2004: 15)

We could argue that these terms originally referred to different kinds of seal, but there is no indication that this should be the case, as they (aside from Finnish *norppa*) represent neutral terms in all of the languages where they are attested. On this basis, we might assume that Finnic, Baltic and Saami interacted with distinct fishing populations speaking potentially unrelated languages. Such a scenario can certainly not be ruled out, and perhaps more such cases could be identified with further research.

As a final note, I would like to point out that the dearth of evidence adduced here cannot be taken as an indication that Finnic and Baltic have been only minimally affected by palaeo-Baltic languages,

but simply that very little can be identified. Given that my methodology demands both the survival of the word in multiple branches, and the demonstration of identifiable irregularities, we cannot expect a huge amount of data to be available to us. Furthermore, it is naturally more difficult to substantiate a substrate origin based on words in unrelated languages, because apparently irregular substitutions in loanwords can often be accounted for by assuming different chronologies or dialectal differences, while such options are usually unavailable when dealing with words in related languages bound by exceptionless sound laws. It is merely a matter of fortune that enough material has survived in these three cases to allow us to make a case for a palaeo-Baltic origin. In fact, many more of the suggested Baltic loanwords in Finnic are of unclear ultimate origin, but with the tools currently available to us, this can only serve as a statistical argument. If this area of research continues to be pursued, I am confident that more hard evidence will be uncovered.

## Abbreviations

Arm. = Armenian	ME = Middle English
Cz. = Czech	MHG = Middle High German
dial. = dialectal	obs. = obsolete
Est. = Estonian	OCS = Old Church Slavic
Fi. = Finnish	OE = Old English
Gmc. = Germanic	OHG = Old High German
Gr. = Greek	ON = Old Norse
IE = Indo-European	PB = Proto-Baltic
Lat. = Latin	PF = Proto-Finnic
Latv. = Latvian	Pl. = Polish
Lith. = Lithuanian	PrE = Prussian (Elbing Vocabulary)
Liv. = Livonian	PrIII = Prussian (Catechism)
Ma. = Mari	PU = Proto-Uralic
MaE = Eastern Mari	Ru. = Russian
MaW = Western Mari	SaaIn = Inari (Aanaar) Saami
Md. = Mordvin	SaaK = Kildin Saami
MdE = Erzya Mordvin	SaaL = Lule Saami
MdM = Moksha Mordvin	SaaN = North Saami

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SaaSk = Skolt Saami	Uk. = Ukrainian
SCr. = Serbo-Croatian	Ve. = Veps
Skt. = Sanskrit	Vo. = Votic
Sl. = Slavic	VS = Võro-Seto (South Estonian)
Sln. = Slovene	Žem. = Žemaitian

## References

- Aikio, Ante. 2004. An essay on substrate studies and the origin of Saami. In Hyvärinen, Irma & Kallio, Petri & Korhonen, Jarmo (eds.), *Etymologie, Entlehnungen und Entwicklungen: Festschrift für Jorma Koivulehto zum 70. Geburtstag*, 5–34. Helsinki: Société Néophilologique. <<https://www.academia.edu/4811770>>
- Aikio, Ante [Luobbal Sámmol Sámmol Ánte]. 2012a. An essay on Saami ethnolinguistic prehistory. In Grünthal, Riho & Kallio Petri (eds.), *A Linguistic Map of Prehistoric Northern Europe* (Mémoires de la Société Fenno-Ougrienne 266), 63–117. Helsinki. <[https://www.sgr.fi/sust/sust266/sust266\\_aikio.pdf](https://www.sgr.fi/sust/sust266/sust266_aikio.pdf)>
- Aikio, Ante [Luobbal Sámmol Sámmol Ánte]. 2012b. On Finnic long vowels, Samoyed vowel sequences, and Proto-Uralic \*x. In Hyytiäinen, Tiina & Jalava, Lotta & Saarikivi, Janne & Sandman, Erika (eds.), *Per Urales ad Orientem: Iter polyphonicum multilingue: Festschrift tillägnad Juha Janhunen på hans sextioårsdag den 12 februari 2012* (Mémoires de la Société Fenno-Ougrienne 264), 227–250. Helsinki. <[https://www.sgr.fi/sust/sust264/sust264\\_aikio.pdf](https://www.sgr.fi/sust/sust264/sust264_aikio.pdf)>
- Aikio, Ante [Luobbal Sámmol Sámmol Ánte]. 2014. Studies in Uralic Etymology II: Finnic Etymologies. *Linguistica Uralica* 50. 1–19. <<https://doi.org/10.3176/lu.2014.1.01>>
- Aikio, Ante [Luobbal Sámmol Sámmol Ánte]. 2015a. The Finnic ‘secondary e-stems’ and Proto-Uralic vocalism. *Journal de la Société Finno-Ougrienne* 95. 25–66. <<https://doi.org/10.33340/susa.82642>>
- Aikio, Ante [Luobbal Sámmol Sámmol Ánte]. 2015b. Studies in Uralic etymology IV: Ob-Ugric etymologies. *Linguistica Uralica* 51. 1–20. <<https://doi.org/10.3176/lu.2015.1.01>>
- Aikio, Ante [Luobbal Sámmol Sámmol Ánte]. 2022. Proto-Uralic. In Bakró-Nagy, Marianne & Laakso, Johanna & Skribnik, Elena (eds.), *The Oxford Guide to the Uralic Languages*, 3–27. Oxford University Press.

