Unde venisti? The Prehistory of Italic through its Loanword Lexicon

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3 Feature Analysis

3.1 Introduction to the Feature Analysis

As detailed in §1.4, it is the irregular alternations between comparanda that allow us to classify lexemes as originating from a source other than PIE. Karl Oštir was one of the first to list, in dense and copious detail, comparanda by irregular correspondence in order to give the evidence for a widespread Alarodian group of languages. In *Drei vorslavisch-etruskische Vogelnamen* (1930) for instance, he collected and classified alternations that he thought betrayed a *Alteuropäisch-Altkleinasiatisch* layer. These included (with his symbol ∞) voiced ∞ unvoiced, simplex ∞ geminate, metathesis, unaspirated ∞ aspirated, *l*/*r* ∞ dental or sibilant, *l*/*r* ∞ *n*, *l*/*r* ∞ *j*, dental ∞ sibilant, velar ∞ sibilant, labial ∞ nasal, as well as vocalic alternation, loss of plosives, liquids, sibilants, nasals, and the semi-vowels etc. His style was too dense (Meillet 1922b) and his analysis was critically lacking in rigor (Schuchardt 1922: 80). Nevertheless, many of the categories that he identified occur in the data presented here. They are not, however, indicative of origin in a single, common substrate.

A similar endeavor was made by the Pelasgianists and others looking for an Indo-European substrate amongst the Indo-European languages. Starting approximately with Georgiev, the Pelasgianists had identified alternations in aspiration (*mediae aspiratae ~ mediae, tenues ~ tenues aspiratae*) and voicedness (*mediae ~ tenues*) as well as labial quality (PIE *$*k^w$, g^w, g^{wh} > Pelasgian k^h, *k*, *g*) and some vocalic alternation (*a ~ o*). Their explanation was that the irregularities are actual regular, borrowed from an IE language in which these are the regular reflexes of PIE material. Holzer's *Tememathic* and Ribezzo and Szemerényi's Ausonian via the same explanation found different alternations in aspiration (*mediae apsiratae ~ tenues*), while the former found also voicing (*mediae ~ tenues*) alternations. Georgiev (1941: 111-44) identified some "angeblich unindogermanische Präfixe und Suffixe" including *a-*, *le-*, *-ss-*, *-nth-*, and *-l-*, which he explains as Pelasgian. Van Windekens (1952: 34-57) found for Pelasgian suffixes deriving from PIE *-*t*-, *-k^w-, *-*g*-, *-*p*-, *-*l*-, *-*n*-, *-*n-t*-, *-*mn*-, *-nd^h-, *-*rn*-, *-*s*-, *-*ṭ*-, etc. Of course, a major catalyst of the movement to study the substrates, IE or not, underlying the Indo-European languages, had been Kretschmer's (1896: 401-9) treatment of the Gk. -νθος suffix.

The Italian scholars including Bertoldi, Battisti, and Alessio also found recurring irregular alternations amongst the words they assigned to the Mediterranean substrate. In Battisti's (1959: 385) index for example, he lists *a*/*e*, *b*/*p*, *d*/*l*, *d*/*t*, *e*/*i*, *f*/*v*, *i*/*u*, *k*/*g*, *l*/*ll*, *p*/*f*, and *r*/*rr*. They too purported to locate morphological features, mainly in the form of suffixes that they ascribed to different strata and locations, often based on the evidence of placenames. As examples, Alessio (1939, 1944a: 103) interprets the *-asco* suffix as evidence of a Ligurian origin. Bertoldi (1942: 196), Alessio (1944a: 102), and Battisti (1959: 196) gave evidence of a Mediterranean *-st-* suffix.

Furnée (1972) had gone through the literature on Pre-Greek and was dissatisfied with the previous scholars having assigned material to the substrate without detailing the phonological aspects. He listed the alternations he found, but interestingly proposed that they were already present in Pre-Greek, created as expressive formations. This led Beekes in several publications (esp. his 2014 *Pre-Greek: Phonology, Morphology, Lexicon*) to detail the phonological alternations and pieces of morphology that he considered indicative of Pre-Greek origin.

Several scholars between and after those mentioned have also sought to study the substratal lexicon of the Indo-European languages in a similar way: through listing the phonological alternations and non-inherited morphology. In this chapter, I will do the same for the dataset comprised of lexemes in §2.2 (*Non-inherited Origin in Latin Accepted*). What follows is an analysis of all of the irregular phonological alternations between Latin words and their comparanda that I have been able to identify. Following that is a discussion of some of the morphological features of these words that I consider diagnostic. The list is not exhaustive. Instead, the consideration of the morphology is secondary, a result of identifying words of non-IE origin by means of their irregular phonological correspondences. Suffixes and morphological phenomena that recur in relation to lexemes that can be identified as loans for other reasons may then themselves originate in the substrate languages; especially those that themselves attest to irregular phonological alternations.

In the tables, the Latin lexemes and their comparanda are sorted by which reflex of a *quasi-* (= "as if") PIE phoneme they attest to (with non-IE languages in parentheses). When it cannot be determined due to sound laws which reflex is present, the word is listed in both places but inside of square brackets. The cells highlighted in gray show which reflex is attested in Latin. (Lighter gray marks the cases where Latin could reconstruct to either of two categories due to its medial treatment of the voiced aspirates). QPIE reconstructions follow those given in §0, and less certain comparanda (those marked with ? and ??) are left out.

3.2 Phonological Alternations

3.2.1 Consonants

3.2.1.1 Alternations between PIE Rows

Proto-Indo-European is reconstructed as having three "rows" of plosives: the labials, dentals, and velars. Within each was a further phonological interplay between two features, reconstructed as either voicing and aspiration (traditionally) or glottalization and fortition/lenition (in the glottalic theory). The velars could show a further distinction between palatalization and labialization. The combinations of features produced a series of phonemes whose reflexes in the daughter languages are well understood. Several of the irregular consonant alternations that allow the identification of lexical material as

non-native in origin exist within these rows.

3.2.1.1.1 Non-Velars

In the labials and dentals, voicing and aspiration produces the traditional *mediae aspriatae* (*b^h and *d^h), *mediae* (**b* and **d*), and *tenues* (**p* and **t*). In the glottalic theory, the contrasts are instead between fortition/lenition and glottalization (various presentations in Hopper 1973, Gamkrelidze & Ivanov 1973, Salmons 1993, Beekes 2011: 128-9, etc.). One need not decide in favor of one or the other, but the choice has implications for the sort of substrate phonemes or dialectal variation underlying the different reflexes in the IE daughter languages. Conclusions will be different depending on whether one understands the alternation to be between *b^h and **p* or between **p:* and **p*. This caveat is of course relevant for all the upcoming categories.

From a quasi-PIE perspective, there are for the non-velars only four possible combinations of irregular correspondence. Besides a alternation between all three types, the remaining three combinations have all been noticed; each has been explained in the context of the sound laws of a lost Indo-European language: $D^h \sim D$ (cf. Pelasgian), $D^h \sim T$ (cf. Tememtic, Ausonian), $D \sim T$ (cf. Pelasgian, Tememtic). As will be seen, there is at least one Latin lexeme which, in comparison with its comparanda, fits into each of these alternations. The significance of this, and how it bodes for the stratificational power of these features will be discussed, as will the legitimacy of describing these alternations in terms of PIE phonology.

3.2.1.1.1.1 Labials

3.2.1.1.1.1.1 Voicing

QPIE **b*	QPIE **p*
QPIE **burso-* : Lat. *burrus*	QPIE **p*(h_2)*ur-*s(-*u̯*)*o-* : Gk. πυρρός
QPIE **bukso-* : Lat. *buxus*	QPIE **pukso-* : πύξος
QPIE **karb-* : Lat. *carbasus*	QPIE *QPIE **karp-* : Gk. κάρπασος QPIE **karp-* : Skt. *karpāsa-*

Table 3.1 Alternations between **b* and **p*

Technically, the *b* of *carbasus* could reconstruct to *b^h, but it entered Latin after rhotacism, much too late to be affected by the development of the voiced aspirates.

3.2.1.1.1.1.2 *Aspiration*

QPIE *b^h	QPIE *b
QPIE *$b^h a/h_2L$- : Gk. φάλλαινα	QPIE *ba/HL- : Lat. *ballaena*
QPIE *$b^h a/oer(s)d^h$- : PGm. *$bar(z)da$- [QPIE *$b(^h)a/ord(^h)$- : PBSl. *$bordá?$] [QPIE *$b(^h)a/orsd(^h)$- : Lith. *barzdà*]	QPIE *$ba/Hr(s?)d^h$- : Lat. *barba* [QPIE *$b(^h)a/ord(^h)$- : PBSl. *$bordá?$] [QPIE *$b(^h)a/orsd(^h)$- : Lith. *barzdà*]
QPIE *$b^h a/Hsk$- : Lat. *fascinus*	QPIE *ba/h_2sk- : Gk. βάσκανος
QPIE *$b^h elik$- : Lat. *felix, filix* QPIE *$b^h reg$- : PGm. *$brekna(n)$-	QPIE *$blē/eh_1g^h$- : Gk. βλῆχνον

Table 3.2 Alternations between *b^h and *b

To this group seems also to belong Lat. *fascis*, especially on comparison with Gk. φάκελος, φάσκωλος ~ Hsch. βάσκιοι. But if Lat. *baiulus* is indeed also related, then there is a *b^h ~ *b alternation attested within Latin as well.

3.2.1.1.1.1.3 Voicing and Aspiration

QPIE *b^h	QPIE *p
QPIE *kub^h- : Gk. κυφαρίσσινος	QPIE *kup- : Gk. κυπάρισσος QPIE *kup- : Lat. c*upressus* (Hebr. *gofer*)
QPIE *$Silb^h$- : Gk. σίλφιον (Berb. *azlaf, aselbu*, etc.)	QPIE *$sirp$- : Lat. *sirpe* QPIE *$Selp$-: Hsch. σέλπον
QPIE ?*$su(o)lb^h$- : PRom. *$su(l)fur$ [QPIE *$sue(l)b^h$-lo- : Go. *swibls*]	QPIE *$su(e/o)lp$- : Lat. *sulpur* [QPIE *$sue(l)p$-$ló$- : Go. *swibls*]
QPIE *$g(^h)ra/ob^h$- : PSlav. *$grabrъ$-	QPIE *ka/Hrp- : Lat. *carpinus*
QPIE *h_2le/ob^h- : Gk. ἄλειφα(ρ)	QPIE *h_2edep- : Lat. *adeps* QPIE *h_2elep- : PRom. *ala/ep-

Table 3.3 Alternations between *b^h and *p

For *cupressus* and *sirpe*, the *b^h ~ *p alternation exists within Greek. It is notable that in all cases, Latin attests to the unvoiced variant (but note Romance *sulfur*). In 2 cases, Italic treatment of the voiced aspirates obscures the original quality of the medial plosive, and it is unclear whether they represent *b ~ *p or *b^h ~ *p alternations:

QPIE *$b(^h)$	QPIE *p
QPIE *$da/Hrb(^h)$- : PRom. *$darbo$-	QPIE *ta/Hlp- : Lat. *talpa*
QPIE *$sa/Hb(^h)$- : Lat. *sabina*	QPIE *sa/HP- : Lat. *sappīnus* QPIE *sa/HP- : OCo. *sibuit*

Table 3.4 Alternations between *b^h or *b and *p

In at least one case, alternations between all three qualities are attested:

QPIE *b^h	QPIE *b	QPIE *p
QPIE *ka/ob^h- : PSlav. *ka/ob- [QPIE *$ka/Hb(^h)$- : Lat. *caballus*] [QPIE *$kab(^h)/p$- : MoP *kawal*]	QPIE *ka/h_2b- : Gk. καβάλλης [QPIE *$ka/Hb(^h)$- : Lat. *caballus*] [QPIE *$kab(^h)/p$- : MoP *kawal*]	QPIE *ka/HP- : PCelt. *$kappe/ilo$- [QPIE *$kab(^h)/p$- : MoP *kawal*]

Table 3.5 Alternations between *b^h, *b, and *p

Additionally, Lat. *rāpum* beside Gk. ῥάφυς, ῥάπυς securely attests to a *b^h ~ *p alternation. Whether PCelt. **arbīno*- reconstructs to *b^h or *b is obscured by Celtic sound laws.

3.2.1.1.1.2 Dentals

3.2.1.1.1.2.1 Voicing

QPIE *d	QPIE *t
QPIE **kudo*-, **kodu*- : Gk. κυδώνια, κοδύ-	QPIE **koto*- : Lat. *cotōneum*
QPIE *$da/Hrb(^h)$- : PRom. **darbo*-	QPIE *ta/Hlp- : Lat. *talpa*
QPIE *deh_2u- : Gk. δαΐς, -ίδος	QPIE *th_2eid- : Lat. *taeda*
QPIE *$drosd(^h)$- : PSlav. *$drozdъ$ QPIE *$droy̯d$- : Arm. *artoyt*	QPIE *$t(o/u)r(s)d(^h)$- : Lat. *turdus* QPIE *$trosd(^h)$- : PCelt. **trozdi*- QPIE *$trosd$- : PGm. *þrastu*- QPIE *$strosd(^h)$- : PBalt. **strozdo*- QPIE *$stroud^h$- : Gk. στρουθός

Table 3.6 Alternations between *d and *t

A further example of this alternation may be Lat. *citrus* ~ Gk. κέδρος, but devoicing of *-dr-* to *-tr-* is possibly regular in Latin. It would fit the pattern in which Latin attests to the unvoiced variant (but note Romance **darbo*-).

3.2.1.1.1.2.2 Aspiration

QPIE *d^h	QPIE *d
QPIE *$stroud^h$- : Gk. στρουθός [QPIE *$t(o/u)r(s)d(^h)$- : Lat. *turdus*] [QPIE *$trosd(^h)$- : PCelt. **trozdi*-] [QPIE *$strosd(^h)$- : PBalt. **strozdo*-] [QPIE *$drosd(^h)$- : PSlav. *$drozdъ$]]	QPIE *$trosd$- : PGm. *þrastu*- QPIE *$droy̯d$- : Arm. *artoyt* [QPIE *$t(o/u)r(s)d(^h)$- : Lat. *turdus*] [QPIE *$trosd(^h)$- : PCelt. **trozdi*-] [QPIE *$strosd(^h)$- : PBalt. **strozdo*-] [QPIE *$drosd(^h)$- : PSlav. *$drozdъ$]]

Table 3.7 Alternations between *d^h and *d

For this lexeme, the alternation between *d^h and *d (at the end of the root) is secured by Gk. στρουθός and PGm. *þrastu*-, Arm. *artoyt*. Whether Lat. *turdus* reconstructs to *$t(o/u)r(s)d^h$- or *$t(o/u)r(s)d$- is unclear. The former is only possible if an intervening sibilant blocks the change *$rd^h > rb$.

3.2.1.1.1.2.3 *Voicing and Aspiration*

QPIE *d^h	QPIE *t
QPIE *kh_2end^h- : Gk. κανθήλια	QPIE *ka/Hnt- : Lat. *cant(h)ērius*
QPIE *$l̥nd^h$- : Gk. λάθυρος	QPIE *$l(e)nt$- : Lat. *lēns*
QPIE *$mind^h$- : Gk. μίνθη	QPIE *$m(e)nt$- : Lat. *menta*

Table 3.8 Alternations between *d^h and *t

Like with the *b^h ~ *p alternations, Latin attests to the unvoiced, unaspirated variant. But unlike that category, where sometimes both variants were attested in Greek, the alternation here is more exclusive. Lat. *hasta* < QPIE *g^ha/Hst- beside PGm. **gazda*- < QPIE *$g^ha/o/Hzd^h$- belongs here as well. Celtic sound laws obscure the whether the dental of PCelt. **gazdo*- was borrowed as *d^h or *d. Such is also the case for Lat. *catulus* < QPIE *ka/Ht- against MIr. *cadla* < *$ka/Hd(^h)$- (where the Germanic forms could reflect *$ka/o/Hd^h$- or *$ka/o/Ht$- with Verner's Law).

The nature of the dental alternation between Lat. *raudus* and its comparanda is unclear. Its dental can reconstruct to *d^h or *d. If PCelt. **rutu*-, whose appurtenance is uncertain, is not compared, and if *raudus* was borrowed with *d like PGm. **arut*-, then there is no alternation attested.

Theoretically, a *d^h ~ *t alternation could exist between the comparanda of Lat. *fīcus* with QPIE *d^h, where Gk. τῦκον, σῦκον could attest to *$t̯i/u̯$- or *$d^hi/u̯$- and Arm. *t^cuz* mechanically reconstructs to *t. But it is more likely that these words were borrowed with *t^h or *θ.

3.2.1.1.1.3 Interim Conclusion on Labials and Dentals

So far, an interesting pattern emerges amongst the cases where the quality of the consonants can be verified (i.e. it has not been obscured due to sound laws). Firstly, alternations involving all possible combinations of quality are attested. While the category of *b^h ~ *b is mixed (twice Latin reflects *b^h, twice *b), in each of the others, Latin patterns consistently. Between the categories, however, it is not consistent. For *b ~ *p alternations, Latin reflects *b but for *d ~ *t alternations, it reflects *t. The distributions of the attested comparanda show that these alternations are not the result of one monolithic contact situation; more on this follows in §4. However, even amongst words with a Mediterranean distribution, the pattern of Latin reflexes is difficult to reconcile with the two IE substrates proposed that might be expected to affect Latin (Ausonian and Pelasgian). If Pelasgian is responsible for *D > *T, then we must assume for Lat. *buxus* ~ Gk. πύξος, the Greek has borrowed the Pelasgian reflex but for Lat. *cotōneum* ~ Gk. κυδώνια, Latin instead has the Pelasgian reflex. One wonders why it is always Latin that has the Pelasgian reflex when a dental is involved. Beyond this, very few of these cases can be etymologized to an IE root.

It is more likely that these alternations are not of Indo-European origin. While they may in part be due to dialectal differences within the substrate languages, the nativization of

foreign phonemes must certain have played a large role in producing irregularity. Such is also the case for the velars (see below), where the additional parameter of labial-/palatalness creates even more possibilities for nativization.

3.2.1.1.2 Velars

The velar consonants as reconstructed for PIE do not only differ in aspiration and voicedness, but have the added (mutually exclusive) aspects of labial- and palatalization. These are traditionally given as **k, *ḱ, *kʷ; *g, *ǵ, *gʷ; *gʰ, *ǵʰ, *gʷʰ* and in the glottalic theory as e.g. **k:, *ḱ:, *kʷ:; *'k, *'ḱ, *'kʷ; *k, *ḱ, *kʷ* (from Beekes 2011: 128-9, other presentations elsewhere as cited above). By the time of the separate daughter branches, when loanwords would be entering, centumization and satəmization would have been developing or would have already occurred. Thus from an inherited perspective, we should not expect to find a palatovelar reflex in a *satəm* language corresponding to a labiovelar reflex in a *centum* language. But a phenomenon like this cannot be ruled out *a priori* for loans from a non-IE language. This adds a layer of difficulty to the analysis. As with the labials and dentals, below are the data that show the distributions. I only include alternation between labial-/palatalness when there is explicit reason to do so.

3.2.1.1.2.1 Voicing

QPIE **g*	QPIE **k*
QPIE **ga/HR-* : Prov. *garric*	QPIE **kerr/so-* : Lat. *cerrus* QPIE **ka/Hr-* : Ital. dial. *cariglio* QPIE **ka/HR-* : Catal. *carrasca*
QPIE **bʰa/ol-ig-* : PGm. *balikōn-*	QPIE **bʰul-Vk-* : Lat. *fulica* QPIE **b(ʰ)o/ul-a/oK-* : SGael. *bolachdan*
QPIE **sur-(V)g-* : PGm. **s(w)ur(V)ka-*	QPIE **s(u̯)ōr-Vk-*: Lat. *sōrex* QPIE **su̯o/ur-ak-* : Gk. ὕραξ
QPIE **gruHm-* : Lat. *grūmus*	QPIE **kroHm-* : Hsch. κρῶμαξ QPIE **kloHm-* : Gk. κλῶμαξ

Table 3.9 Alternations between **g* and **k*

Lat. *corbis* belongs here if it is indeed related to PGm. **krebō-* < QPIE **grébʰ-ōn-*. For Lat. *grãmiae*, there exists a **k ~ *g* alternation amongst the Slavic comparanda, but this must be the result of a post-Common Slavic (i.e. during the first millennium CE) borrowing into Slavic. Thus its bearing on earlier substrate features, at least in terms of this alternation, seems dubious.

3.2.1.1.2.2 Aspiration

Interestingly, there is one uncertain case of an aspiration alternation involving velars. This is the case of Lat. *ālium* ~ Gk. ἄγλῑς, γέλγῑς. PBerb. **agVlum-* of similar shape to the Latin form suggests that it once had a velar like Gk. ἄγλῑς, and one explanation for its disappearance is that it was **gʰ*, undergoing development to **h*.

3.2.1.1.2.3 Voicing and Aspiration

QPIE *g^h	QPIE *k
QPIE *$tu/ūg^h$- : Arm. *t^cuz*	QPIE *$d^hīk$- : Lat. *fīcus* QPIE *$d^h/ti̯/u̯ūk$- : Gk. τῦκον, σῦκον (Hebr. *šiqmā*)
QPIE *$Hurg^h$- : Gk. ὕρχη	QPIE *$H(o)rk$- : Lat. *orca*
QPIE *g^ha/h_2l-ik- : Gk. χάλιξ	QPIE *ka/Hlk- : Lat. *calx*

Table 3.10 Alternations between *g^h and *k

In 1 case, it cannot be determined whether the alternation is *g ~ *k or *g^h ~ *k:

QPIE *$g(^h)$	QPIE *k
QPIE *$g(^h)ra/ob^h$- : PSlav. **grabrъ*-	QPIE *ka/Hrp- : Lat. *carpinus*

Table 3.11 Alternations between *g^h or *g and *k

In 2 cases, alternations between all three qualities are attested:

QPIE *g^h	QPIE *g	QPIE *k
QPIE *$blē/eh_1g^h$- : Gk. βλῆχνον	QPIE *b^hreg- : PGm. **brekna*(*n*)-	QPIE *b^helik- : Lat. *felix, filix*
QPIE *$HruG^h$- : PGm. **rugg*-	QPIE *$H/u̯ra/Hg$- : Lat. *raia*	QPIE **HreK*- : PGm. **rehhōn*-

Table 3.12 Alternations between *g^h, *g, and *k

Lat. *felix, filix* against PGm. **brakna*(*n*)- shows the same alternation as between Lat. *fulica* ~ PGm. **balikōn*- and Lat. *sōrex* ~ PGm. **s*(*w*)*urka*- above; but the Greek comparanda of *felix* show the reflex of a voiced aspirate. For Lat. *raia*, Germanic shows two variants, both geminates.

3.2.1.1.2.4 Palatalization

Given that palatovelars are a class reconstructed for PIE, it is valid to question whether non-IE languages of Europe would have had such a feature. One case seems to indeed suggest that something akin to palatovelars was indeed present. Lat. *cucumis* matches Hsch. κύκυον as if from **ku-ku*-. Arm. *sex* could reconstruct to *$ḱek^h$- with an unvoiced aspirate not reconstructible for PIE and in opposition to the plain unvoiced consonant of the Latin and Greek forms. That its *s* is from something akin to *$ḱ$ is supported by Gk. σικύα, Hsch. σεκούα < QPIE *$ki̯/ek$-. The Greek reflex of inherited *$ḱ$ is simply κ, thus this lemma was potentially borrowed with a palatal element that seems to have been interpreted in Armenian as a palatovelar. In one case, the *satəm* languages allow us to see that there was an alternation in palatalization. In the comparanda of *columba*, Arm. *salamb* attests to palatalized *$ḱol$- while OCS *golǫbь* is from unpalatalized **gol*-.[489]

Alb. *dallëndyshe*, in light of the velar of Gk. χελῑδών (and Lat. *hirundō* < *g^h),

[489] Such an alternation potentially also exists in the suffix of the hawk word (cf. *capys*, whose circulation in Latin is suspect), where PSlav. **kobuzъ* attests to *-*uǵ*^{h}- against *-*ig*- in Arm. *$k^cowpič$* 'male hawk or falcon' (cf. Thorsø fthc.).

reconstructs to palatovelar *$ǵ^h$. Less straightforward are the cases of Lat. *excetra* and *avēna*. The former, taken at face value, reconstructs to a cluster *-*ksk*-. For the Baltic comparanda, an option exists to reconstruct this cluster with one palatovelar (*-*ḱsk*-). For the latter, a reconstruction of **aweCsnā* is possible, but so is simply **awesnā*. Its Baltic and Slavic comparanda reconstruct to an alternation between the reflexes of *$ḱ$ and *$ǵ^h$, but all forms might have been borrowed with an affricate (Kroonen et al. 2022: 19-20) or (esp. on comparison with West Uralic **wešnä* and PGm. **hab*(*a*)*zan*-) a "spirant of indeterminate voicing" (Huld 1990: 404).

3.2.1.1.2.5 Labialization

Like with palatovelars, labiovelars are a distinctly PIE reconstructed feature. But five cases include comparanda that securely reconstruct to labiovelars. Lat. *fungus* and its comparanda attest to alternation between *$g^w(^h)$ and *$u̯$ (Latin and Greek: *(*s*)g^{wh}*ong*- ~ Germanic : *$su̯ong^{wh}$-) that seems to suggest that the velar component of the original phoneme could be "overtaken" by the labial component. In Germanic, the final velar seems to have been labialized as well. A similar situation may occur in Lat. *malva* and its Greek comparanda where Gk. μάλβακα reconstructs to **malg*^{w}*ak*- against Gk. μαλάχη, μολόχη. The latter probably continue **malu̯ak*^{h}-.[490]

Lat. *laurus* forms a Greco-Italic isogloss with Gk. δάφνη, δαύχνα. The most straightforward way of accounting for the φ ~ χ alternation is via a reconstruction with *g^{wh}, which also works for Latin. The vocalism of the Greek forms produces two further possibilities, neither of which allows the group to be of Indo-European origin. The first possibility is that there was an irregular **a* ~ **au* vocalic alternation that triggered the *boukolos* rule in Greek and Latin. QPIE **dag*^{wh}*nā*- would yield Gk. δάφνη while **daug*^{wh}*na*- would yield Gk. δαύχνα. QPIE **laug*^{wh}*ro*- would yield PItal. **lauχro*- > *laurus*. But given the possibility of a non-native labialized velar with a strong labial component, the vocalic alternation could be seen as the result of different interpretations of the placement of the labial element: *K^w vs. *^wK. In this way, **dag*^{wh}*nā*- would yield Gk. δάφνη and **da*^{w}*g*^{h}*na*- Gk. δαύχνα. A pre-form **la*^{w}*g*^{h}*ro*- would yield PItal. **lauχro*- > *laurus*.

Go. *aqizi* requires a reconstruction with *g^w, which is not possible for Gk. ἀξίνη or (if the metathesis is not secondary, which I argue it is not) Lat. *ascia*, producing an alternation in labialization. Similarly, PGm. **hwerhwetjō*- reconstructs to *k^w. In Lat. *cucurbita*, the internal velar could theoretically have been a labiovelar (unrounded before *u*), but an intial **k*^{w}*u*- seems to have been deleted (cf. *ubi* < **k*^{w}*u-d*^{h}*e-i*). Thus this lexeme too points to an alternation in labialization.

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[490] The preform **malu̯ak*^{h}- at first glance looks like it could also yield Lat. *malva*, but in order to not produce ***malla*, it would have to have been borrowed too late for *k^h > *h*. One solution to this is to have the form enter Latin as **malwaχa*, and have the labialization be attracted to the *$χ$ producing **malaχ*^{w}*a*-. This would then give **malava* and with later syncope the attested *malva*.

3.2.1.1.2.6 Interim Conclusion on Velars

For the labials and dentals, it was possible to see that all possible combinations of the 3 qualities are attested. This is much more difficult to say for the velars. Theoretically, given 9 reconstructible velars, there are a total of 502 possible combinations. This is an inflated estimate however. While a *g* in both a *centum* and *satəm* language could be hiding alternations between palatovelars and labiovelars (**ǵ ~ *g*, **g ~ *g^{w}*, **ǵ ~ *g^{w}*), we find no examples of the opposite phenomenon—a visible *satəm* palatovelar ~ *centum* labiovelar alternation. A more realistic number of possible combinations can be approximated from a set consisting of **k*, **g*, **g^{h}*; **ḱ^{w}*, **ǵ^{w}*, **ǵ^{wh}* (in which labial-/palatalness is collapsed). And indeed, there are examples of alternations in palatalness and labialness in the languages that can preserve them. This is the most meaningful conclusion from the data: there is evidence for both palatalized and labialized phonemes in the substrate languages of Europe (cf. Beekes 2014: 4 on Pre-Greek).

3.2.1.1.3 Conclusions on the QPIE Plosive Rows

The stratificational power of alternations like this on their own is hampered by the fact that there is only a limited possibility for nativization of foreign sounds. That is, a phoneme that did not exist in Proto-Italic, upon being borrowed, would have to be mapped onto one of the reflexes of an existing PIE phoneme. Theoretically, two different foreign sounds could end up being mapped onto the same reflex, masking their originally separate origins. On the other hand, a singular sound in a foreign language can be borrowed with phonological variation even within the same borrowing language (cf. Meester fthc.).

As remarked on above, the sound laws proposed by IE Pelasgianists seem artificial, as when all the evidence of irregularities is taken together, there are more alternations than can be explained by discrete sets of chain shifts. While Latin exhibits tendencies (it reflects an unvoiced, unaspirated reflex in cases of **b^{h} ~ *p*, **d^{h} ~ *t*, **d ~ *t*, **g^{h} ~ *k*, and **g ~ *k* alternation) they are not always fully consistent, they are not all due to the same contact situations, and the variation outside of Latin is generally without a pattern (on this latter aspect, cf. Beekes 2014: 4, Šorgo 2020: 459). Beekes (2014: 4-5) uses this to conclude that (for Pre-Greek in his context), voice and aspiration were not distinctive features (cf. also Palmer 1963: 39, Furnée 1972: 115-200). What is at least clear from the alternations is that such features must not have worked the same way as in Indo-European. Labialization and palatalization do indeed seem to be phonetic features of one or more of the substrate languages of Europe, at least to the point where they could be perceived by speakers of PIE (cf. cases like Gk. σικύα Lat. *laurus* ~ Gk. δάφνη, δαύχνα) or mapped onto the phonologized contrast between plain and palato-/labiovelars.

In general, describing alternations in terms of PIE phonology is also artificial, since the words in which they occur were borrowed at a post-PIE date and at various points in

time. A foreign /f/ borrowed into Proto-Italic at a time before the production of **f* from the IE voiced aspirates would almost certainly have been mapped differently than an /f/ that entered after the development of Italic **f*. The latter case, which presumably would have been preserved as Latin *f*, would nevertheless be mechanically reconstructed to PIE **b^{h}*, obscuring the fact that it was actually borrowed as a fricative. QPIE reconstructions provide a useful shorthand for being able to show that lexemes are not inherited, but a more detailed distributional analysis (see §4) is needed to be able to identify distinct contact scenarios.

3.2.1.2 Alternations Beyond the Plosive Rows

A phonological justification must exist for considering that two different phonemes were diachronically underlyingly the same. Even with this caveat, alternations within the same place of articulation are not limited to the PIE plosive rows. In fact, there are even several cases of alternations between different places of articulation. Cases like the latter are not typologically unparalleled (cf. the allophonic variation of *k* ~ *t* in Hawai'ian).

3.2.1.2.1 Labial Plosive ~ Labial Nasal Alternation

The following alternations share a place of articulation (labial), differing in manner of articulation:

QPIE **b*(*^{h}*)	QPIE **m*
QPIE **h$_{2}$erb*(*^{h}*)/*d^{h}*- : Lat. *arbutus*	QPIE **h$_{2}$erm*- : PRom. **armōn*-

Table 3.13 Alternation between **b*(*^{h}*) and **m*

This alternation occurs between Latin and Ligurian dialects, suggesting that the source of the alternation was close to the Italian peninsula.[491] It is present within Greek, between Gk. κυβερνάω and Cypriot *ku-me-re-na-i*. Lat. *gubernāre* seems to be an indirect borrowing of κυβερνάω, and thus is not independent evidence of a **b*(*^{h}*) ~ **m* alternation. (The potential Baltic forms that suggest a further alternation with **mb*(*^{h}*) are likewise too insecure to include as independent evidence.)

QPIE **p*	QPIE **b* (and **b^{h}*)	QPIE **m*
QPIE **plo/uNd^{h}u̯*- : Lat. *plumbum* QPIE **ple/oud*(*^{h}*)- : PCelt. **(ɸ)loudio*-	QPIE **bolubdo*- : Gk. βόλυβδος [QPIE **b^{h}liHwo*- : PGm. **blīwa*-] (Basque *berun*) (PBerb. **βaldūn* etc.)	QPIE **moliwdo*- : Gk. μόλιβδος [QPIE **mliHwo*- : PGm. **blīwa*-]

Table 3.14 Alternation between **p*, **b* (/**b^{h}*), and **m*

Germanic **blīwa*- reconstructs to QPIE **b^{h}*, but it can also be the reflex of **ml*, like in many of the Greek forms. A QPIE **b* is attested by Greek variants with β (and is

[491] Cf. the "alternanza mediterranea" of *m* and *b* listed by e.g. Alessio (1946a: 154). Bertoldi (1933b) finds a widely distributed (Sardinia, Iberia, Etruria, Gaul) lexeme "bush" (represented by Gk. βάτος and μαντία) with a *b* ~ *m* alternation.

probably the source of the Basque and Berber forms).