- Aikio, Ante [Luobbal Sámmol Sámmol Ánte]. In prep. *Uralic Etymological Dictionary* (draft version of entries A-Ć; 1/17/2020). <<https://www.academia.edu/41659514>>
- ALEW = Hock, Wolfgang (ed.). 2019. *Altltauisches etymologisches Wörterbuch*. Version 1.1. Berlin: Humboldt-Universität. <[https://alew.hu-berlin.de/pdf/alew\\_1\\_1.pdf](https://alew.hu-berlin.de/pdf/alew_1_1.pdf)>
- Anderson, Walter. 1938. Zum Lehnwort im Baltendeutsch. *Zeitschrift für Mundartforschung* 14. 146–149.
- Ariste, Paul. 1962. Mõnda substraadist. *Keel ja Kirjandus* 5(1). 13–17. <<http://www.digar.ee/id/nlib-digar:193311>>
- Ariste, Paul. 1971. The earliest substrata in the Baltic-Finnic languages. *Néprajz és Nyelvtudomány* 15. 5–11.
- Ariste, Paul. 1975. Substraatseid kalanimetusi. *Keel ja Kirjandus* 18(8). 467–472. <<http://www.digar.ee/id/nlib-digar:193471>>
- Bartens, Raija. 1999. *Mordvalaiskielten rakenne ja kehitys* (Mémoires de la Société Finno-Ougrienne 232). Helsinki. <<https://www.sgr.fi/en/files/original/2ffela9c6d2ab3d5f64acebc3d3f61cf.pdf>>
- Brückner, Aleksander. 1877. *Litu-slavishe Studien I: Die slavischen Fremdwörter im Litauischen*. Weimar: Böhlau. <<https://www.digitale-samm-lungen.de/en/details/bsb11373881>>
- Būga, Kazimieras. 1908. *Aistiški studijai: Tyrinėjamai lygintijo prūsų, latvijų ir lietuvių kalbōmoksljo srityjē I*. Peterburgas: Imperatoriškosjos Mokslų Akademijos Spaustuve.
- Būga, Kazimieras. 1916. Славяно-балтийские этимологии. *Русский филологический вестник* 75. 141–156. <<https://www.prlib.ru/item/678469>>
- Būga, Kazimieras. 1924. Šis-tas iš lietuvių ir indoeuropiečių senovės. *Tauta ir žodis* 2. 98–110.
- Būga RR = Zinkevičius, Zigmās (ed.). 1958–62. *K. Būga: Rinkiniai raštai* 1–4. Vilnius: Valstybinė politinės ir mokslinės literatūros leidykla.
- Bugge, Sophus. 1888. Etymologische Studien ueber germanische Lautverschiebung III. *Beiträge zur Geschichte der deutschen Sprache und Literatur* 13. 311–339. <<https://archive.org/details/beitrgeszurgesc13halluoft>>
- Carpelan, Christian. 1999. Käännekohtia Suomen esihistoriassa aikavälillä 5100. 1000 eKr. In Fogelberg, Paul (ed.), *Pohjan poluilla: suomalaisten juuret nykytutkimuksen mukaan*, 249–280. Helsinki: Suomen tiedeseura.

- Carpelan, Christian & Parpola, Asko. 2001. Emergence, contacts and dispersal of Proto-Indo-European, Proto-Uralic and Proto-Aryan in archaeological perspective. In Carpelan, Christian & Parpola, Asko & Koskikallio, Petteri (eds.), *Early Contacts between Uralic and Indo-European: Linguistic and Archaeological Considerations: Papers presented at an international symposium held at the Tvärminne Research Station of the University of Helsinki 8–10 January, 1999* (Mémoires de la Société Finno-Ougrienne 242), 55–150. Helsinki. <<https://www.sgr.fi/sust/SUST242.pdf>>
- Cheung, Johnny. 2007. *Etymological Dictionary of the Iranian Verb*. (Leiden Indo-European Etymological Dictionary Series 2). Leiden – Boston: Brill.
- Derksen, Rick. 2015. *Etymological Dictionary of the Baltic Inherited Lexicon*. (Leiden Indo-European Etymological Dictionary Series 13). Leiden – Boston: Brill.
- Endzelin, Jan. 1911. *Славяно-балтийские этюды*. Харьковъ: Зильбербергъ. <<https://escriptorium.karazin.ua/items/74d0170f-0f90-4abb-b9bc-24e3affecc0f>>
- Endzelin, Jan. 1914. Zu den kurischen Bestandteilen des Lettischen. *Indo-germanische Forschungen* 33. 96–104. <<https://archive.org/details/indogermanischef33berluoft/page/96/mode/2up>>
- EWAhd = Lloyd, Albert Larry, Springer, Otto & Lühr, Rosemarie (eds.). 1988–. *Etymologisches Wörterbuch des Althochdeutschen* 1–7. Göttingen – Zürich: Vandenhoeck & Ruprecht. <<https://ewa.saw-leipzig.de/de>>
- Falk, Hjalmar & Torp, Alf. 1910–11. *Norwegisch-dänisches etymologisches wörterbuch*. Heidelberg: Winter. <<https://archive.org/details/norwegischdnis01falkuoft>>
- Gorbachov, Slava [Yaroslav]. 2006. “North Indo-European” tuh<sub>x</sub>sŋtih<sub>z</sub> ‘1000’. A new proposal. [Conference handout.] *AATSEEL Annual Meeting, Philadelphia, 29 December 2006*.
- Grünthal, Riho & Heyd, Volker & Holopainen, Sampsa & Janhunen, Juha & Khanina, Olesya & Miestamo, Matti & Nichols, Johanna & Saarikivi, Janne & Sinnemäki, Kaius. 2022. Drastic demographic events triggered the Uralic spread. *Diachronica* 39(4). 490–524. <<https://doi.org/10.1075/dia.20038.gru>>
- Häkkinen, Jaakko. 2009. Kantauralin ajoitus ja paikannus: perustelut puntarissa. *Journal de la Société Finno-Ougrienne* 92. 9–56. <<https://doi.org/10.33340/susa.82020>>
- Häkkinen, Kaisa. 2004. *Nykysuomen etymologinen sanakirja*. Juva: WSOY.

- Heikkilä, Mikko. 2013. Itämerensuomen ehdollisesta äännevuoksesta /ai/ > /ei/. *Virittäjä* 117. 583–592. <<https://journal.fi/virittaja/article/view/8623>>
- Hirt, Hermann. 1896. Akzentstudien I: Germ. got. *Būsundi*. *Indogermanische Forschungen* 6. 344–349. <<https://archive.org/details/indogermanischef06berluoft/page/344/mode/2up>>
- Holopainen, Sampsa & Kuokkala, Juha & Junttila, Santeri. 2017. Indo-európai jövevényiszavak és a második szótagi labiális magánhangzók fejlődése az uráli nyelvekben. *A nyelvtörténeti kutatások újabb eredményei* 9. 109–136. <[https://acta.bibl.u-szeged.hu/54577/1/nyelvtort\\_009\\_109-136.pdf](https://acta.bibl.u-szeged.hu/54577/1/nyelvtort_009_109-136.pdf)>
- Holopainen, Sampsa & Junttila, Santeri. 2022. *Die alten arischen und baltischen Lehnverben der uralischen Sprachen*. (Münchener Studien zur Sprachwissenschaft, Beiheft 33). Dettelbach: Röhl.
- Itkonen, Erkki. 1946. Zur Frage nach der Entwicklung des Vokalismus der ersten Silbe in den finnisch-ugrischen Sprachen, insbesondere im Mordwinischen. *Finnisch-Ugrische Forschungen* 29. 232–337. <<http://urn.fi/URN:NBN:fi-fe2016112829992>>
- Itkonen, Toivo Immanuel. 1958. *Koltan- ja kuolanlapin sanakirja: Wörterbuch des Kolta- und Kolalappischen I–II* (Lexica Societatis Fenno-Ugricae XV). Helsinki: Suomalais-Ugrilainen Seura. <<https://www.sgr.fi/fi/items/show/428>>
- Iversen, Rune & Kroonen, Guus. 2017. Talking Neolithic: Linguistic and Archaeological Perspectives on How Indo-European Was Implemented in Southern Scandinavia *American Journal of Archaeology* 121. 511–525. <<https://scholarlypublications.universiteitleiden.nl/handle/1887/72458>>
- Jakob, Anthony. 2024. *A History of East Baltic through Language Contact*. Leiden – Boston: Brill. <<https://hdl.handle.net/1887/3630131>>
- Jakob, Anthony. Forthc. Symmetry in vowel substitutions: The case of Baltic and Finnic. To appear in Holopainen, Sampsa & Pystynen, Juho (eds.), *Areal effects in prehistoric contacts between Uralic and Indo-European* [provisional title]. Helsinki.
- Junttila, Santeri. 2012. The prehistoric context of the oldest contacts between Baltic and Finnic languages. In Grünthal, Riho & Kallio Petri (eds.), *A Linguistic Map of Prehistoric Northern Europe* (Mémoires de la Société Fenno-Ougrienne 266), 261–296. Helsinki. <[https://www.sgr.fi/sust/sust266/sust266\\_junttila.pdf](https://www.sgr.fi/sust/sust266/sust266_junttila.pdf)>