The **b(ʰ)* of Lat. *sabulum* alternates with **m* in Gk. ψάμαθος and PGm. **sammada-*. Arm. *awaz* can be reconstructed to **sabʰ-* or **sap-*; thus it is uncertain if this represents a **b(ʰ)* ~ **m* or a **p* ~ **b(ʰ)* ~ **m* alternation.

QPIE **b(ʰ)*	QPIE **mb(ʰ)*
QPIE **la/Hb(ʰ)/dʰ/sr-* : Lat. *lā̃brusca*	QPIE **la/Hmb(ʰ)/dʰ/sr-* : It. *lambrusca*
QPIE **sa/Hb(ʰ)-* : Lat. *sabūcus*	QPIE **sa/Hmb(ʰ)-* : Lat. *sambūcus*
QPIE **gul-ubʰ-* : PGm. **kulubrōn-*	QPIE **ke/ol-o/umb(ʰ)-* : Lat. *columba* QPIE **g(ʰ)ol-omb(ʰ)-* : OCS *golǫbъ* QPIE **ḱol-(o)mbʰ-* : Arm. *salamb* (Copt. ϧⲣⲟⲟⲙⲡⲉ)

Table 3.15 Alternations between **b(ʰ)* and **mb(ʰ)*

The case of Lat. *columba*, in which the nasal is lacking in Germanic,[492] has widespread comparanda.

Otherwise the cases of **b(ʰ)* ~ **mb(ʰ)* alternation are restricted to Latin and Romance. The case of *lā̃brusca* is more uncertain, since its *b* can be reconstructed in several ways. While there are numerous cases of etymological nasals being dropped before consonants due to their weak pronunciation (cf. Väänänen 1981: 63), nasal epenthesis is a more complex phenomenon in Romance. Cases often cited included *sa*(*m*)*būcus*, *la*(*m*)*brusca*, *stra*(*m*)*bus* 'squinting, crooked (of eyes)', and *sambatum*/*sabbatum* 'sabbath'. The latter are clear loans from Greek (with some evidence for the form with *m* existing already in Greek), while the former two have no good etymology. Nor do the former fit into many of the more easily explained cases of Romance nasal epenthesis (leveling of the nasal infix in verbs, anticipation of an upcoming nasal, blends like **rendō* < *reddō* modelled on *prēndō*, hypercorrection based on cases of restitution of lost nasals, cf. Malkiel 1984[493]). This seems to be indicative of non-native origin. In Greek, original voiced stops were fricativized, but new voiced stops appeared when this process was blocked by a preceding nasal or when a voiceless stop was voiced by a preceding nasal (Holton et al. 2020: 114). Thus voiced stops appeared only after nasals, and loans of voiced stops subsequently appear as μπ, νδ, and γγ. If the Latin voiced stops were fricatives (cf. Kortlandt 2007: 150-1), then perhaps the cases of the appearance of a nasal was due to the borrowing of a voiced stop. But the only concrete examples in the dataset involve *b*.[494]

[492] The reconstruction **kulumfrōn-* seems to be ruled out. Given the restriction of epenthesis to Northumbrian, it is more likely that *culfre* is the result of syncope from *culufre*. Such syncope is not expected in a vowel that is the result of **um* (cf. Jakob fthc.).

[493] Malkiel further includes "phonosymbolic" i.e. expressive cases (including *strambus* for *strabus*) and notes cases of *mb* for both original *b* and *m*, the latter mainly being a feature of Sardinian (see also Wagner 1941: 223-4).

[494] Though cf. potentially Lat. *lēns* < QPIE **lm̥ti-* ~ Gk. λάθυρος < QPIE **lm̥dʰ-*. We might consider it

Lat. *plumbum* attests to an *mb*, where the nasal is difficult to account for in comparison to the Celtic, Germanic, and Greek comparanda. On the one hand, it could be the result of specifically Italic nasal insertion: since an argument can be made that the *b* is from **d^h* and since a nasal would almost certainly have blocked the change **d^h* > *b* unless we reconstruct an otherwise unparalleled **plo/uNd^h-u̯o-*, the nasal was introduced after the Italic development of the voiced aspirates. On the other hand, Greek variants like μόλυβος and βόλιβος attest to a *b* in the same position as in Lat. *plumbum*. If the *b* is original in Latin, then so too might be the *m*, cf. the pre-nasalization in the substrate vocabulary of Germanic (Kuiper 1995: 68-72, Šorgo 2020: 459-60) and Greek (Beekes 2014: 14-15).

3.2.1.2.2 Labial Plosive ~ Labial Approximant Alternation

Beekes' (2014: 15) discussion of nasalization in Pre-Greek included alternations between a labial stop and *w*.[495] Furnée (1972: 230-1) noted examples beyond Greek, and Šorgo (2020: 460-1), who considers it a separate phenomenon from nasalization, suggests it represents an attempt to render a foreign phoneme like [β] or [v]. In cases involving Italic, Latin attests to both variants.

QPIE *b^h	QPIE *b	QPIE *$u̯$
QPIE *$b(^h)a/ob^h$- : PBSl. *ba/ob-	QPIE *b^hab- : Fal. *haba*	QPIE *ba/ou-n- : PGm. *$baunō$- (PBerb. *$ā$-$b/βāw$)

Table 3.16 Alternation between *b^h, *b, and *$u̯$

In the case of Lat. *faba*, Fal. *haba* points to *b while Balto-Slavic requires *b^h.

QPIE *b	QPIE *$u̯$
QPIE *h_1orh_3b- : Gk. ὄροβος QPIE *h_1erh_1b- : Gk. ἐρέβινθος QPIE *h_1orVb- : Arm. *arowoyt*	QPIE *$h_1er(H/V)u̯$- : Lat. *ervum* QPIE *$h_1oru̯$- : PGm. *$arwīt$-

Table 3.17 Alternation between *b and *$u̯$

Beyond these two secure cases with a relatively wide distribution are other more complex examples. While Hubschmid (1953: 63, fn. 2) purported to find no cases of such an alternation with a Mediterranean distribution, Lat. *bolunda* ~ Gk. ὄλυνθος seems to be one such example (with the assumption of original Gk. *Ϝόλυνθος). If Lat. *bāca* is related to *vaccīnium*, they too hint at a *b ~ *w alternation.

unlikely that the non-IE source language would have a phoneme akin to a PIE syllabic resonant, in which case the nasal of the Latin form might be explained as intrusive, albeit before unvoiced *t*.

[495] There may be one case of an alternation like this within Italic. Lat. *Mārs* is from a form with **u̯*, preserved in *Māvors*. But the Sabellic languages and the *Lapis Satricanus* attest to a stem *mamart-*. Thus **māmart-* has somehow changed to something like **māwart-*, an otherwise unparalleled change that suggests it might not be native to Italic (cf. DV 366).

Another complex case occurs between PGm. **blīwa-* and Greek variants μόλιβος, μόλυβος, βόλιβος. The variant with **w* seems also to appear in PCelt. **ɸloudio-*. The analysis of Lat. *plumbum* is complicated. If its *b* is from **d^{h}*, then perhaps its *u* participates in the **b* ~ **w* alternation. If however its *b* is original (and it lacks the dental suffix of e.g. μόλυβδος), then it patterns with the Greek forms with *b*.

3.2.1.2.3 L ~ R Alternations

Amongst the liquids, laterals and rhotics are articulated in much of the same space. The two classes, even within Italic and its descendants, are prone to metathesis (cf. Spanish *milagro* 'miracle' < Lat. *mīrāculum*, *palabra* 'word, speech' < Lat. *parabola*, *peligro* 'danger' < Lat. *perīculum*, cf. e.g. Straka 1979: 400-22, Schmid 2016: 481) and dissimilation (cf. *-ālis* > *-āris* when attached to a base containing *l* like *vulgāris*, Väänänen 1981: 70, Weiss 2020: 168). Their alternation can easily come about in contact situations: several languages have one underlyingly liquid phoneme that surfaces as rhotic or lateral depending on the environment or is used in free variation (Korean and Japanese for example, cf. Ladefoged and Maddieson 1996: 182, 243).

Several cases exist in which Latin words and their comparanda attest to *l* ~ *r* alternations. I present them in three groups. In Group A, the alternation exists between Latin and Greek. In Group B, Latin and Greek agree against an alternation in other comparanda. In Group C, there is no Greek comparandum.

QPIE **l*	QPIE **r*
QPIE **kh$_2$end^{h}eHl-* : Gk. κανθήλια	QPIE **ka/HnteHr-* : Lat. *canthērius*
QPIE **kloHm-* : Gk. κλῶμαξ QPIE **kroHm-* : Hsch. κρῶμαξ	QPIE **gruHm-* : Lat. *grūmus*
QPIE **g^{h}eliHd-* : Gk. χελῑδών QPIE **ǵ^{h}o(u)l(H)-(o)nt/d(^{h})-* : Alb. *dallëndyshe*	QPIE **g^{h}iro/und(^{h})-* : Lat. *hirundō*
QPIE **silb^{h}-* : Gk. σίλφιον QPIE **selp-* : Hsch. σέλπον (Berber *azlaf*, *aselbu*, etc.)	QPIE **sirp-* : Lat. *sirpe*
QPIE **gl̥mo-* : Gk. γλάμων	QPIE **greHm-* : Lat. *grāmiae* QPIE **g/krHm-* : PSlav. **k/grъm-*
QPIE **leili-* : Lat. *līlium* QPIE **Hol-* : Hitt. *alēl* (Copt. *hlēli*)	QPIE **leiri-* : Gk. λείριον (Copt. *hrēri*)

Table 3.18 Group A alternations between **l* and **r*

For Lat. *grūmus*, the **l* ~ **r* alternation exists within Greek, such that it could theoretically belong to Group B.

QPIE *l	QPIE *r
QPIE *$b^{h}elVk$- : Lat. *felix* QPIE *$bleHg^{h}$- : Gk. βλῆχνον, βλῆχρον	QPIE *$b^{h}reg$-*n*- : Dan. *bregne*
QPIE *$ph_{2}eil$-*a*/*ek*- : Lat. *paelex* QPIE *pa/*HL*-*ak*- : Gk. παλλακή	QPIE *pa/*erik*- : OIr. *airech*

Table 3.19 Group B alternations between **l* and **r*

QPIE *l	QPIE *r
QPIE *ta/*Hlp*- : Lat. *talpa*	QPIE *da/*Hrb(^{h})- : PRom. **darbo*-

Table 3.20 Group C alternation between **l* and **r*

Given that the appurtenance of Gk. κόλυμβος to Lat. *columba* is uncertain for semantic reasons, the group, for which all forms beside Copt. ϭροομπє attest to the variant with **l*, most likely fits into Group C. For the stratificational power of this alternation, see §4.2.2.4.1.

3.2.1.2.4 N ~ M Alternation

There is one lexeme that seems to show a nasal alternation of *n* ~ *m*: Lat. *laena* vs. Gk. χλαῖνα, χλανίς, χλαμύς. As explained by Rosoł (2013: 107-9), the alternation likely has its source in Semitic: Hebr. *glōm* against Late Babylonian *gulēnu*. Thus the alternation is likely not a result of the borrowing process into Latin/Greek but instead attests to this word being borrowed more than once.

3.2.1.2.5 L ~ D Alternation

A lateral can develop into a dental or *vice versa* because of an overlap in the place of articulation (cf. Sardinian, Sicilian, Calabrian retroflex *ḍḍ* < *ll*, cf. NavigAIS).

There exists within Latin a phenomenon referred to as the "Sabine *l*", in which Latin attests to *l* as the reflex of inherited **d* in some words. The phenomenon was attributed to Sabine by Conway (1893) via dubious methodology. No ancient source attributes the phenomenon to Sabine, but the idea was followed by Petr (1899) who found 17 Sabinicisms and others like Schrijnen (1914) who argued on the basis of historico-political and -social evidence. Bottiglioni (1943: 316-17) shows that the words we have as purportedly Sabine prove that it was not responsible for this change. His best example is a passage of Varro, where the deities called *Novensiles* by Livy are said to be called *Novensides* by the Sabines. Weiss (2020: 504 fn. 63) adds *fedus* = *haedus* 'goat' and *īdūs*, both purported to be Sabine, to show that Sabine allowed *-d-*.

Nor is the phenomenon itself well understood. There is a short list of generally accepted cases, some problematic, and some other unclear cases. The best cases are *odor* 'smell' < **$h_{3}ed$- ~ *olere* 'to smell', *sedere* 'to sit' < **sed*- and *solium* 'chair, throne; bathtub; sarcophagus'. Lat. *lacrima* 'tear' might be a loan from Gk. δάκρυμα 'tear' or might represent an inherited formation. Lat. *lēvir*/*laevir* 'husband's brother', attested in glosses,

could have *-vir* for *-ver* from contamination with *vir* 'man' and thus descend from **deh₂i-uer-* (cf. Gk. δᾱήρ 'husband's brother', etc.; DV 336). Lat. *lingua* 'tongue' seems to be attested also as *dingua*; in any case it descends from **dnǵʰ-uh₂* 'tongue', but its *l* might be from contamination with *lingere* 'to lick' (DV 343, Weiss 2020: 504). Thus it cannot be adduced as an example of the phenomenon with certainty. Lat. *lautia* 'entertainment provided for guests' is generally taken as the development of *dautia*, a hapax in Paulus *ex Festo* (cf. DV 161). It would be from **douH-ó-* 'giving, bestowing', with Thurneysen-Havet's Law (Vine 2006: 238). However, since *lautia* always occurs in the collocation *locus lautiaque* or *loca lautia*, it is sometimes suspected that the *d* > *l* is due to alliteration (cf. DV 161). Prósper (2019: 463) even proposes that *dautia* is an artificial archaism. In any case, the status of *lautia* as an example of the phenomenon is uncertain.

That the phenomenon of the "Sabine" *l* occurs only in inherited lexemes could theoretically be due to the fact that it is only visible in cases with secure comparanda. Lat. *simila* is, along with Gk. σεμίδᾶλις, most likely originally a loan from Semitic (cf. Aram. *səmīdā*, Akk. *samīdu*). Its *l* for *d* could theoretically be due to the "Sabine" *l* affecting loanwords. Lat. *laurus* has been borrowed from the same source as Gk. δάφνη, (Thess.) δαύχνα. Its *l* for *d* may also be due to the phenomenon at hand, but Hsch. λάφνη, said to be in currency in Pergamon, suggests that the alternation here had a wider distribution. Lat. *adeps* occurred alongside PRom. **ala*/*ep-* but in this case its relationship to Gk. ἄλειφα(ρ), from which it cannot be a direct borrowing, rules out the "Sabine" *l*; the change is in the opposite direction. In this latter case, it should be mentioned that Lat. *clueō* 'to be known' with inherited **l* occurs in South Picene as **kduiú** [1sg.pres.] with <d>. Thus perhaps it could have been involved in some **l* > *d* changes.

3.2.1.2.6 S ~ D Alternation

There is one instance of Lat. *s* for a *d* in all other comparanda, namely the case of Lat. *rosa*. As discussed (s.v. *rosa*), not even recourse to the Umbrian change of intervocalic **d* > **ř**, *rs* provides a convincing explanation. Biville (I: 257-6) suggests that the same alternation between a dental and a sibilant might be found between Lat. *rēsīna* 'resin' and Gk. ῥητίνη 'resin', but that it is more likely that it is borrowed from a Greek by-form *ῥησίνα (cf. also EDG 1284 who only accepts this latter possibility). Biville also mentions Lat. *asinus* ~ Hebr. '*ātōn* 'donkey'. It is possible that they are connected, and an alternation of this sort might be behind both lemmata. The route of transmission of the two words must have been different however; Gk. ὄνος, if related to *asinus*, can only be explained via the erstwhile presence of a sibilant whereas in ῥόδον it has the dental.

3.2.1.2.7 D ~ K ~ Ø Alternation

The comparanda of Lat. *nux* each end in a different consonant: Lat. *nux* < QPIE *(*k*)*nuk-* ~ PGm. **hnut-* < QPIE **knud-* ~ PCelt. **knū-*, **knowes-* < QPIE **knu*(*H*)-, **kn*(*e*/*o*)*u*(*H*)-. Whether the Celtic comparanda attest to a laryngeal is obscured by

regular developments within Irish and British Celtic. The phenomenon of a dental-velar-zero alternation is found by van Sluis (fthc.) in two other lemmata, one of which has a secure Latin comparandum. But in both cases, the dental is QPIE **t*. These are the 'head' word Lat. *caput* < PQIE **ka/Hput-* ~ W *cawg* < QPIE **ka/Hpuk-* (~ OE *hafola* < QPIE **ka/o/Hp-ulo-* or **ka/o/Hput-lo-*) and the 'bee' word Lith. *bìtė* < QPIE **b^{h}it-* ~ OIr. *bech* < QPIE **b^{h}ek-* ~ OE *beó* < QPIE **b^{h}i-on-*. If these all represent the same phenomenon, then there is no need to reconstruct a laryngeal for the Celtic comparanda of Lat. *nux*. Kroonen (2012a: 248) suggested that the pattern is the result of the nativization of a substratal glottal stop, which could be the case whether or not a laryngeal is reconstructed. Otherwise, the alternation might be due to existing dialectal or paradigmatic differences in the source languages. In North Saami, for example, stem-final **-g* regularly (albeit rarely) becomes *-t* in absolute final position (Aikio and Ylikoski 2010 course handout, page 37[496]).

The **k ~ *t* alternation within Lat. *caput* and its comparanda have often been explained as belonging to a suffixal element (cf. Boutkan 1998: 111, Schrijver 1997: 295). It cannot be ruled out that the vacillating stop of the 'bee' word and the 'nut' word are suffixes as well, but they certainly look like part of the root. If Skt. *kapā́la-* 'cup, jar, dish; skull' is only coincidentally similar to the rest of the comparanda for the 'head' word, then all three lemmata share a relatively similar distribution. Beyond these three "canonical" examples are a few potential others. Anthony Jakob (fthc. thesis) notes the phenomenon potentially between ON *síld* and Lith. *siĨkė* (OPr. *sylecke*, > Fin. *silakka*) 'herring'. If a laryngeal truly is involved, perhaps the alternation is found between **natr-ik-* (Lat. *natrix* 'water-snake', OIr. *nathir* 'adder, snake') ~ **natr-iH-* (W *neidr* 'snake') ~ **natr-* (Co. *nader*, etc.; Go. *nadre* [gen.pl.], etc. 'adder', cf. with a long vowel OHG *nātara*, etc. 'adder'), despite usually being etymologized as a derivation from **sneh$_2$-* 'to swim'.[497] Finally, Lat. *pix* 'pitch, tar' and *picea* 'pine/spruce' < **pik-* might show a *k ~ t* alternation with Gk. πίτυς 'pine' < **pit-*. Lat. *pīnus* could be from either **pik-s-no-* or **pit-s-no-*. This would however introduce a Greek comparandum into the phenomenon, which so far has importantly excluded Greek. On the importance of the lack of any Greek comparanda to the stratification of this alternation, see §4.3.2.3.1.

3.2.1.2.8 Further Irregular Involvement of a Sibilant

3.2.1.2.8.1 S mobile

Some Indo-European roots appear with and without an initial *s*, even within the same branch (cf. Skt. *páśyati* 'sees', *spāśáyate* 'makes seen'), a phenomenon called *s* mobile (cf. Forston 2010: 76-7). It is poorly understood in inherited roots, but may have something to do with re-bracketing of endings. It is *a priori* strange to be able to find

[496] Available online: https://www.academia.edu/36836577/The_Structure_of_North_Saami
[497] Stifter (fth.) alternatively suggests that this could be an example of the non-native suffix spreading to an inherited base. At the same time, this smacks of the sort of laryngeal hardening proposed by Martinet (1955).

such a phenomenon occurring in non-inherited material unless it occurred independently in the daughter branches and could thus occur after loanwords were taken up. This could only be the case if it was a very trivial phenomenon, i.e. that re-bracketing was a frequent tendency for roots with certain onsets. This question requires further investigation, but there seems to be one good example of something akin to *s* mobile in a lexeme of non-IE origin.

The lexeme in question is Lat. *turdus* and its widespread comparanda. An initial **s* is not present in Italic, Celtic, Germanic, Slavic, or Armenian. But it does appear in Baltic **storzdo-* and Gk. στροῦθος.

For two other lexemes, it is questionable whether the forms with initial **s* really belong with those that lack it. To Lat. *calix* ~ Gk. κύλιξ might belong U **skalçeta** and Hsch. σκάλλιον, but these may be coincidentally similar.[498] Lat. *carpinus* is semantically best matched by PSlav. **grabrъ*. It has been compared to OPr. *skerptus* and Lith. *skir̃pstas* 'hornbeam, elm, alder buckthorn, honeysuckle, beech'. But given the broad semantics of the Baltic forms with initial *s, they too may be only coincidentally similar.

Finally, twice in the dataset Latin has *f-* for Gk. σφ(/π)-: Lat. *fungus* ~ Gk. σπ/φόγγος and Lat. *funda* ~ Gk. σφενδόνη.[499] These are not inherited from PIE and they cannot be direct loans from Greek (in light of Lat. *spinter* 'bracelet' < Gk. σφιγκτήρ 'something that binds' and Lat. *spaeritam* 'dumpling' < a derivation of σφαῖρα 'sphere, ball', attested since Plautus and Cato respectively, cf. Hiersche 1964: 229-31; Biville I: 152-7, 197-9). It is unclear if these forms entered Latin without initial **s*. It is present in all secure[500] comparanda. Initial *sf* is not an allowed cluster in (Classical) Latin; thus perhaps a foreign sequence borrowed as something akin to **sb*^{h} or **sg*^{wh} would have lost its **s* along with the development of the voiced aspirates to attested *f*.

3.2.1.2.8.2 S Insertion

In several cases, comparanda attest to the vacillating presence of a sibilant before a consonant word-internally. In the two most secure cases, the phonetic environment is such that it cannot be determined if the Latin word was borrowed with or without the sibilant. Such is the case for Lat. *turdus*, which could continue PItal. **to/urzdo-* or **to/urdo-*. Pre-forms with an internal sibilant are reconstructible for Celtic,[501] Slavic, Germanic, and Baltic but not for Greek or Armenian. The second *b* of Lat. *barba*, in light of comparanda, reconstructs to **d*^{h}. It is not clear if the sequence **-rsd*^{h}- would also yield *-rb-*, but in any case a sibilant cluster is present in Lith. *barzdà*, Latv. *bârzda*

[498] Cf. potentially OHG *scāla* 'drinking bowl' etc. (Untermann 2000: 684) < PGm. **skēlō-* (Philippa et al. 2003-9 s.v. *schaal* 1). The Germanic verb is from *(*s*)*kel-* 'to cut', but LIV2 also gives **skelH-* 'to slit open, split'. U **skalçeta** < PItal. **skalik-* could continue **skl̥H-ik-*.

[499] A third case I have not mentioned is that of Lat. *fidēs* 'stringed instrument, gutstring' ~ Hsch. σφίδες· χορδαὶ μαγειρικαί 'intestines for cooking', σφίδη· χορδή 'intestines'. While Gk. χορδή can also mean gutstring (thus matching Lat. *fidēs*), in light of the other gloss, it more likely means 'sausage'.

[500] Not the insecure Slavic comparanda of *fungus*.

[501] The Brythonic forms cannot have an internal sibilant, but they may represent a loan from Goidelic.

'beard' whereas the sibilant is absent in PSlav. **bordà*.

The case of Lat. *fracēs* is similar in many ways (German and Baltic reconstruct to **dʰra/ogʰ-* but Slavic to **d(ʰ)rasgʰ-*), but Alb. *dra* attests to a slightly different pattern. The velar should probably not be lost in Albanian, but **s* can be lost, at least before a back vowel (cf. Schumacher & Matzinger 2013: 262-3); thus the best reconstruction for Alb. *dra* is **d(ʰ)ras-*. It is unclear if the **s* is the same as the sigmatic element of the Slavic form (but lacking the velar), or if it should instead be interpreted as an irregular correspondent of the velar.

A similar alternation seems to occur between Lat. *fascis* ~ Gk. φάσκωλος ~ Hsch. βάσκιοι on the one hand and Gk. φάκελος on the other. Given this latter form without the sibilant, it is tempting to compare PGm. **pakk-*, **bagg-* (and thus Lat. *baiulus*). Alb. *báshkë* also has the variant with the sibilant while Celtic comparanda can be reconstructed with or without it. Finally, Šorgo (2020: 459) calls attention to the pair Lat. *aesculus* ~ PGm. **aik-*. I have included it under §2.3.2 *Uncertain Comparanda*, but if the two words are related, then they would indeed exhibit the same pattern shown here.

3.2.1.2.8.3 SK Metathesis

There are several cases of irregular metathesis involving a sibilant and velar.

QPIE **sk*	QPIE **ks*
QPIE **h₂esk-* : Lat. *ascia*	QPIE **h₂eg(ʰ)/ks-* : Gk. ἀξίνη QPIE **h₂egʷes-* : PGm. **akwesi-*
QPIE **mus(g(ʰ)/k)lo-* : Lat. *mūlus*, *muscellus* QPIE **musku-* : PSlav. **mъskъ* QPIE **musk-lo-* : Hsch. μύσκλοι	QPIE **mug(ʰ)/k(s)-lo-* : Hsch. μυχλός
QPIE **wisko-* : Lat. *viscum*	QPIE **wikso-* : Gk. ἰξός QPIE **weiks-* : PGm. **wīhsilō-* QPIE **wei(k)si-* : PSlav. **višь*

Table 3.21 Alternations in the order of sibilant and velar in clusters

Otrębski (1939: 133) lists 10 cases of (simple) *s*-metathesis,[502] 6 of which are still generally compared today. His list includes Lat. *ascia* and *viscum*. Additionally he gives 1) PGm. **fahsa-* 'hair of the head', Gk. πέκος 'fleece' ~ Gk. πέσκος 'skin, rind' (perhaps **poḱ-so-*, **peḱ-es-* ~ **peḱ-sk-o-*, though EDG 1180 is not fully certain), 2) PBSl. **wośko-* 'wax' ~ PGm. **wahsa-* 'wax' (perhaps through metathesis or dissimilations of clusters, cf. Kroonen 2013: 566, or a borrowing from a substrate language, cf. Philippa et al. 2003-9 s.v. *was*), 3) Lat. *vespa* 'wasp' ~ PCelt. **woxs-V-*, PBSl. **wóps(w)aʔ*, Germanic (cf. OHG *wafsa*, OE *wæsp*, etc.), perhaps PIr. **wabža-* 'wasp' (potentially from PIE **(h₁)uebʰ-* 'to weave'), and 4) PGm. **aspō-*, **apsō-* 'aspen' ~ PBSl. **aps-* 'aspen' (also in Turkic languages and Finnic, considered non-IE by i.e. Kroonen 2013:

[502] Note however that the goal of his 1939 *Indogermanische Forschungen* was to explain these as regular.

39).

A further example might include Lat. *tamarix*, some of whose Romance descendants attest to **tamarisk-*. Šorgo (2020: 459) notes the Celto-Germanic isogloss (potentially a substrate borrowing, cf. Kroonen, van Sluis & Jörgensen 2023: 212) PGm. **þahsu-* ~ PCelt. **tazgo-*, **tasko-* 'badger'. The phenomenon thus seems to be quite limited, with the only case that demands an inherited origin being that of the wasp word given its widespread distribution in combination with a reasonable IE root etymology.

This phenomenon might represent different attempts at simplifying a foreign complex cluster. For example, beside Hsch. μύσκλοι and μυχλός, there is also Gk. μύκλος, lacking the sibilant entirely. A more exemplary case is that of Lat. *excetra*, with the cluster **-ksk-*. Its Baltic comparanda reconstruct to a cluster **-ḱsk-*, while the Slavic forms seem at most to reflect **-ḱs-*. Theoretically, **ks-* could also be behind Germanic comparanda, in which the cluster has been simplified further to PGm. **stur-*.

3.2.1.2.9 Gemination

Indo-European roots are not reconstructed with geminate consonants (except for nursery words like **atta-*), and gemination that should have occurred via morphological processes was reduced or interrupted (cf. 2sg. **h₁esi* 'you are' for expected ***h₁es-si*, nom/acc dual **h₂usíh₁* 'two ears' for expected ***h₂uss-íh₁*, and the insertion of **s* in **TT* clusters; examples from Ringe 2006: 18). Various processes occurred in the individual daughter languages that produced gemination, often the assimilation of clusters produced by the addition of derivational morphology. In Latin, the most important source of gemination that is not the result of assimilation is the *littera* (or *Iuppiter*) rule, in which a long vowel followed by a voiceless stop resulted in either a long vowel plus single stop or a short vowel plus a geminate (thus *lītera* vs. *littera* and *Iūpiter* vs. *Iuppiter*). Weiss (2010b, 2020: 155) suggests that the long vowel must be of diphthongal origin and the consonant involved must be a voiceless stop. A similar phenomenon occurs for *r* after *a* (the best example being *narrō* 'to say, tell'). There are thus some cases of Latin geminates for which the *littera* rule may not provide an adequate explanation and a non-native origin can be considered.

The opposite situation has occurred in the research on the substrate of Germanic. Kuiper's (1995: 68-72) A2 layer is labelled the "language of the geminates" by Schrijver (2001: 420-1) based on its most peculiar feature. It is credited as the source for much of the non-IE vocabulary in Germanic (Boutkan 1998, Boutkan & Siebinga 2005: xvi-xvii). Kroonen (2009: 60-2) however importantly noted that this feature was overused. Many of the geminate forms occur in the *n*-stems and iteratives, such that they can easily be explained by assimilation of **n* to the preceding consonant (Kluge's Law). Thus the importance of geminates in Germanic for the study of the pre-IE substrate had been overestimated.

An explanation that has often been offered to explain the presence of geminates is that

they are expressive. In certain semantic categories, including onomatopoeias, this seems plausible. But as Kroonen (2009: 59) notes (in defense of Kluge's Law, but the argument transfers), "it is *a priori* implausible that a completely new range of phonemes (i.e. geminates) could be introduced into a linguistic system by extra-linguistic factors such as charged semantics," comparing this to the outdated idea of spontaneous generation in biology.

Taking these considerations into account, when the appearance of a geminate in a lexeme can be excluded as a regular development, it may be indicative of a non-native origin for the lexeme in which it occurs. We should keep in mind that this does not automatically presuppose that the source language had geminates however. Once geminates arose via sound changes in the daughter languages, a geminate consonant became a native phoneme onto which a foreign sound could be mapped. There are other phonological properties that the original sounds could have had that resulted in their appearance as geminates. Kroonen (2009: 62) even adds: "One could even speculate, for instance, Kluge's Law was triggered by the absorption of speakers of this substrate language [that had long stops] into the PIE dialect that ultimately became known as Germanic." But to assume that geminate stops appeared as features of the daughter languages because they borrowed words from a substrate language that contained them is perilously close to the *ex nihilo* argument that Kroonen warned against. In any case, the indication of non-native origin that non-*lautgesetzlich* geminates provide is strengthened, as with all the categories above, when the geminate is not consistently present (i.e. it alternates) between comparanda and especially when it occurs in a lexeme that attests to other irregular alternations.

Singleton	Geminate
QPIE **ba*/*Hk*- : Lat. *baculum* QPIE **ba*/*h₂k*- : Gk. βάκτρον QPIE **ba*/*o*/*Hk*-́ / **ba*/*o*/*Hgʰ*- : PGm. **pagjō*-	QPIE **ba*/*HK*- : PRom. **bakkillo*- QPIE **ba*/*HK*- : PCelt. **bakko*-
QPIE **beh₂k*- : Lat. *bāca* QPIE **bh₂k*- : PCelt. **bak*-	QPIE **beh₂K*- : It. *bacca*
QPIE **ba*/*Hg*- : Lat. *baiulus*	QPIE **ba*/*o*/*HG*- (or **ba*/*o*/*Hg-nó*-) : PGm. **pakka*- QPIE **bʰa*/*o*/*HGʰ*- : PGm. **bagg*-
QPIE **bʰul-Vk*- : Lat. *fulica* QPIE **bʰa*/*ol-ig*- : OHG *belihha*	QPIE **b*(ʰ)*o*/*ul-a*/*oK*- : SGael. *bolachdan*
QPIE **la*/*Hk*- : Lat. *lacerna*	QPIE **la*/*h₂K*- : Gk. λάκκος QPIE **lh₃K*- : Hsch. λόκκη
QPIE **la*/*Hp*- : Lat. *lapis* QPIE **le*/*h₁p*- : Gk. λέπας QPIE **le*(*h₁*)*p*- / **lr̥̄p*- : OIr. *líe*	QPIE **la*/*HP*- : PRom. **lappa*
QPIE **lep-os*- : Lat. *lepus*	QPIE **la*/*HP-Vr*- : PRom. **lapparo*-

QPIE **ph₂eil-a/ek-* : Lat. *paelex* QPIE **pa/er-ik-* : OIr. *airech*	QPIE **pa/HL-ak-* : Gk. παλλακή
QPIE **Hra/Hg-* : Lat. *raia*	QPIE **HruG^{h}-* : PGm. **rugg-* QPIE **HreK-* : PGm. **rehhōn-*
QPIE **sa/HP-* : OCo. *sibuit* QPIE **sa/Hb(^{h})-* : Lat. *sabīna*	QPIE **sa/HP-* : Lat. *sappīnus*
QPIE **u̯a/h₂k-* : Gk. ὐάκινθος	QPIE **u̯a/HK-* : Lat. *vaccīnium*

Table 3.22 Alternations in gemination

A remarkable pattern emerges in which attested Classical Latin almost always has the variant *without* the geminate. (In *caballus*, it indeed has a geminate *l* despite a singleton *b* however). The robustness of this pattern is questionable however, as in 4 of these cases, Romance forms continue a geminate. This perhaps explains the geminate of Lat. *vaccīnium* (especially if related to *bāca*) and the gemination alternation between Lat. *sappīnus* and Lat. *sabīna*. Classical Latin mainly records forms with a singleton, but it seems to mask the variation that actually existed in Italic. Besides being a sociolinguistic phenomenon, this could also be a chronological issue. The forms with a singleton may have been borrowed before the phonemicization of gemination in Latin, with the geminate forms reborrowed upon the later expansion of Latin.