- Junttila, Santeri. 2015. Proto-Finnic loanwords in the Baltic languages? An old hypothesis revisited. In Junttila, Santeri (ed.), *Contacts between the Baltic and Finnic languages* (Uralica Helsingiensia 7), 12–38. Suomalais-Ugrilainen Seura. <<https://journal.fi/uralicahelsingiensia/issue/view/uh7>>
- Kalima, Jalo. 1919. *Die ostseefinnischen Lehnwörter im Russischen* (Mémoires de la Société Fenno-Ougrienne 44). Helsinki. <<http://urn.fi/URN:NBN:fi-fe2016083123369>>
- Kalima, Jalo. 1936. *Itämerensuomalaisten kielten balttilaiset lainasanat* (Suomalaisen Kirjallisuuden Seuran toimituksia XV). Helsinki.
- Kallio, Petri. 1997. Uralic substrate features in Germanic? *Journal de la Société Finno-Ougrienne* 87. 123–130. <<https://www.academia.edu/1103440>>
- Kallio, Petri. 2006. Suomen kantakielten absoluuttista kronologiaa. *Virittäjä* 110. 2–25. <<https://journal.fi/virittaja/article/view/40454>>
- Kallio, Petri. 2008a. On the “early Baltic” loanwords in common Finnic. In Lubotsky, Alexander & Schaeken, Jos & Wiedenhof, Jeroen (eds.), *Evidence and Counter-Evidence: Essays in Honour of Frederik Kortlandt I: Balto-Slavic and Indo-European Linguistics*, 265–277. Amsterdam – New York: Brill. <<https://www.academia.edu/1103450>>
- Kallio, Petri. 2008b. The etymology of Finnish *sauna* ‘sauna’. In Dekker, Kees & MacDonald, Alasdair & Niebaum, Hermann (eds.), *Northern Voices: Essays on Old Germanic and Related Topics Offered to Professor Tette Hofstra*, 314–319. Leuven – Paris – Dudley: Peeters. <<https://www.academia.edu/1103454>>
- Kallio, Petri. 2016. Historical phonology from Proto-Finnic to Proto-Livonian. *Journal of Estonian and Finno-Ugric Linguistics* 7/1. 39–65. <<https://doi.org/10.12697/jeful.2016.7.1.02>>
- Kallio, Petri. Forthc. [2014]. Substrates in Finnic. To appear in Aikio, Ante & Palviainen, Santeri (eds.), *Substrate Languages in Northern Europe*. De Gruyter Mouton.
- Kendla, Mari & Viikberg, Jüri. 2015. Protoeurooplaste keelepärändist. *Emakeele Seltsi aastaraamat* 61. 135–154. <[https://kirj.ee/public/ESA/2015/esa\\_61\\_2015\\_135\\_154.pdf](https://kirj.ee/public/ESA/2015/esa_61_2015_135_154.pdf)>
- Keresztes, László. 1986. *Geschichte des modwinischen Konsonantismus II: Etymologisches Belegmaterial* (Studia Uralo-Altaica 26). Szeged. <[https://acta.bibl.u-szeged.hu/38742/1/altaica\\_026.pdf](https://acta.bibl.u-szeged.hu/38742/1/altaica_026.pdf)>
- KEWA = Mayrhofer, Manfred. 1956–80. *Kurzgefaßtes etymologisches Wörterbuch des Altindischen* 1–4. Heidelberg: Winter. <<https://archive.org/details/KurzgefasstesEtymologischesMayrhoferManfred>>



- Kiparsky, Valentin. 1936. *Fremdes im Baltendeutsch*. Helsinki: Société Néophilologique.
- Koivulehto, Jorma. 1981. Reflexe des germ. /ē/ im Finnischen und die Datierung der germanisch-finnischen Lehnbeziehungen. *Beiträge zur Geschichte der deutschen Sprache und Literatur* 103. 167–203.
- Koivulehto, Jorma. 1983. Seit wann leben die Urfinnen im Ostseeraum? Zur relativen und absoluten Chronologie der alten idg. Lehnwortschichten im Ostseefinnischen. In Janhunen, Juha & Peräniitty, Anneli & Suhonen, Seppo (eds.), *Symposium Saeculare Societatis Fenno-Ugricae* (Mémoires de la Société Finno-Ougrienne 85), 135–157. Helsinki.
- Koivulehto, Jorma. 1984. Itämerensuomalais-germaaniset kosketukset. In Åström, Sven-Erik (ed.), *Suomen väestön esihistorialliset juuret*, 191–204. Helsinki: Societas Scientiarum Fennica.
- Koivulehto, Jorma. 1990. Zu den ältesten Kontakten zwischen Ostseefinnisch und Balto-Slavisch. In Vaula, Sari (ed.), *Itämerensuomalaiset kielikontaktit* (Kotimaisten kielten tutkimuskeskuksen julkaisu 61), 148–153. Helsinki: Valtion painatuskeskus.
- Koivulehto, Jorma. 2000. Reflexe des urbaltischen \*ā in baltischen Lehnwörtern des Ostseefinnischen. *Linguistica Baltica* 8. 103–124.
- Koivulehto, Jorma. 2001. Pärekö pärahtämistä, turvako turisemistä? *Tieteessä tapahtuu* 19:5. 48–51. <<https://journal.fi/tt/article/view/58064>>
- Kroonen, Guus. 2012. Non-Indo-European root nouns in Germanic: Evidence in support of the Agricultural Substrate Hypothesis. In Grünthal, Riho & Kallio Petri (eds.), *A Linguistic Map of Prehistoric Northern Europe* (Mémoires de la Société Finno-Ougrienne 266), 239–260. Helsinki. <[https://www.sgr.fi/sust/sust266/sust266\\_kroonen.pdf](https://www.sgr.fi/sust/sust266/sust266_kroonen.pdf)>
- Kroonen, Guus. 2013. *Etymological Dictionary of Proto-Germanic* (Leiden Indo-European Etymological Dictionary Series 11), Leiden – Boston: Brill.
- Kroonen, Guus. 2017. The development of the Proto-Indo-European instrumental suffix in Germanic. *Indogermanische Forschungen* 122. 105–110. <<https://www.academia.edu/35086093>>
- LägLoS = Kylstra, Andries Dirk & Hahmo, Sirkka-Liisa & Hofstra, Tette & Nikkilä, Osmo. 1991–2012. *Lexikon der älteren germanischen Lehnwörter in den Ostseefinnischen Sprachen I–III*. Amsterdam: Rodopi.