The geminate *r* of Lat. *cerrus* (and PRom **karr-*, **garr-*) could technically be the result of a suffix like **-so-* against It. dial. *cariglio* < **kar-*. But given the gemination alternations within Italic attested above, it may simply be original. The gemination of Lat. *pannus* is also likely to be genuine; it would be one of the only examples of the *littera* rule involving a nasal and, while it could be syncopated from **pan-ino-*, its meaning seems too basal for such a derived formation.

3.2.2 Vowels

The accent-ablaut system of Proto-Indo-European is relatively well understood. Morphemes with ablaut can appear in the zero grade, the full *e-* or *o*-grade, and the lengthened *ē-* or *ō*-grade. The semivowels **i* and **u* did not participate in ablaut, but could form diphthongs with ablauting vowels (appearing as stand-alone *saṃprasāraṇa* vowels in the zero-grade). The vowel **a*, if it is reconstructible for PIE outside of the influence of laryngeal coloring, was extremely rare. There are only a very limited number of cases that might suggest that it also participated in ablaut, and of them, only quantitative ablaut seems visible (cf. Forston 2010: 81, Melchert 2022). This thesis generally follows the idea that **a* is not reconstructible (cf. Lubotsky 1989, Pronk 2019) and if it is required, it is indicative of the non-native origin of the lexeme in which it occurs. Given this information, we can rule out certain vocalic alternations as inheritable from the outset. Cases of *i* ~ *u*, *e* ~ *u*, *o* ~ *u*, *e* ~ *i*, *o* ~ *i*, *u* ~ *ū* and *i* ~ *ī* are not reconstructible and are indicative of non-native origin. So are, in this thesis, alternations involving *a* of non-laryngeal origin.

In the most general terms, the semantic value of the different ablaut grades is unknown (Fortson 2010: 80), though they are understood to occur in a number of relatively predictable ways in the form of, for the nouns, the various reconstructed accent-ablaut classes (cf. Fortson 2010: 119-22, Beekes 2011: 190-216, Weiss 2020: 276-81 for overviews). Thus in the root of nouns, allowable ablaut is between *e*, *o*, and zero, with complications introduced by the effects of laryngeals. Lengthened *ē*-grade of the root seems to be reconstructible at least for **Hi̯ḗkʷ-r̥-* 'liver'. Lengthened grade roots may also have arisen in the form of Narten-type nominal roots (Schindler 1994) and through the process of creating *vr̥ddhi* derivations (though that the latter dates to PIE is doubted by i.e. Beekes 2011: 181-2). Given these considerations, a question that arises is whether all cases that look like they could be ablaut are in fact of PIE origin. Without any other change in derivational morphology or semantics for example, vocalic alternation between comparanda that could be reconstructed as e.g. the zero-grade and lengthened *ō*-grade of a root does not fit into any of the understood accent-ablaut classes. Thus it looks inherited superficially, but the morphology does not behave in inherited ways, in turn suggesting that it may not be an inherited pattern after all. Both the clear-cut cases mentioned above and cases like this will be considered here.

3.2.2.1 Clearly non-IE Alternations

3.2.2.1.1 E ~ I

Vocalic alternation between *e* and *i* has often been given as a Mediterranean, frequently specifically Etruscan alternation but also Anatolian (e.g. Bertoldi 1939b: 89, Battisti 1959: 154-7). Breyer (1993: 16) notes that, because Etruscan underwent a sound change from *i* > *e*, Latin words that show an alternation (like *vespillō*/*vispillō*) might represent borrowings from Etruscan at different times or regions, or have to do with Etruscan vocalic phonology. When alternations occur with comparanda outside of Italic, it seems like Etruscan can have little to do with the alternation unless as a mediator of vocabulary to Latin—a difficult hypothesis since none of the forms is attested in Etruscan.

The alternation is indeed found with an almost exclusively Mediterranean distribution (see §4.2.2.4.2):

QPIE **e*	QPIE **i*
QPIE **kedro-* : Gk. κέδρος	QPIE **kitro-* : Lat. *citrus*
QPIE **gʰel-iHd-ōn-* : Gk. χελῑδών	QPIE **gʰir-o/und(ʰ)-ōn-* : Lat. *hirundō*
QPIE **gen-es-to-* : Lat. *genesta*	QPIE **gen-is-to-* : Lat. *genista*
QPIE **kup(V)r-et-to-* : Lat. *cupressus*	QPIE **kupar-it-i̯o-* : Gk. κυπάρισσος
QPIE **m(e)nt-* : Lat. *menta*	QPIE **mindʰ-* : Gk. μίνθη
QPIE **gʰed(ʰ)-a/er/s-* : Lat. *hedera*	QPIE **k/gʰidʰ-ar-* : Gk. κιθάρα
QPIE **h₂eu-e(C)s-n-* : Lat. *avēna*	QPIE **h₂eu-iḱ/s-* : PSlav. **ovьsъ* QPIE **h₂eu-ig̑ʰ/S-* : PEBalt. **(a)viža?-*

Table 3.23 Alternations between **e* and **i*

A less clear example is that of Gk. σικύα ~ Hsch. σεκούα, Arm. *sex* (where the Lat. comparandum is *cucumis*). For Lat. *menta*, a loan from Greek through Sabellic could theoretically explain Lat. *e* for *i* (see fn. 171), perhaps in the other cases with this distribution as well. Without attestations of the word in Sabellic, this explanation is no better than suspecting Etruscan as an intermediary. The pair Lat. *hirundō* ~ Gk. χελῑδών has a further comparandum in Alb. *dallëndyshe*, whose root vocalism cannot reconstruct to **e* or **i*. The singular non-Mediterranean case is that of Lat. *avēna* against Baltic and Slavic forms with **i*.

3.2.2.1.2 I ~ U

Vocalic alternation between *i* and *u* has also often been considered characteristic of the Mediterranean substrate (e.g. Hubschmid 1953: 28, Alessio 1955: 375, 537-40 suggesting a substrate vowel *ü*; Battisti 1959: 155), potentially in relation to Etruscan (cf. Bertoldi 1948: 70). Some cases of this alternation within Latin can be explained as regular however. For example, *lubet* ~ *libet* 'it pleases' and *clipeus* ~ *clupeus* 'shield' attest to the change **u* > *i* between *l* and a labial (cf. Weiss 2020: 153). While Bertoldi (1948) suggested that *fūnis* and *fīnis* were related via borrowing from a substrate, such inner-Latin relationships can be explained via IE ablaut, with *e*-grade **ei* > *ī* and *o*-grade **oi* > *ū* (though in this case, the words are not related). Additionally, Sabellic seems to have undergone a change *ū* > *ī* in monosyllables (Cf. Buck 1904: 41). There are several cases of *i* ~ *u* alternation that cannot be explained in these ways; all indeed show a Mediterranean distribution of attestation:

QPIE **i*	QPIE **u*
QPIE **g^{h}el-iHd-ōn-* : Gk. χελῑδών	QPIE **g^{h}ir-o/und(^{h})-ōn-* : Lat. *hirundō*

Table 3.24 Alternation between **i* and **u*

As for the **e* ~ **i* alternation in Lat. *hirundo* ~ Gk. χελῑδών, Alb. *dallëndyshe* reconstructs to different vocalism. An additional case seems to include Lat. *cucumis*, Hsch. κύκυον in alternation with Gk. σικύα (though compare also Hsch. σεκούα, Arm. *sex* in the **e* ~ **i* alternation above). Finally, even if *supparus* is a loan from Oscan, its *u*-vocalism against Gk. σίφαρος remains irregular.

QPIE **ī*	QPIE **ū*
QPIE **d^{h}īk-* : Lat. *fīcus* (Hebr. *šiqmā*)	QPIE **d^{h}/ti̯/u̯ūk-* : Gk. τῦκον, σῦκον QPIE **tu/ūg^{h}-* : Arm. *t^{c}uz*
QPIE **b^{h}rīg-* : Lat. *frīgō*	QPIE **b^{h}rūg-* : Gk. φρῡ́γω

Table 3.25 Alternations between **ī* and **ū*

There is an additional *ī* ~ *ū* alternation present in Lat. *brīsa*. Its most proximal source might be a pre-form of Albanian (or a relative thereof), but the vocalism of PAlb. **brīšā-* is in irregular alternation with forms attested as Gk. βρῦτος, βρύτεα.

3.2.2.1.3 E ~ U

QPIE *e	QPIE *u
QPIE *sb^{h}/g^{wh}end- : Gk. σφενδόνη	QPIE *b^{h}/g^{wh}und(^{h})- : Lat. *funda*

Table 3.26 Alternation between *e and *u

There is no regular way to get a change from *o > Lat. *u* in this position, thus the *e ~ u* alternation is original.

3.2.2.1.4 O ~ U

Alternations within Latin words between *o* and *u* can occur for several reasons. Some are regular (like *o > *u* /_ *lC*). Because Etruscan lacked a graphical distinction between *o* and *u* and Latin transcriptions of some Etruscan names use Lat. <o> for Etr. <u>, the Etruscan vowel's quality may have been phonetically between Lat. *o* and *u* (cf. Breyer 1993: 14-15). Indeed, there are several cases where Etruscan is suspected to have mediated Greek words with *o* to Latin where they show up as *u* and *vice versa*: e.g. Lat. *ancora* < Gk. ἄγκῡρᾰ 'anchor', Lat. *sporta* < Gk. [acc.] σπυρίδα 'basket', Lat. *amurca* < Gk. ἀμόργη 'watery part of pressed olives' (cf. Alessio 1941a: 551 fn. 2, de Simone I: 132-42). Without attested Etruscan forms, this is difficult to verify. Notably, Messapic too lacked a distinction between *o* and *u* (de Simone 2018: 1844). Several lexemes from the dataset show this alternation:

QPIE *o	QPIE *u
QPIE *ke/ol-o/umb(^{h})- : Lat. *columba* QPIE *g(^{h})ol-omb(^{h})- : OCS *golǫbь* QPIE *ḱol-(o)mb^{h}- : Arm. *salamb*	QPIE *gul-ub^{h}- : PGm. *kulubrōn-
QPIE *kotōn- : Lat. *cotōneum*	QPIE *kudōn- : Gk. κυδώνιον QPIE *kodu- : Gk. κοδύμαλον
QPIE *H(o)rk- : Lat. *orca* [QPIE *H(o/u)rk- : Lat. *urceus*]	QPIE *Hurg^{h}- : Gk. ὕρχη [QPIE *H(o/u)rk- : Lat. *urceus*]
QPIE *b^{h}a/ol-ig- : OHG *belihha* [QPIE *b(^{h})o/ul-a/oK- : SGael. *bolachdan*]	QPIE *b^{h}ul-Vk- : Lat. *fulica* [QPIE *b(^{h})o/ul-a/oK- : SGael. *bolachdan*]

Table 3.27 Alternations between *o and *u

ō	*ū*
QPIE *kroHm- : Hsch. κρῶμαξ QPIE *kloHm- : Gk. κλῶμαξ	QPIE *gruHm- : Lat. *grūmus*

Table 3.28 Alternation between *ō* and *ū*

ō	*u*
QPIE *s(u̯)oHr-e/ak- : Lat. *sōrex* [QPIE *su̯o/ur-ak- : Gk. ὗραξ]	QPIE *sur-Vg- : PGm. *s(w)ur(V)ka- [QPIE *su̯o/ur-ak- : Gk. ὗραξ]

Table 3.29 Alternation between *ō* and *u*

Intermediation via Etruscan or Messapic seems particularly unlikely for *columba*[503] and *fulica* due to their distribution of attestation. While *cotōneum* has been suspected of being an Etruscan-mediated Greek loan, especially given its apparent devoicing (cf. de Simone I: 134, II: 271-2, 279), the preservation of *ō* is suspicious as Etruscan does not seem to have distinguished vowel length.

3.2.2.2 *a*-Vocalism

3.2.2.2.1 Reconstructed a-Vocalism

As mentioned above, there is reason to be suspicious of roots for which original *a*-vocalism must be reconstructed. There are number of ways that *a*-vocalism can arise in inherited roots beyond the effects of laryngeals. In Latin for instance, Schrijver (1991: 505) summarizes five sound laws that he finds can lead to Latin *a*: 1) **e* > *a* after a pure velar, 2) Thurneysen-Havet's Law of **ou̯* > *au*, 3) **o* > *a* /*m*, *u̯* _ CV and /*m* _ *r* + velar, 4) **RDC* > *RaDC*, and 5) epenthesis of *a* in sequences C_CCC. Not all of these are universally accepted. There are nevertheless several lexemes for which the *a*-vocalism in Latin has no regular explanation, suggesting it was present at the time of borrowing.

Since **CRHC* yield Lat. *CRāC*, the short *a* of *fracēs* is straightforwardly reconstructed as having entered Italic as **a*.[504] As to Lat. *trabs*, Schrijver (1991: 376, 482) suggests that the Latin form, on comparison with **trēb-* in Sabellic, if it does not represent a regular development from **trb-*, could represent a morphological zero-grade **trēbs*, **trăbes* in which the expected **torb-* < **tr̥b-* was replaced with a form with *a*-vocalism on comparison with the more frequently seen *ē*/*ă* pattern amongst verbs (like *agere, ēgī* and *frangere, frēgī*). That *trabs* could have developed from **trb-* is not clear; though Schrijver (1991: 483-4) finds evidence that tautosyllabic **RD* (where **D* is an unaspirated voiced stop) yielded *RaD*, he prefers the idea that *trab-* developed in the oblique cases of **trēb-* and thus would not have been tautosyllabic. But the idea that the oblique stem of a nominal paradigm was reshaped on analogy with verbal ablaut seems very strange. Given the problems, I think the most straightforward reconstruction is with **a*. Such seems also to have been the case for (at least) the second *a* of Lat. *caballus* and *tamarix*. Potential Sanskrit comparanda for Lat. *caput* and *calix* must reconstruct to *a*-vocalism, since they have not palatalized the preceding *k* or undergone Brugmann's Law, but their appurtenance is uncertain.

For none of the words given here is the reconstruction of *a*-vocalism the only peculiarity; other alternations confirm a non-inherited origin. This seems like good evidence for the existence of this vowel in the contact languages.

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[503] The Coptic forms, lacking the first vowel, show *oo*, *o*, *a*, and *aa*, interestingly suggesting *a*-vocalism in the Egyptian parent form (Allen 2020).

[504] This would be the case for *grãmiae* as well, if its vowel (whose length is indeterminate) were short.

3.2.2.2.2 Alternations Involving A

In the cases above, attested *a*-vocalism has no internally reconstructible source and is likely to have been original. There are additionally several cases where *a*-vocalism can be reconstructed to valid IE pre-forms though only for individual daughter languages; that is, alternations between comparanda rule out the feasibility of these reconstructing representing anything besides original *a*-vocalism. In other cases, irregular alternations that indicate non-native origin make the reconstruction of specifically IE phonemes like laryngeals highly dubious.

3.2.2.2.2.1 A ~ Ā

While Lat. *racēmus* can reflect **HrHk*- (since **HRHC* > Lat. *RăC*, Schrijver 1991: 314), Greek comparanda lack a prothetic vowel and thus rule out an initial laryngeal. While **u̯re*/*oHg*- could be behind the Greek forms (ῥᾴξ, ῥώξ), **u̯rHg*- in Latin should have given ***rāc*-. Thus here too, the *a*-vocalism of Latin was likely present upon borrowing.

The short **a* of Gk. ῥάφυς against the long **ā* of Lat. *rāpum* and Lith. *rópė* could be seen as ablaut grades of a sequence **eh₂*. The Germanic preforms can reconstruct to **ā* (as if **eh₂*) or **ō* (as if *oh₂*). But the root must be reconstructed with invalid initial **r*- and Greek evidence provides variation in the quality of the plosive. The Slavic vocalism reconstructs to more aberrant **ē* or **oi* (or **ai*), and the Celtic comparanda instead show something akin to the *a*-prefix phenomenon. Unlikely to be inherited, the attested *a*-vocalism is thus unlikely explainable via PIE laryngeals.

The long **ā* of Lat. *bāca* stands in contrast to the short **a* of Celtic forms like W *bagad*. These could be reconstructed as ablaut grades of a sequence **eh₂*, but the root begins with **b*, suspicious if inherited. It. *bacca*, if its geminate is original, further points to non-native origin and thus original *a*-vocalism. Similar is the case of Lat. *pannus* alongside PGm. **fanan*- against Gk. πήνη < **ā*. Its geminate *n* is unlikely to be due to the *littera* rule and points to non-native origin.

3.2.2.2.2.2 A ~ E

Even amongst those who work with the existence of a quantitatively ablauting PIE **a*, there is uncertainty about its participation in qualitative ablaut (cf. Melchert 2022: 202). Šorgo (2020: 457-8) lists several cases of *a* ~ *e* alternations in what he identifies as the substrate lexicon of Germanic, proposing it resulted from treatments of a substrate vowel intermediate to **a* and **e*. An *a* ~ *e* alternation has also been proposed to be characteristic of the Mediterranean substrate (cf. Battisti 1943: 146; Alessio 1946a: 165; Hubschmid 1953: 48, Battisti 1959: 130, 147, 284).

An *a* ~ *e* alternation occurs in the initial vowels of Lat. *alaternus* against Cretan Greek ἐλαίτρινος. While ***h₁lC*- could have yielded the forms, **h₁lV*- cannot. Romance comparanda for Lat. *cerrus* attest to *a*-vocalism. While this could be the result of ablaut within a root **kh₁er*- (full *e*-grade for *cerrus* and zero-grade for the Romance forms),

further alternations in consonant voicing and gemination demonstrate non-native origin of this lexeme. These two cases are attested with a Mediterranean distribution.

The *a* of Lat. *lapis* against the *e* of Gk. λέπας could reconstruct to **hₗ*. But Romance forms attest to an irregular geminate *pp* (potentially even more aberrant PRom. **lībb-*). OIr. *líe* (if it reconstructs to **p* rather than **ṷ*) can be reconstructed to either **ẽ̆* like Greek or **ĩ̆* like the most aberrant Romance form.

For the Slavic comparanda of Lat. *alnus*, an *a* ~ *e* alternation does not seem to be easily explained away. The same is probably true for the **e* of ON *jǫlstr* against **a* elsewhere. (It cannot be ruled out that the *a* ~ *e* alternation of the Baltic forms is due to Rozwadowski's change.) While the *a* ~ *e* alternation in Germanic, Baltic, and Slavic can be explained as **o* ~ **e*[505] and thus QPIE **hₗe* ~ **hₗo*, Lat. *alnus* would require **h₂e*. Thus a laryngeal cannot account for the alternation. Lat. *aper* and its Umbrian cognates have *a*-vocalism against *e*-vocalism in Germanic and Greek. Some have suspected contamination from the *a* of *caper*. But it can also be taken at face value as a substrate alternation. That Balto-Slavic has an additional element before the vowel is further evidence of this.

The long *ē* of Lat. *cēpa* cannot be reconstructed to the same pre-form as Hsch. κάπια. If the latter is truly Greek, then it attests to an irregular alternation. If it is not, then Hesychius has recorded a foreign word that appears in Latin with different vocalism. Finally, Lat. *nāpus* corresponds to Gk. νᾶπυ, whence it may or may not be a borrowing. If independent, it stands in irregular alternation with Arm. *niw*, whose vocalism can be reconstructed to **i* or **ē*.[506]

3.2.2.2.2.3 A ~ O

The analysis of *a* ~ *o* alternation is made difficult by the fact that both phonemes merge in Albanian, Germanic, Baltic, Slavic, and Indo-Iranian. Thus the true extent of *a*-vocalism and *a* ~ *o* alternation is hidden in these branches.[507] Šorgo (2020: 458-9) even suggests that the substrate language(s) of Germanic may not have had a phonemically rounded low vowel, noting that in several cases of PGm. **a* against **o* in other branches, the phonetic environment between a labial and resonant may be responsible for conditioning the rounding.

Within Latin, an *a* ~ *o* alternation seems to exist between *caulae* and *cohum*. There are also a few examples between Latin and other branches that do not merge **a* and **o*. It likely appears between Lat. *corbis* ~ OIr. *carpat* (though the appurtenance of the latter is uncertain), unless this represents a *ø* ~ *a* alternation (**krb(ʰ)-* for Latin, **karb(ʰ)-* for

[505] In light of this, we can reconstruct either **a* ~ **e* ~ **o* alternation or simply **a* ~ **e* alternation. The latter seems preferable (cf. Šorgo 2020: 459 fn. 38).

[506] Lat. *cēra* cannot be ruled out as a loan from Gk. κηρός. But the latter, whose vocalism is almost certainly to be reconstructed as **ē*, stands in irregular alternation with PEBalt. **kār-*, attesting to an **ā* ~ **ē* alternation.

[507] And given that the languages where the merger does not occur are Celtic, Armenian, Greek, and Latin, there exists the risk of over-Mediterraneanizing the presence of *a*.

Celtic). While some reconstruct this alternation for PIE (cf. Melchert 2022: 198, Forston 2010: 81), an Indo-European origin for this lexeme is made unlikely by the further alternation introduced by PGm. **krebō-* < QPIE **greb^{h}-*. The vocalism of Lat. *lacerna* matches that of Gk. λάκκος, though the latter itself alternates with Gk. λόκκη. This is similar to the case of Lat. *racēmus* above, which alternates with Gk. ῥᾱ́ξ and ῥώξ. The *a* ~ *o* alternation of Lat. *badius* and OIr. *buide* is less straightforward, as mechanisms have been proposed within each language that could result in the change: Celtic **a* raising between a labial and a palatal consonant (Thurneysen 1946: 50), Italic **o* unrounding after a labial consonant (Schrijver 1991: 454-65). In neither case is it fully certain that the mechanism can have occurred.

3.2.2.2.2.4 A ~ AU

There are two cases of an *a* ~ *au* alternation in the dataset. The first is the Mediterranean pair Lat. *caupō* ~ Gk. κάπηλος. Even if the ultimate source is Hitt. *ḫāppar-* (cf. Puhvel III: 127), it has not entered into Latin directly. Second, PGm. **haubuda-* and **haubeda-* attest a diphthong **au* against **a* in PGm. **habuda-* and **hafulan-* as well as in all other comparanda for the word (including Lat. *caput*). This has been interpreted as *u*-infection (Boutkan 1998: 111, DV 91) or metathesis from oblique forms (Kroonen 2013: 215), but in light of the possibility of non-IE origin, this could represent a genuine alternation.

3.2.2.2.2.5 A ~ U

The best semantic match for Lat. *calix* (whose *a*-vocalism may be matched by Skt. *kaláśa-*) is Gk. κύλιξ, attesting to an *a* ~ *u* alternation. Lat. *raia* could reconstruct to **HrHg-*, but its Germanic comparanda (PGm. **rugg-* and **rehhōn-*) do not reconstruct to a laryngeal. Thus the *a* of Latin alternates with both **u* and **e* in Germanic. Lat. *tamarix* has either been borrowed very late (after the effect of vowel weakening) or owes its unweakened second *a* to the *alacer* rule. In any case, its original quality was **a*, whether of laryngeal origin or not. It stands in alternation to the *u* of Gk. μυρίκη, which appears without the initial *ta-* of the Latin form (and has therefore been analyzed as a prefix, perhaps of Berber or Semitic origin).

3.2.2.2.2.6 A ~ AI

Schrijver (1997: 306) notes a pattern in which British Celtic *a* corresponds to Germanic *ai* in eight lexemes, proposing that it is the result of the branches nativizing a foreign substrate phoneme like /aə/. In none of the lexemes does a comparandum exist in Latin. He does however mention a similar phenomenon in the Mediterranean, noting for example Gk. χλανίς against Gk. χλαῖνα (cf. also Lat. *laena*) as well as Lat. *aesculus*,[508] for which he considers the comparison with Gk. ἄσκρα and Basque *azkaŕ* and *askaŕ* certain (and not mentioning the possibility of a relationship with PGm. **aik-*). Because

[508] Cf. also Bertoldi (1942: 191 but only between Basque and Greek, the Basque forms somehow with *e-*), Alessio (1948-9: 148), Hubschmid (1953: 84, fn. 1).

of the differences in patterns of attestation, he is rightly hesitant to attribute both patterns to the same phenomenon. Šorgo (2020: 457-8) suggests expanding this alternation pattern to include the cases of *a* ~ *e* alternation within Germanic and between Germanic and other branches. He similarly proposes that this was the result of a foreign phoneme (transcribed as **æ*), perhaps one that was perceived by PIE-speakers as similar to both **a* and **e*. Including this as part of the same phenomenon as the *a* ~ *ai* alternation involves the inclusion, beyond Germanic and Celtic, of Italic, Greek, Baltic, and Slavic.

I would rather follow Schrijver's more cautious approach in considering these different alternations as potentially separate phenomena, especially in light of the large number of more or less perfect Celto-Germanic correspondences he is able to locate. Thus I here list the *a* ~ *ai* alternation separate from the *a* ~ *e* alternation above. I find only two examples (excluding Lat. *laena*, as its diphthong seems to suggest an indirect borrowing from Greek, where the diphthong may be the result of Greek sound laws) of an *a* ~ *ai* alternation involving Latin. The first is Lat. *alaternus*, whose second *a* vowel stands against αι in Cretan Greek ἐλαίτρινος. Second is Lat. *paelex* ~ Gk. παλλακή. At first glance, it seems to fit the secondary Mediterranean type that Schrijver mentions, but this is complicated by the additional comparison with OIr. *airech*. Its *a* most easily reconstructs to *a*-vocalism, though before a palatalized consonant, **e* is also a possibility. It feels like a stretch to link the Celto-Germanic *a* ~ *ai* alternation to the Mediterranean *a* ~ *ai* alternation on the basis of one form whose vocalism is not even guaranteed. Thus it really seems like these are two separate phenomena, with OIr. *airech* potentially representing the partial participation of Celtic in the Mediterranean substrate.

3.2.2.3 Wider Variation

There are several cases for which the wider amount of variation in reconstructible vocalism makes it difficult to categorize alternations.

A root of the shape **u̯reh₂d-* could yield PGm. **wrōt-* in the full-grade and PAlb. **wradn(i̯)ā-* and PGm. **wurti-* in the zero-grade (along with Lat. *rādīx* and Gk. ῥᾰ́διξ) in either. No ablaut grade of a root of this shape can give PCelt. **wradi-* however (as both *e-* and zero-grades would give ***wrādi-*). Nor can a root with a laryngeal give PCelt. **wridā-* or Gk. ῥίζα. The original thus variation seems to be between **ā*, **a*, **r̥*, and **i*. Given that the presence of an IE feature like a syllabic *r* in a non-IE language is dubious, perhaps the vowel of PGm. **wurti-*, PCelt. **wridā-* and Gk. ῥίζα reflects something akin to a schwa (cf. Šorgo 2020: 456 fn. 25).

The *a* of Lat. *trabs* alternates with **ē* in Oscan and **e* in Umbrian and Celtic as well as **o* (with Winter's Law and metathesis) in Baltic and what reconstructs to a syllabic resonant in Germanic (perhaps original **u* or a schwa as above).

Lat. *tilia* can be reconstructed to original *e*-vocalism like PGm. **felwō-*, Arm. *tʿeli*, and Gk. πτελέα. If PCelt. **axtl/nV-* can be reconstructed as such, it points to the vocalic reduction triggered by an *a*-prefix (see more below). If Lat. *pōpulus* is connected, then

this reducible *e*-vocalism additionally alternates with **ō* and **a*/*o*.

The case of Lat. *plumbum* is complex, likely representing a Wanderwort. The whole family seems to reflect a non-IE diphthong. PGm. **blīwa-* against Gk. μόλιβδος, μόλυβος points to an **ī̃ ~ *u* alternation in a diphthong with **b ~ *w* alternation. Lat. *plumbum* matches μόλυβος quite well, if perhaps the vowel of the diphthong was nasalized. PCelt. **(ϕ)loudio-* < QPIE **ple*/*oud*(*ʰ*)- is difficult to analyze. If the dental element is a suffix like μόλυβδος, then the **u* of its diphthong might correspond to the **b ~ *w* element. Its **e*/*o*-vocalism would then be in alternation with the **ī̃ ~ *u* of the other forms.

3.2.2.4 Ablaut Phenomena

It is important to note, as has been mentioned above, that several lexemes attest to vocalic alternation that looks similar to acceptable Indo-European ablaut. In many cases, further irregular correspondences between the comparanda show that the words are not of IE origin, and therefore that the resemblance to IE ablaut is coincidental.[509] In other cases, the vocalic alternation is between vowels that participate in ablaut, but its appearance does not correspond to a known accent/ablaut pattern. In these cases, we must ask, as will be done in §3.3 about morphological features, whether Indo-European features behaving in non-Indo-European ways might not be Indo-European after all.

3.2.2.4.1 Ablaut Unparalleled in IE

Lat. *alnus* and its comparanda can be interpreted as a root **a*/*el-* with a sigmatic suffix, but the alternations in vocalism of that suffix do not follow a known PIE pattern. Szemerényi (1960: 228) proposed **-is-* as the basis for all comparanda, but Latin *alnus* can only be reconstructed to **-s-*. The *i ~ u* alternation within the suffix in PGm. **aluz-* beside **alis*/*zo-* is the expected reflex of an inherited PIE *s*-stem (cf. Schrijver 1991: 41), but the *i*-vocalism is present in Slavic as well, where it cannot be explained in such a way (cf. Derksen 2007: 370). Thus its incorporation into the inherited *s*-stems seems to be a uniquely Germanic development. The absence of the *i* in Baltic may or may not be due to sporadic syncope. However, put all together, the evidence shows the alternating presence of a vowel in a sigmatic suffix **-s-* (guaranteed by Latin) ~ **-is-* (guaranteed by Slavic). This alternation cannot be understood in terms of inherited ablaut and, in the face of the *a ~ e* alternation also present in the comparanda, is a feature of the substrate language itself or the borrowing process from that language.

Inherited ablaut is likewise unable to account for, on the one hand, Lat. *ulmus* and the Germanic variants **elma-* and **alma-* and, on the other hand, PCelt. **limo-*/**lemo-* (behind MIr. *lem*) and **lēmā-* (behind W *llwyf*) < QPIE **(h₁)leim-*.

[509] Cf. Stifter's (fthc.) "linguistic pareidolia".

3.2.2.4.2 Ablaut Difficult to Motivate from an IE Perspective

The most secure comparanda for Lat. *ardea* is Gk. ἐρῳδιός. Even if the variants ἀρωδιός and ῥωδιός are explained away, *ardea* can only be reconstructed to a zero-grade **Hrd-* to which ἐρῳδιός represents the lengthened *o*-grade (as **HrHd-* ought to yield Lat. **radea*, cf. Schrijver 1991: 314). It is immediately suspicious that there is no recognized accent/ablaut pattern that results in **ō* ~ **ø* ablaut. The appurtenance of PGm. **artō*(*n*)-, which requires a full vowel to the left of the resonant further points the conclusion that the unparalleled ablaut is not PIE at all.

The same pattern occurs for Lat. *sōrex* beside Gk. ὗραξ and OSw. *surk*. Working from a root **su̯er-*, Vine (1999a: 572-3) explains the Greek vocalism as an original *o*-grade with Cowgill's Law. This cannot apply to Germanic however, which can only reconstruct to a zero-grade **sur-*. Again we are faced with unparalleled **ō* ~ **ø* ablaut, this time in roots of identical structure (i.e. none of the forms can be argued to be derivational). The aberration in voicedness of the velar suffix between the forms allows us to conclude that the ablaut looks so strange because it is not PIE.

3.2.2.4.3 Vocalic Alternations That Can Occur in Ablaut Paradigms

There are several cases where vocalic alternation can be reconstructed as relatively unproblematic IE ablaut, but for which other irregular correspondences provide sufficient evidence of a non-IE origin. In these cases, the ability to reconstruct inherited ablaut grades must be due to coincidence.