- Lang, Valter. 2015. Formation of Proto-Finnic: an archaeological scenario from the Bronze Age / Early Iron Age. In Mantila, Harri & Leinonen, Kaisa & Brunni, Sisko & Palviainen, Santeri & Sivonen, Jari (eds.), *Congressus Duodecimus Internationalis Fenno-Ugristarum: Plenary Papers*, 63–84. <<https://www.yumpu.com/en/document/read/54899612/congressus-duodecimus-internationalis-fenno-ugristarum-oulu-2015>>
- Lang, Valter. 2020. *Homo Fennicus: Itämerensuomalaisten etnohistoria*. Helsinki: Suomalaisen Kirjallisuuden Seura.
- Laumane, Benita. 1973. *Zivju nosaukumi latviešu valodā*. Rīga: Zinātne.
- Lehtinen, Meri. 1967. On the Origin of the Balto-Finnic Long Vowels. *Ural-Altäische Jahrbücher* 39. 147–152.
- Leumann, Manu. 1942. Idg. *sk̑* im Altindischen und im Litauischen (Schluß). *Indogermanische Forschungen* 58. 113–130.
- LEW = Fraenkel, Ernst. 1955–65. *Litauisches etymologisches Wörterbuch* 1–2. Heidelberg – Göttingen: Winter – Vandenhoeck & Ruprecht. <<https://archive.org/details/fraenkel-litauisches-etymologisches-woerterbuch-bd.-1-2-1962-1965>>
- Linde, Paul van. 2007. *The Finnic vocabulary against the background of interference*. Doctoral dissertation: University of Groningen.
- Liukkonen, Kari. 1999. *Baltisches im Finnischen*. (Mémoires de la Société Finno-Ougrienne 235). Helsinki.
- LIV = Rix, Helmut (ed.). 2001. *Lexikon der indogermanischen Verben: Die Wurzeln und ihre Primärstambildungen*. Bearbeitet von Martin Kümmel, Thomas Zehnder, Reiner Lipp und Brigitte Schirmer. Zweite, erweiterte und verbesserte Auflage, bearbeitet von Martin Kümmel und Helmut Rix. Wiesbaden: Reichert. <[https://www.researchgate.net/profile/Reiner-Lipp/publication/281727453\\_LIV\\_Lexikon\\_der\\_indogermanischen\\_Verben/links/5654bbbc08aefe619b1alc8f/LIV-Lexikon-der-indogermanischen-Verben.pdf](https://www.researchgate.net/profile/Reiner-Lipp/publication/281727453_LIV_Lexikon_der_indogermanischen_Verben/links/5654bbbc08aefe619b1alc8f/LIV-Lexikon-der-indogermanischen-Verben.pdf)>
- LKA = Grinaveckienė, Elena & Morkūnas, Kazys (main eds.). 1977–91. *Lietuvių kalbos atlasas* 1–3. Vilnius: Mokslas. <<https://archive.org/details/lietuviu-kalbos-atlasas-i.-leksika-1977>>
- Lühr, Rosemarie. 1993. Zur Semantifizierung von Zahlwörtern: Das Wort ‚Tausend‘ – eine germanisch-baltoslavische Isoglosse? *Linguistica* 33. 117–136. <[https://www.researchgate.net/publication/307718845\\_Zur\\_Semantifizierung\\_von\\_Zahlwortern\\_das\\_Wort\\_`tausend`\\_-\\_eine\\_germanisch-baltoslavische\\_Isoglosse](https://www.researchgate.net/publication/307718845_Zur_Semantifizierung_von_Zahlwortern_das_Wort_`tausend`_-_eine_germanisch-baltoslavische_Isoglosse)>
- Mägiste, Julius. 1959. Gibt es im Tscheremissischen baltische Lehnwörter? *Ural-Altäische Jahrbücher* 31. 169–176.

- MdWb = Heikkilä, Kaino (ed.). 1990–96. *H. Paasonens Mordvinisches Wörterbuch 1–6* (Lexica Societatis Fenno-Ugricae XXIII). Helsinki: Finnisch-Ugrische Gesellschaft. <<https://www.mv.helsinki.fi/home/rueter/PaasonenMW.shtml>>
- ME = Endzelīns, Jānis (ed.). 1923–32. *K. Mühlenbachs Lettisch-deutsches Wörterbuch I–IV*. Rīga: Latvju grāmata.
- Mikkola, Jooseppi Julius. 1903. Baltisches und Slavisches. *Öfversigt af Finska Vetenskaps-Societetens Förhandlingar* 45:4. 2–47. <<https://www.biodiversitylibrary.org/item/52618#page/41/mode/1up>>
- Miklosich, Franz von. 1886. *Etymologisches Wörterbuch der Slavischen Sprachen*. Amsterdam: Philo. <<https://www.digitale-sammlungen.de/de/view/bsb00114234>>
- Moór, Elemér. 1958. Die Ausbildung des ungarischen Volkes im Lichte der Laut- und Wortgeschichte (III). *Acta Linguistica Academiae Scientiarum Hungaricae* 7. 341–377.
- Nieminen, Eino. 1934. Der stammauslaut der ins urfennische entlehnten baltischen ā-feminina und die herkunftsfrage. *Finnisch-Ugrische Forschungen* 22. 5–66. <<http://urn.fi/URN:NBN:fi-fe2016112529974>>
- Nieminen, Eino. 1957. Über einige Eigenschaften der baltischen Sprache, die sich in den ältesten baltischen Lehnwörtern der ostseefinnischen Sprachen abspiegelt. *Sitzungsberichte der Finnischen Akademie der Wissenschaften* 1956. 185–206.
- Noreen, Adolf. 1894. Etymologisches. *Indogermanische Forschungen* 4. 320–326. <<https://archive.org/details/indogermanischef04berluoft/page/320/mode/2up>>
- Noreen, Adolf. 1923. *Altnordische Grammatik I: Altisländische und altnorwegische Grammatik*. [4. Auflage]. Halle: Niemeyer. <<https://digital-humanities.uni-tuebingen.de/altn-gram/noreen1923.html>>
- Nuutinen, Olli. 1987. Kalannimi *seipi*. In Koski, Mauno & Lähdemäki, Eeva & Häkkinen, Kaisa (eds.), *Fennistica festiva in honorem Göran Karlsson septuagernarii* (Fennistica 9), 107–115. Åbo Akademis förlag.
- Osthoff, Hermann. 1910. Etymologisches zur Steigerungsformenbildung. In Osthoff, Hermann & Brugmann, Karl *Morphologische Untersuchungen auf dem Gebiete der indogermanischen Sprachen* 6, 303–350. Hirtel.
- Paasonen, Heikki. 1896. Kielellisiä lisiä suomalaisten sivistyshistoriaan. *Suomi* 3:13.
- Paasonen, Heikki. 1903. *Mordvinische Lautlehre* (Mémoires de la Société Fenno-Ougrienne 22). Helsinki. <<https://doi.org/10.33341/sus.811>>

- Pajusalu, Karl & Krikmann, Arvo & Winkler, Eberhard. 2009. Lexical relations between Salaca Livonian and Estonian dialects. *Linguistica Uralica* 45. 283–298. <<https://doi.org/10.3176/lu.2009.4.04>>
- Pijnenburg, Wilhelmus Johannes Juliana. 1989. Eine germanisch-baltoslawische Isoglosse. *Historische Sprachforschung* 102. 99–106.
- Plöger, Angela. 1982. Über die Entstehung des finnischen Stammtyps *CṼ C(Ca/ä)*. *Finnisch-Ugrische Forschungen* 44. 66–98.
- PKEŽ = Mažiulis, Vytautas. 1988–97. *Prūsų kalbos etimologijos žodynas* 1–4. Vilnius: Mokslas. <<http://www.prusistika.flf.vu.lt/paieska>>
- Polomé, Edgar. 1989. Substrate Lexicon in Germanic. *North-Western European Language Evolution* 14. 53–73.
- Posti, Lauri. 1953. From Pre-Finnic to Late Proto-Finnic. *Finnisch-Ugrische Forschungen* 31. 1–91. <<https://doi.org/10.33339/fuf.114294>>
- Posti, Lauri. 1962. Silakka sanan alkuperästä. *Virittäjä* 66. 282–287. <<https://journal.fi/virittaja/article/view/34470>>
- Pronk, Tijmen. 2022. Balto-Slavic. In Olander, Thomas (ed.), *The Indo-European Language Family: A Phylogenetic Perspective*, 269–292. Cambridge University Press. <<https://doi.org/10.1017/9781108758666.015>>
- Pystynen, Juho. 2018. *Itämerensuomen pitkien vokaalien alkuperä*. Pro gradu: Helsingin yliopisto. <<http://hdl.handle.net/10138/236213>>
- Pystynen, Juho. 2020. *Secondary apocope in Mordvinic*. [Blog post.] <<https://protouralic.wordpress.com/2020/02/14/secondary-apocope-in-mordvinic/>>
- REW = Vasmer, Max. 1953–58. *Russisches etymologisches Wörterbuch* I–III. Heidelberg: Winter.
- Saarikivi, Janne. 2004. Is there Palaeo-European substratum interference in western branches of Uralic?. *Journal de la Société Finno-Ougrienne* 90. 187–214.
- Saarikivi, Janne. 2020. Kyllä kiitos: Muutaman yleisen sanan etymologiasta (*kyllä, kiittää, kirja, vero* ynnä muuta pientä). In Holopainen, Sampsa & Kuokkala, Juha & Saarikivi, Janne (eds.), *Ёмас сымьш нэ́кве вóртур э́тност самы́н натум: Scripta miscellanea in honorem Ulla-Maija Forsberg* (Mémoires de la Société Fenno-Ougrienne 275), 272–283. Helsinki. <<https://doi.org/10.33341/sus.11.11>>
- Saarikivi, Janne. 2022. The divergence of Proto-Uralic and its offspring: A descendant reconstruction. In Bakró-Nagy, Marianne & Laakso, Johanna & Skribnik, Elena (eds.), *The Oxford Guide to the Uralic Languages*, 28–58. Oxford University Press.