The following lexemes can be reconstructed to alternations in *e*- and *o*-vocalism. In inherited lexemes these could continue an old acrostatic paradigm, but here they are not inherited:

QPIE **e*	QPIE **o*	Irregularities
QPIE **h₁er*(*H*/*V*)*u̯*- : Lat. *ervum* QPIE **h₁erh₁b*- : Gk. ἐρέβινθος	QPIE **h₁orh₃-b*- : Gk. ὄροβος QPIE **h₁oru*- : ON *ertr* QPIE * *h₁orVb*- : Arm. *aṙowoyt*	*b* ~ *w* Disyllabic root
[QPIE **su*(*e*/*o*)*lp*- : Lat. *sulpur*] [QPIE **su*(*e*/*o*)*lF*- : PRom. **su*(*l*)*fur*-] QPIE **su̯e*(*l*)*bʰ*/*p*- : PGm. **swe*(*l*)*bla*-	[QPIE **su*(*e*/*o*)*lp*- : Lat. *sulpur*] [QPIE **su*(*e*/*o*)*lF*- : PRom. **su*(*l*)*fur*-]	**bʰ* ~ **p*

Table 3.30 Alternations between **e* and **o*

Several cases can be reconstructed to alternations in *e*-grade and zero-grade vocalism, as if perhaps (leveled) continuants of a proterokinetic stem. Again, here they are not inherited:

QPIE *e	QPIE *ø	Irregularities
QPIE *b^hers- : Lat. *ferrum*	QPIE *b^hros- : PGm. **brasa-*	Schwebeablaut
QPIE *(*H*)mes-*Vl*- : Lat. *merula* QPIE *(*H*)mes-(*a*)*l*- : PCelt. **mesal-*	QPIE *$h_{2/3}$ems-lo- : PGm. **amslōn-*	Schwebeablaut
QPIE *$\underset{\cdot}{u}$eiks- : PGm. **wīhsilō-* QPIE *$\underset{\cdot}{u}$ei(*k*)s- : PSlav. **višь-*	QPIE *$\underset{\cdot}{u}$isk- : Lat. *viscum* QPIE *$\underset{\cdot}{u}$iks- : Gk. ἰξός	*SK* metathesis

Table 3.31 Alternations between **e* and **ø*

For Lat. *ferrum*, a derivation from **b^her-s-* looks like a proterokinetic *s*-stem, but the **b^hr-os-* with zero-grade of the root for PGm. **brasa-* is unexpected, even from a neuter *s*-stem. Thus it seems rather that the **s* was part of the root. Instead of an *e*-grade ~ zero-grade alternation, if the **s* is part of the root, we have *e*- and *o*-vocalism, but on opposite sides of the resonant. Its presence in Italic and Germanic alone in the face of a similar-looking Wanderwort of Luwian origin makes it very unlikely that the Italic and Germanic words are inherited. For Lat. *merula*, the forms without an initial vowel show a full-grade root whereas Germanic, with an initial vowel, shows a zero-grade root. This could be construed as Schwebeablaut in root **$h_2$ems-*, but it fits much better into the pattern of *a*-prefixation that will be discussed below.

3.2.3 Phonological Conclusions

The overall trend that emerges is that phonological alternations on their own, while being the gold standard for identifying non-inherited lexemes, are not very useful for stratificational purposes. A combination of at least four factors has been interacting to produce the complicated picture we have received. 1) Latin has interacted with an unknown number of other languages. 2) Latin has interacted with these languages at different points in time and for different lengths of time; thus both it and the languages with which it was interacting were undergoing changes during the periods of contact. 3) Latin had a closed set of phonemes which it used to reflect all foreign sounds present in the words it borrowed. Another language's larger phoneme inventory would have been collapsed. But even if another language had a smaller phoneme inventory, if some of those phonemes were perceived as intermediate to native sounds, they could have been borrowing different ways (cf. the ideas proposed for the borrowing of Etruscan *u*). These effects of the borrowing process are likely behind some of the various alternations in plosive voicedness and aspiration. 4) The languages from which Latin borrowed could themselves have had dialectal variation or have been related more distantly at the family level to other languages, resulting perhaps in some of the same alternations as in (3) but also perhaps more drastic alternations (like some of those beyond the plosive rows). The effects of each of these factors has been collapsed down to one dimension: that of the attested Latin lexicon. And it is therefore perilous to conclude that every example of an irregular alternation is due to contact with the same language. In the other direction, it is difficult to know which alternations are related to one another. Are the cases of *s*-insertion related to the cases of *SK* metathesis for instance?

In fact, describing the alternations in terms of voicing and aspiration is almost certainly inaccurate. It is a useful shorthand to show that alternations exist by reconstructing proto-forms to PIE and pointing out their irreconcilability. But this obfuscates the original nature of the phonology of the contact languages. The traditional reconstruction of *tenues*, *mediae*, and *mediae aspiratae* is in competition with the various reconstructions under the glottalic theory. Thus a reconstructed **b^h* ~ **p* alternation could instead have been a **p:* ~ **p*, **p* ~ **p^h*, or **p* ~ **b* alternation. Which of these represents the truth, we may never know. (Though in some cases, like *fīcus*, our guesses can be refined.)

A clearer stratificational picture will be provided when the alternations are examined in combination with the distributions of the lexemes in which they are attested (see §4).

3.3 Morphological Alternations

An interesting contrast to the phonological alternations is provided by morphological alternations. As opposed to the large number of different factors that can all have the same phonological result, there is less of a chance that two different languages have identical morphemes (or morphological phenomena). It is by no means bulletproof however (sometimes unrelated languages *do* have otherwise identical morphemes or phonological consequences of the borrowing process might merge two originally different morphemes).

Much of the work that has been done on non-IE morphological features to date has been on affixes. For instance, Ernout (1946: 21-51, reprint of 1930) proposed several suffixes in Latin that he thought could represent borrowings from Etruscan. Bertoldi, Alessio, Battisti, and Hubschmid defined several different substrate suffixes that recurred in Latin and Romance languages. Beekes (esp. 2014) lists 149 suffixes that he attributes to his version of Pre-Greek. With the understanding that suffixes of any origin can be added to bases of any origin, I looked for morphological features secondarily. Some morphological patterns factor into the primary evidence, such as the *a*-prefix phenomenon and polysyllabic roots, because they cannot be regularly reconstructed to PIE. Otherwise, considered in this section are a few cases of recurring morphemes on lexemes whose non-native origin is indicated by other features, making them potentially also of non-native origin themselves.

3.3.1 Pre-Greek Suffixes

While the following sections will discuss morphological features that appear between comparanda of Latin words, there are several cases of Latin words that themselves contain suffixes otherwise suspected to be Pre-Greek (in the Beekesian sense of restricted to Greece).

3.3.1.1 Latin *-essus*

On the basis of Greek placenames in -σ(σ)ος (and -τ(τ)ος) that matched placenames in Asia Minor, Kretschmer (1896: 405-6, further e.g. 1923a: 69) proposed influence from a language of Asia Minor, with the caveat that such a sequence also appears in inherited formations. With the discovery of the Anatolian languages, the possibility that these suffixes represented vestiges of previous Anatolian-speaking (more specifically Luwian) inhabitants developed (cf. recently Finkelberg 2006: 52, West 2007: 8, who names it "Parnassian"). The variant -τ(τ)ος has led some to be suspicious of this explanation (cf. Morpurgo Davies 1986: 119-120). Beekes (2009: 192-3) explains it as the reflex of Pre-Greek palatalized velars (adducing as evidence the Hsch. var. δαλάγχαν of Gk. θάλασσα, Attic θάλαττα) and (in Beekes 2014: 39) considers it a non-IE Pre-Greek suffix.

Whether of ultimate IE origin or not, the suffix is at home in Greek. In Latin, the sequences *-issa/us* and *-essa/us* appear, when not inherited (e.g. compounds of *missus* and *gressus* etc.), in direct loans from Greek (e.g. *narcissus* < νάρκισσος). In one case, *cupressus*, the suffix appears on a Latin word that has not been directly borrowed from its Greek comparandum κυπάρισσος.

3.3.1.2 Latin *-undo*

Likewise on the basis of placenames, matches between Gk. -νθος and *-anda* in Asia Minor led the Greek suffix to be early on considered a relic of a Pre-Greek substrate (cf. Kretschmer 1896: 402-5, but already Pott 1853: 451). Like -σ(σ)ος, attempts have been made to give it an IE origin (cf. discussion in Kroonen fthc.; additionally, Finkelberg 2006: 52 and West 2007: 8 consider it Luwian). And like -σ(σ)ος, it is still widely considered to be of non-IE Pre-Greek origin (cf. Beekes 2014: 37, Kroonen fthc.).[510]

The representation of the Pre-Greek suffix in Latin is difficult to analyze. Firstly, there are several cases of Greek lexemes with the suffix -ινθ- that have Latin comparanda in which the suffix is not present; even when something similar to it is present in other non-Greek branches. The best and most curious example is that of Gk. ὄροβος ~ ἐρέβινθος, beside which PGm. **arwīt-* < QPIE **orw-īd-*, Arm. *aṙowoyt* < QPIE **HrVbʰ-oud-*, and maybe even Iranian forms < QPIE **Hreb(ʰ)-e/ont/d(ʰ)-* contain a suffix that looks comparable to -ινθ-/-ννθ-. Lat. *ervum* however lacks the suffix completely.

In contrast to this, Lat. *bolunda* seems to suggest that *-und-* is the Latin reflex of Pre-Greek -(υ)νθ-, as compared with Gk. ὄλυνθος whence it almost certainly cannot be a regular borrowing. There are two other cases of obscure Lat. *-und-*, but they remarkably do not correspond to Greek forms with -νθ-. Lat. *harundō* has no secure relatives while Lat. *hirundō* corresponds to Alb. *dallëndyshe* (whose root ends in QPIE *-(o)nt/d(ʰ)-) but Gk. χελῑδών (with no trace of the nasal or aspirated consonant). Perhaps this suggests

[510] Against a Luwian origin, Morpurgo Davies (1986: 120) rightly wonders why it surfaces as -νθ- rather than -ντ- or -νδ-.

that the Latin words are borrowed independently of Greek (i.e. from a relative of Pre-Greek on the Italian peninsula), but they are so few that this is unlikely. Additionally, Kroonen (fthc.) notes the peculiarity that Lat. *menta* ~ Gk. μίνθη and PRom. (Southern Italian) **plenta-* ~ Gk. πλίνθος potentially present conflicting outcomes of the same suffix.

3.3.1.3 Latin **-ara*

Beekes (2014: 32), following Furnée (1972: 256-7, esp. 257 fn. 36), gives evidence of -αρ- as a Pre-Greek suffix. Gk. κισσός ~ κίσσαρος, κιθάρα has a Latin comparandum in *hedera*. The latter reconstructs to a pre-form identical to that of κιθάρα but for an *e* ~ *i* alternation, interestingly the same as that between Lat. *cupressus* ~ Gk. κυπάρισσος, Lat. *hirundō* ~ Gk. χελῑδών, Lat. *menta* ~ Gk. μίνθη and PRom. **plenta-* ~ Gk. πλίνθος above.

3.3.1.4 Conclusion on Pre-Greek Suffixes in Latin

The paucity of the reflexes of these suffixes in Latin lexemes in comparison with their frequent occurrence in Greek seems to point away from a Pre-Greek-speaking population in Italy. If this is the case however, then the words must have been transmitted from Greek to Latin via an intermediary language, perhaps via sea trade. This is plausible for *cupressus*, *bolunda*, and **plenta-*, which may be considered items of economic importance. It seems more difficult to understand this for *harundō*, *hirundō*, *menta*, and *hedera*. The first two, as mentioned, do not certainly contain a Pre-Greek element. For the Greek comparanda of *menta* (and **plenta-* for that matter), although they end in a sequence containing -ινθ-, it is difficult to confirm that they indeed attest to the -ινθος suffix (cf. Kroonen fthc.). The explanation of *hedera* remains elusive. It is *a priori* plausible that a language related to Pre-Greek would have been spoken on the Italian peninsula (i.e. that it was not exclusive and unique to Greece), but it seems dubious to confirm its presence on the basis of one word. In the end, what we find might be a combination of words from a Mediterranean substrate language borrowed independently by Latin and Greek and Pre-Greek words mediated into Latin by a (and in some cases surely the same) substrate language.

3.3.2 The *a*-Prefix

Schrijver (1997: 296-7, 307-12) collected examples of a phenomenon in which some languages attest to a lexeme with an initial *a-* against others without the *a-*. In the best examples, the *a*-prefixed words shows a concomitant reduction in vocalism. The first three he accepted were **amsl-* (OHG *amsla*) ~ **mVsl-* (Lat. *merula*, W *mwyalch*) 'blackbird', **alaud-* (Gaulish *alauda*, documented in Latin) ~ **laiwaz-* (OE *lāwerce*) 'lark', and **arud-* (OHG *aruz*) ~ **raud-* (Lat. *rauda*) 'ore'. Further examples exhibit the vacillating presence of an initial *a-* but lack the vocalic reduction, perhaps representing leveling of the vocalism: W *garr* 'leg, shank' ~ Hsch. ἄκαρα 'leg', PCelt. **strabi-* (OIr. *straiph, sraib* 'sulphur', *sraiftene* 'lightning') ~ PGk. **(a)st(e)rVp-* (ἀστεροπή, στεροπή,

ἀστραπη, etc. ‘lightning’). But Schrijver was unsure of the many examples given by Furnée (1972: 368-74) of vacillating *prothetisches* α belonged to the same phenomenon.[511] Iversen and Kroonen (2017: 518) added several further examples:

- *r(ō)d- (Gk. ῥωδιός, Serb. *róda* ‘stork’) ~ *ard- (ON *arta* ‘teal, garganey’, Lat. *ardea*, Gk. ἐρῳδιός, ἀρωδιός ‘heron’)
- *reʔk- (ON *rækja* ‘shrimp’) ~ *arʔk- (Ru. *rak* ‘crayfish’, Lith. *érkė* ‘tick, mite’)
- *gedl- (Gk. γέλγῑς ‘garlic’) ~ *agdl- (ἄγλῑς, Lat. *allium* ‘garlic’), cf. already Kroonen (2012b)
- *raiʔs- (Lith. *ríešas* ‘nut’) ~ *arʔs- (Ru. *oréx*, Alb. *arrë* ‘walnut’)
- *sak-/*se-sk- (OE *secge* , OIr. *seisc* ‘sedge’) ~ *as(a)k- (Ru. *osóka* ‘sedge’)
- *setr- (OHG *sturio* ‘sturgeon’) ~ *as(e)tr- (Ru. *osëtr* ‘sturgeon’), cf. already Kroonen (2012a: 240, 256)
- *rap- (Gk. ῥάφ/πυς, Lat. *rāpum*, OHG *ruoba* ‘turnip’) ~ *arb- (W *erfin* ‘turnips)
- *sker- (OHG *sker* ‘mole’) ~ *askr- (Gk. ἀσκαρίς ‘worm’, Ru. *jáščer* ‘lizard’)

Schrijver (2018: 362) adds *aleil- (Hitt. *alēl*) ~ *leil- (Lat. *līlium*, Gk. λείριον) ‘lily’.

Schrijver (2017: 362) suggested that the *a*-prefix and its effects on vocalism was similar to that of the Hattic nominal prefix *ha-*,[512] as part of the evidence that the language of the first European farmers may have been related to Hatto-Sumerian. Šorgo’s (2020: 457) explanation on the other hand is that it is not actually an *a*-prefix at all. Instead it is a subset of a broader substrate feature of accentually conditioned alternation from an original (C)V́CV ~ (C)VCV́C.[513] As examples of other types of cases, he provides:

VCC- ~ VCVC- (PGm. *arwīt-, Lat. *ervum* ~ Gk. ὄροβος, ἐρέβινθος)

CVC̯- ~ CCV̯- ~ CC̯- (Gk. μόλυβδος etc. ~ PGm. *blīwa- ~ Lat. *plumbum*)

CVCC ~ CCVC (PGm. *maldjo- ‘orach’ ~ Gk. βλίτον, βλῆτον ‘amaranth’), (PCelt. *se/immr- ‘clover’ ~ PGm. *smai/ēr- ‘sourgrass’), (PGm. *waldō- ~ Lat. *lūtum* < *u̯loṷt-/*u̯lūt- ‘dyer’s rocket’)

CVCC ~ CVCV (PGm. *samda- ~ Gk. ἄμαθος ‘sand’)

CVC̯C ~ CC̯VC (PGm. *waizda- ~ Gk. ἰσάτις ‘woad’)

If Lat. *ervum* ~ Gk. ὄροβος is a part of this phenomenon, then the numerous cases of the

[511] As a general substrate feature, cf. e.g. Alessio (1944a: 149, fn. 242), Hubschmid (1950b: 291). Furnée (1972: 368 with further lit.) finds this phenomenon distributed from Iran and Mesopotamia, through Asia Minor, Greece, and the Balkans, to the Western Mediterranean.

[512] A similar source had been suspected of producing the prothetic *a-* in some toponyms in Asia Minor (e.g. Kretschmer 1933a: 86).

[513] Recently, Schrijver (fthc.) along similar lines has instead proposed that the source of the *a*-prefix alternation is an East Caucasian language.

a-prefix only coincidentally have *a*-vocalism. Potentially in favor of this is the case of the elm word (Lat. *ulmus*), which Schrijver (1997: 311) was uncertain about adding because Germanic has both *e*- and *a*-vocalism of the prefix (and Latin probably has *e*- or *o*-vocalism). Perhaps the Greek form ἐρῳδιός with its initial *e* shows this pattern as well. If Kroonen's addition of PGm. **sturja*/*ōn*- is correct, it should be noted that the Slavic forms all regularly reconstruct to *e*-vocalism. Thus this would be another example of an *e*-prefix. If the vowel does not have to be *a*, then Šorgo's proposal seems attractive. It is strange that there are so few cases with non-*a* vocalism, but perhaps this has something to do with the distribution of vowels in the substrate language(s).