- Salmons, Joseph. 1992. Northwest Indo-European Vocabulary and Substrate Phonology. In *Perspectives on Indo-European Language, Culture and Religion: studies in honor of Edgar C. Polomé II* (Journal of Indo-European Studies Monograph Series 7), 265–279. McLean: Institute for the Study of Man.
- Sausverde, Erika. 1996. *Seewörter* and Substratum in Germanic: Baltic and Baltic Finno-Ugric Languages. In Jones-Bley, Karlene & Huld, Martin E. (eds.), *The Indo-Europeanization of Northern Europe*, 133–147. Washington DC: Institute for the Study of Man.
- Schmidt, Peter [Šmits, Pēteris]. 1930. Sprachliche Zeugnisse über die Urheimat der Balten und ihre Kultur. In Adamovičs, Fritzis (ed.), *Die Letten*, 71–88. Riga: Walters & Rapa.
- Schrijver, Peter. 1997. Animal, vegetable and mineral: Some Western European substratum words. In Lubotsky, Alexander (ed.), *Sound Law and Analogy – Papers in Honor of Robert S. P. Beekes on the Occasion of his 60th Birthday*, 293–316. Amsterdam – Atlanta: Rodopi. <<https://www.academia.edu/34818486>>
- Skardžius, Pranas. 1941. *Lietuvių kalbos žodžių daryba*. Vilnius: Lietuvos mokslų akademija. <<https://archive.org/details/skardzius-lietuviu-kalbos-zodziu-daryba-1941>>
- SKES = Toivonen, Yrjö Henrik & Itkonen, Erkki & Joki, Aulis Johannes & Peltola, Reino. 1955–81. *Suomen kielen etymologinen sanakirja* 1–7 (Lexica Societatis Fenno-Ugricae XII). Helsinki: Suomalais-Ugrilainen Seura.
- Sluis, Paulus van. Forthc. *Substrate alternations in Celtic*.
- Smith, Emil. 1910. Om opindelsen til fiskenavene *sild* og *sil*. *Maal og minne* 1910. 139–142. <<https://archive.org/details/maalogminne1910olse/page/n149/mode/2up>>
- Smoczyński, Wojciech. 2016. *Lithuanian Etymological Dictionary* 1–5. Berlin: Lang.
- Solmsen, Felix. 1904. Slavische etymologien. *Zeitschrift für vergleichende Sprachforschung auf dem Gebiete der Indogermanischen Sprachen* 37. 575–601.
- Sommer, Ferdinand. 1914. *Die indogermanischen iā- und io-Stämme im Baltischen*. Leipzig: Teubner. <<https://archive.org/details/dieindogermanisc00somm>>
- Soosaar, Sven-Erik. 2020. Võimalikke protoeuroopa substraadi jälgi eesti keele dendronüümid. *Emakeele Seltsi aastaraamat* 66. 295–309. <<http://dx.doi.org/10.3176/esa66.12>>

- Šorgo, Aljoša. 2020. Characteristics of lexemes of a substratum origin in Proto-Germanic. In Garnier, Romain (ed.), *Loanwords and substrata* [Conference proceedings], 427–472. <<https://www.academia.edu/86215929>>
- Specht, Franz. 1947. *Der Ursprung der indogermanischen Deklination*. Göttingen: Vandenhoeck & Ruprecht.
- SSA = Itkonen, Erkki & Kulonen, Ulla-Maija, et al (eds.). 1992–2000. *Suomen sanojen alkuperä: Etymologinen sanakirja I–III*. Helsinki: Kotimaisten kielten tutkimuskeskus – Suomalaisen Kirjallisuuden Seura. <<https://kaino.kotus.fi/ses>>
- Stang, Christian Schweigaard. 1966. *Vergleichende Grammatik der baltischen Sprachen*. Oslo: Universitetsforlaget.
- Stang, Christian Schweigaard. 1972. *Lexikalische Sonderübereinstimmungen zwischen dem Slavischen, Baltischen und Germanischen*. Oslo: Universitetsforlaget.
- Stifter, David. 2023. With the Back to the Ocean: The Celtic Maritime Vocabulary. In Kristiansen, Kristian & Kroonen, Guus & Willerslev, Eske (eds.), *The Indo-European Puzzle Revisited*, 172–192. Cambridge University Press. <<https://www.academia.edu/101047265>>
- Thomsen, Vilhelm. 1890. *Berøringer mellem de finske og de baltiske (litauisk-lettiske) Sprog: En sproghistorisk Undersøgelse*. København: Blanco Lunos. <<http://hdl.handle.net/10062/38769>>
- Thörnqvist, Clara. 1948. *Studien über die nordischen Lehnwörter im Russischen*. Uppsala – Stockholm: Almqvist & Wiksell.
- Trautmann, Reinhold. 1910. *Die altpreussischen Sprachdenkmäler*. Göttingen: Vandenhoeck & Ruprecht. <<https://archive.org/details/diealtpreussisch00trau>>
- Trautmann, Reinhold. 1923. *Baltisch-Slavisches Wörterbuch*. Göttingen: Vandenhoeck & Ruprecht. <[https://digi20.digitale-sammlungen.de/de/fs1/object/display/bsb00107751\\_00001.html](https://digi20.digitale-sammlungen.de/de/fs1/object/display/bsb00107751_00001.html)>
- UEW = Rédei, Károly. 1986–92. *Uralisches etymologisches Wörterbuch* 1–3. Wiesbaden: Harrassowitz. <<http://uraloteka.nytud.hu/>>
- Vaba, Lembit. 1992a. Eesti kalatökkenimetus *näri* ja balti \**ē* läänemeresoome substituutidest. *Keel ja Kirjandus* 35(12). 726–727. <<http://www.digar.ee/id/nlib-digar:194947>>
- Vaba, Lembit. 1992b. [Review of]: Kylstra, A. D. & Hahmo, Sirkka-Liisa & Hofstra, Tette & Nikkilä, Osmo: *Lexikon der älteren germanischen Lehnwörter in den ostseefinnischen Sprachen I. Linguistica Uralica* 28. 219–223. <<https://doi.org/10.3176/lu.1992.3.10>>

- Vaba, Lembit. 2011. Balti laenude uurimine avab meie kauget minevikku. *Keel ja Kirjandus* 54(10). 734–763. <<https://keeljakirjandus.ee/archive/734-763.pdf>>
- Viitso, Tiit-Rein. 1992. Finnic and its prehistoric Indo-European neighbors. In Honti, László & Hahmo, Sirkka-Liisa & Hofstra, Tette & Jastrzębska, Jolanta & Nikkilä, Osmo (eds.), *Finnisch-ugrische Sprachen zwischen dem germanischen und dem slavischen Sprachraum*, 185–196. Amsterdam – Atlanta: Rodopi.
- VKS = Grünberg, Silja (ed.). 2019. *Vadja keele sõnaraamat: Vaðdaa tšeelee sõna-tširja: Словарь водского языка*. 2. täiendatud ja parandatud trükk. Tallinn: Eesti Keele Instituut – Eesti Keele Sihtasutus. <[www.eki.ee/dict/vadja](http://www.eki.ee/dict/vadja)>
- Vries, Jan de. 1977. *Altnordisches etymologisches Wörterbuch*. Zweite verbesserte Auflage. Leiden: Brill. <<https://archive.org/details/nordischesetymologischeswörterbuch/page/n3/mode/2up>>
- Wiik, Kalevi. 1992. Suomen kielen ja murteiden syntykysymyksiä. In Remes, Hannu (ed.), *Lähivertailuja* 6, 85–110. Joensuu yliopisto.
- Wiklund, Karl Bernhard. 1896. *Entwurf einer urlappischen Lautlehre I: Einleitung, Quantitätsgesetze, Accent, Geschichte der hauptbetonten Vokale*. Helsinki: Suomalais-Ugrilainen Seura. <<http://urn.fi/URN:NBN:fi-fe2016083123319>>
- Герд, Александр. 1970. Из истории прибалтийско-финских названий рыб (sintti, tintti, tint). *Советское финно-угроведение* 6(2). 87–91.
- Герд, Александр. 1980. Лексические заимствования или слова-автохтоны. In *IV Всесоюзная конференция балтистов: Тезисы докладов*, 125. Рига.
- Герд, Александр. 1981. Из истории прибалтийско-финских названий рыб (siika, siiga; muhju). In Керт, Георгий М & Зайцева, Мария И (eds.), *Прибалтийско-финское языкознание: Вопросы лексикологии и лексикографии* 6, 50–54. Ленинград: Наука.
- Живлов, Михаил. 2015. Неиндоевропейский субстрат в финно-волжских языках [Conference handout]. *X Чтения памяти С. А. Старостина* 27. 3. 2015. <<https://starlingdb.org/confer/Zhivlov-2015.pdf>>
- Кузьменко, Юрий. 2013. К вопросу о неиндоевропейских субстратах в германском. *Индоевропейское языкознание и классическая филология* 17. 511–535. <<https://cyberleninka.ru/article/n/k-voprosu-o-neindoevropeyskih-substratah-v-germanskom/viewer>>
- Лаумане, Бенита & Непокупный, Анатолий Павлович. 1968. К постановке вопроса об атласе морской и рыболовецкой лексики балтийского моря. *Baltistica* 4(1). 69–78. <<http://dx.doi.org/10.15388/baltistica.4.1.1677>>

- Напольских, Владимир. 1990. Палеоевропейский субстрат в составе западных финно-угров. In Иванов, Вячеслав & Судник, Т. & Хелимский, Евгений (eds.), *Uralo-Indogermanica: Балто-славянские языки и проблема урало-индоевропейских связей: Материалы 3-ей балто-славянской конференции, 18-22 июня 1990 г.* II, 128–134. Москва: Академия Наук СССР. <<https://inslav.ru/publication/uralo-indogermanica-chast-ii-m-1990>>
- Напольских, Владимир. 1997. Происхождение субстратных палеоевропейских компонентов в составе западных финно-угров. *Балто-славянские исследования* 1988–96. 198–208. <[https://inslav.ru/images/stories/books/BSII1988-1996\(1997\).pdf](https://inslav.ru/images/stories/books/BSII1988-1996(1997).pdf)>
- Преображенский, Александръ. 1910–16. *Этимологический словарь русского языка* I–II. Москва: Лиснер & Совко. <[https://archive.org/details/i-..\\_20210824](https://archive.org/details/i-.._20210824)>
- РЭС = Аникин, Александр. 2007–. *Русский этимологический словарь* 1–15. Москва. <<https://etymolog.ruslang.ru/index.php?act=anikin>>
- Хелимский, Евгений. 1982. *Древнейшие венгерско-самодийские языковые параллели*. Москва: Наука. <[https://inslav.ru/images/stories/pdf/1982\\_Xelimskij.pdf](https://inslav.ru/images/stories/pdf/1982_Xelimskij.pdf)>
- Хелимский, Евгений. 2001. Уральцы и их предшественники: Белые пятна на этноисторической карте Северной Евразии и уральские языки. In Seilenthal, Tõnu & Nurk, Anu & Palo, Triinu *Congressus Nonus Internationalis Fenno-Ugristarum* IV. *Dissertationes sectionum. Linguistica* I, 332–336. Tartu.