Regardless of which explanation is correct, there are indeed several Latin lexemes that participate in the phenomenon of *a*-prefixation. From the dataset, *ardea*, *merula*, *rāpum*, and *raudus* (as well as *ervum* and *plumbum*) have already been mentioned. *Ālium* fits, with some difficulties, into the pattern including Gk. γέλγῑς ~ ἄγλῑς, as does *excetra* to the pattern including Baltic, Slavic and Germanic sturgeon words. I am not sure that the *līlium* lexeme belongs to this group, because it seems plausible that the initial *ḥ* of the Egyptian comparandum, if it represents the source, could have affected the anlaut in the borrowings.

To the list can be added Lat. *tilia*, whose Celtic comparanda from PCelt. **axtlV*- can be reconstructed further to **aptlV*- (cf. the preserved initial cluster in Gk. πτελέα). Lat. *pirum* ~ Gk. ἄπιον might represent an example where the vocalism of the root has been leveled. Restricted to Latin and Greek (and perhaps languages much further East), it distribution makes its relevance to this widespread European phenomenon uncertain. Finally, if the vowel of the *a*-prefix indeed does not have to be *a*, then an example from the uncertain cases might include Lat. *īnsula* (s.v.) against Gk. νῆσος. The other evidence of a non-*a* vowel involves *e*, but *īnsula* (with regular lengthening from **in*-) has perhaps undergone the same change **en*- > *in*- that occurred in the preposition, preverb, and negative prefix.

3.3.3 The Velar Suffix[514]

Numerous Latin words ending in *-ax*, *-ex*, *-ix*, and *-ox* lack a good IE etymology and fall into semantic categories including animals, biting insects, trees, plants, and body parts (cf. Ernout 1946: 133-63, Leumann 1977: 375-6, Weiss 2020: 326-7). While some lexical bases to which this suffix is attached can be argued to be inherited (Ettmayer 1926: 23, Ernout 1946, Specht 1947: 40-1, Martinet 1955, Olsen 2009, Matasović 2016, Weiss 2020: 326-7), many of the etymologically obscure forms have long been suspected of being non-IE in origin (Ettmayer 1926: 23; Terracini 1929: 212-14; Bertoldi 1937: 157; Gerola 1942: 364; Alessio 1944a: 104; Hubschmid 1953: 84, 1960: 97; Leumann 1977: 375; DV 299). Likewise, numerous Greek words in -αξ, -ακος belong to similar semantic categories and are also suspected of being loanwords (Nehring 1925,

[514] This section follows and is developed out of Wigman (fthc.).

Chantraine 1933: 376-83, Beekes 2014: 32, 44).

A suffix *-*k*- is reconstructible for PIE in many forms and functions (cf. Brugmann 1906: 472-506), but an interesting pattern emerges as concerns especially the *-ix*/*-ex* suffixes of Latin.[515] While thematic velar suffixes and athematic velar suffixes with a long vowel have good parallels in other branches and have relatively well-understood sources (cf. Wigman fthc.), the athematic, short-vowel *-ix*/*-ex* suffixes are often isolated to Latin. There is little lexical overlap with other branches. One case might be Lat. *natrix* 'sea serpent' against OIr. *nathir* < **natrik*- but this is complicated by the Brythonic forms reconstructing to **natrī*- and Germanic forms similarly lacking the velar element. In Greek, Kölligan (2017: 369-70) suggests that no cases of Greek formations in -αξ beside a velar element in another branch need be interpreted as anything but individual parallel developments. There are indeed remarkably few cases of Latin *-ex* corresponding to Gk. -αξ (suggesting that Lat. *-ex* is, at least in some cases, the result of weakening from **-ax*). This includes Lat. Lat. *mūrex* ~ Gk. μύαξ 'murex' and, rather uncertainly, Lat. *īlex* ~ Macedonian (Hsch.) ἴλαξ 'holm oak'.[516] Crucially, this same correspondence occurs in one lexeme that has a Germanic comparandum where the velar is voiced (1). This irregular alternation between Germanic **k* < QPIE **g* against Lat. **k* < QPIE **k* occurs in two further lexemes (2, 3):

(1) Lat. *sōrex* < QPIE **s(u̯)ōrVk*- ~ Gk. ὕραξ < QPIE **su̯o*/*urak*- ~ PGm. **s*(*w*)*ur*(*V*)*ka*-< QPIE **sur*(*V*)*g*-
(2) Lat. *fulica* < **bʰulVk*- ~ SGael. *bolachdan* < QPIE **b*(*ʰ*)*o*/*ula*/*oK*- ~ OHG *belihha* < QPIE **bʰa*/*olig*-
(3) Lat. *filix, felix* < QPIE **bʰelik*- ~ Gk. βλῆχνον, βλῆχρον < QPIE **blēgʰ*-*n*/*r*- ~ PGm. **brekna*(*n*)- < QPIE **bʰrĝ*-*n*-

In (3), the Greek and Germanic forms have an additional suffix added, which may be responsible for the aspiration in Greek (see §3.3.4). This irregular alternation within the suffix itself indicates that some examples of Lat. *-ix*/*-ex* have been borrowed. On the other hand, this correspondence pattern is not the only source of Lat. *-ix*/*-ex*. Lat. *salix* beside PCelt. **salik*-, PGm. **salihōn*-, and potentially Gk. (Arcad.) ἑλικης can be reconstructed to ablaut grades of a root **selH-ik*-. All cases reconstruct to the same unvoiced velar in the suffix, and there is thus no positive evidence indicating that this lexeme is not inherited. That not all examples of Lat. *-ix*/*-ex* are from the same source makes it difficult to determine whether the *sōrex-fulica-filix* type truly represents a suffix or whether it is simply the final velar of a disyllabic substrate root. Some weak evidence against suffix status is that other suffixes have been added (e.g. the *n*-suffix of the Greek and Germanic comparanda of *filix*). I suggested a relationship between Lat. *sīl* 'ochre'

[515] Due to the possibility of leveling of the vocalism from the oblique, some cases of *-ix* might represent originally the same suffix as *-ex*.
[516] Lat. *latex* 'liquid, fluid' ~ Gk. λάταξ 'drop of wine' looks like an example, the Greek oblique forms have γ rather than κ.

and *silex* 'flint', but without a Germanic comparandum, it is difficult to know if this represents the same "suffix". Such is also the case for Lat. *cerrus* 'holm oak' against Romance forms like OProv. *garric* 'kermes oak'.[517]

Beyond these cases, there are few lexemes with a velar element in what looks like a suffix position that can be show to be of non-inherited origin due to irregular correspondences in the root material. Such is the case for Lat. *calix* ~ Gk. κύλιξ. The velar element is present in U **skalçeta** but is lacking in Hsch. σκάλλιον, though the appurtenance of the latter two is not secure. Nor is it for Skt. *kaláśa-*, which would indicate that the velar involved is a palatovelar, a feature that is not normally visible due to attestations in *centum* languages. For Lat. *tamarix* ~ Gk. μυρίκη, the Greek form is thematic as it is in Lat. *paelex* ~ Gk. παλλακή (also attested is πάλλαξ, but EDG 1147 suggests it is a backformation from παλλακή) ~ PCelt. **ϕa/erikā-*. The latter Celtic form reconstructs to QPIE **k*, making this group more similar to the *salix* type of velar suffix than the *sōrex-fulica-filix* type where the Celtic comparandum of *fulica* reconstructs to a geminate **kk*.

In Lat. *calx* ~ Gk. χάλιξ, the relationship to the velar suffix(es) is unclear. Given the productivity of *-ix* in Latin, it is highly unexpected that the vowel would be syncopated. But is it likely that the Greek form has added an anaptyctic vowel? Finally, the suffix *-īx*, which can have a good native etymology (the inherited *devī*-suffix **-ih₂-*, probably with the addition of **-k-* [Schrijver 1991: 148-54, Weiss 2020: 325], though arguments can be made that it is the result of laryngeal hardening [Olsen 2009]), seems to have been added to Lat. *rādīx* and Gk. ῥᾰ́δῐξ in light of the fact that no other comparanda have the suffix. It is curious that the exact same suffix should added, but the semantic difference between the Latin and Greek forms makes it unlikely that either is loaned from the other.

In the end, there is evidence for a Lat. *-ix*/*-ex* of non-inherited origin, as well as cases of Lat. *-ix*/*-ex* attached to lexemes of non-inherited origin. It is not possible in all cases to know if 1) the element is the same everywhere it appears (and in fact, there are at least two separate sources) and 2) if the element functioned as a suffix in the language where it originated. It seems easy enough for Latin to have analyzed it as a suffix upon borrowing on comparison with inherited suffixes of the shape **-Vko-* and **-V́k-* and nominal compounds in *-fex* < *facere*.

3.3.4 The *n*-Suffix

Kuiper (1995: 80) noted for PGm. **baunō-* that "suffixation of *-no-*/*-nā-*, whatever their origin may be, occurs in several loanwords." Unlike the above case of the velar suffixes, due to the nature of the dental nasal in the daughter languages, there is no possible phonological alternation that could suggest irregular correspondences; only the vacillation of its presence. Proto-Indo-European is reconstructed to have had a deverbal suffix of this shape (Fortson 2010: 131). Leumann (1977: 320) also notes that stems of

[517] FEW (II: 411) considers this an example of the "wohl ebenso iberisches" suffix *-ico-*.

this shape can be the result of derivation of inherited *n*-stems. Given that there was an inherited *n*-suffix, its presence on a word cannot be any indication of non-native origin. But when it appears on words of non-native origin, we must wonder how it appeared there. Was its usage transferred from inherited cases as a strategy for nativizing foreign lexical material? Or was it borrowed in place because the substrate language(s) also had a nasal suffix?

There are a few indications that this is not an inherited *n*-suffix. It is a derivational morpheme, but between the comparanda that contain it and those that do not, there is little derivation in meaning. The vacillation of its presence itself is suspicious; if it is deverbal, then the forms without it should still be verbal. There is no way to know whether the borrowed lexeme had a verbal function (and therefore that the *n*-suffix could represent the addition of native morphology), but the semantic similarity of the forms without it to the forms with it suggest that they were borrowed in nominal function. Unless we propose that the substrate language(s) had an IE-esque *n*-stem construction, this cannot be the explanation either. This is a potential example of IE morphology behaving in non-IE ways turning out not to be IE after all. But one point merits caution: In Latin, an additional source of words with an *n*-suffix are the material adjectives in *-(*i*)*no*- (either *-*no*- or always-syncopated *-*ino*-), a derivational shape that also occurs in Greek -ῖνος.[518] In certain cases, a substantivized material adjective could come to be synonymous with the underived nominal base.

The words that can be determined to be of non-IE origin due to other factors and which contain an *n*-suffix are:

With *n*-suffix	Without *n*-suffix
Lat. *alnus* < PItal. **alsno*- PBalt. **(a/)el(i)snio*-	PGm. **aluz*, **alis/zo*-, ?**elustrō*- PSlav. **o/elьxa*-
Lat. *avēna* < PItal. **awe(C)snā* ?West Uralic **we/äšnä*	PSlav. **ovьsъ* PBalt. **(a)viža?*- ?PGm. **hab(a)zan*-
Lat. *urna* < PItal. **ur(k)nā*	Lat. *orca*, *urceus* Gk. ὕρχη
PGm. **hadnō*-	Lat. *catulus* < PItal. **kate/o/ulo*- PGm. **hada/e/ulō*- PCelt. **kadVlot*-
PGm. **baunō*-	Lat. *faba* < PItal. **bʰabā* PSlav. **bòbъ*- PBalt. **babō*-
Gk. βλῆχνον, βλῆχρον PGm. **brekna(n)*-	Lat. *filix*, *felix* < PItal. **felik*-

[518] Lat. *-īnus*, Gk. -ῖνος, and PGm. *-īnaz* have a long vowel that would not syncopate in Latin.

Gk. δάφνη, δαύχνα	Lat. *laurus* < PItal. **lauro-*

Table 3.32 Alternating presence of an *n*-suffix

The suffix looks also to be present in Lat. *alaternus*, but Cretan ἐλαίτρινος suggests that the *-rno-* sequence is secondary from *-rino-*. One Celtic comparandum for Lat. *rādīx* (OIr. *frén* < **wridnā*) has an *n*-suffix as opposed to several other forms, even within Celtic, that do not have it. Therefore I am uncertain if it represents the same phenomenon. But a very similar case, albeit without a Latin comparandum, is the holly word. It has an *n*-suffix in PCelt. **kolinno-* < QPIE **kolis-no-* that is lacking in PCelt. **kelastr-* < QPIE **kela*(*s*)*-str-* and in all the other comparanda (Germanic, Greek, Armenian, and Romance forms including Sardinian, cf. van Sluis fthc.).

Two other forms that have been classified as uncertain because they have no other features pointing to a non-native origin (or competing plausible etymologies) include Lat. *acer* against PGm. **ahurna-* (with the suffix, and PGm. **ah*(*i*)*ra-* without it) and Lat. *pīnus* against either Lat. *pix*, *picea* or Gk. πίτυς (or both, if this is a *t* ~ *k* alternation, see above).

Between nearly all sets of words, the meaning is identical. The explanation of a syncopated adjectival **-ino-* being substantivized does not work for the cases where it is not Latin that attests to the suffix (like PGm. **baunō-*). In the case of *avēna*, it is even present on the Uralic forms, suggesting that they borrowed the word *with* the suffix (and from the source, as both Baltic and Slavic lack the suffix showing they cannot have been the source of it in Uralic). This all seems to indicate that in these words, the suffix is of non-IE origin. And unlike with the velar suffix, there is enough vacillation amongst the comparanda to suggest that it functioned as a suffix (in that it could be added or removed) in the source language.

The Greek forms attest to an interesting pattern. In all cases where Greek attests to an *n*-suffix, when this suffix is attached to a stop, that stop is aspirated (κυλίχνη; βλῆχνον; δάφνη, δαύχνα; ἀράχνη). This pattern occurs elsewhere within Greek, for example between Gk. πέλιξ and πελλίχνη 'bowl'. This led Beekes (2014: 37) to follow Furnée (1972: 132, fn. 64, 65) in a suggesting that the *n*-suffix may have been responsible for aspirating a Greek κ. But Indo-European also had derivations in **-sno-*, potentially from diverse sources, which, after a stop in Greek, produced aspiration (cf. **louk-sn-eh₂* > Lat. *lūna* 'moon', Av. *raoxšna* 'lantern, bright light', **luk-sn-o-* > Gk. λύχνος 'lamp'). Mawet (2008: 43) notes that the resulting 'aspirated consonant + νη' spread as a derivational pattern within Greek. Thus Gk. κυλίχνη may represent a regular derivation of Gk. κύλιξ. In part for the same reasons as given above for the *n*-suffix in general, I do not think that all of these cases, especially when they occur on words that can be demonstrated to be of non-IE origin, can be explained as an inherited phenomenon.

In βλῆχνον/βλῆχρον, the aspiration occurs not only before the **n* but also the **r* in the alternate form. (Notably, the *n*- and *r*-suffix distribution is also found between Lat.

laurus ~ Gk. δάφνη, δαύχνα). In the Germanic comparandum **brekna*(*n*)-, no **s* occurs. And in fact, as opposed to Greek, which, as just noted, always aspirates the stop before this suffix, the three cases of this suffix in Germanic (**hadnō*-, **baunō*-, and **brekna*(*n*)-) where an **s* would be preserved never attest to an **s*. One might propose that this pattern of 'aspirated consonant + νη' became ubiquitous in Greek and that perhaps the *r*-suffix of βλῆχρον replaced the *n*-suffix that had already triggered the analogical change of *-κν- > -χν-. But the pair Gk. ἀράχνη ~ Lat. *arāneus* shows that not all cases are analogical. Here the Latin long vowel shows that both forms go back to a true cluster **-ksn*-. The βλῆχνον/βλῆχρον case is further interesting because it looks like the *n*-(/*r*-)suffix has been added to a velar 'suffix', attested in its plain form in the Latin comparandum *filix*/*felix*. The Greek forms could hypothetically represent the *n*-suffix added to a nominative formation in -ξ. This certainly cannot be the case, but it raises the question of how to segment this cluster. Does βλῆχνον represent **blēk-sno*- or **blēks-no*-? Given that Germanic attests to the same suffix without the sibilant, perhaps the latter is more likely. In this case, some quality of the foreign velar was interpreted in Greek as an affricate.

Evidence that Latin has interpreted a foreign velar as an affricate is found in *avēna* < **awe*(*C*)*snā*-. Against the reflex of **ḱ* in Slavic and **ǵʰ* in Baltic, all forms may simply have been borrowed as some sort of sibilant (cf. West Uralic **we*/*äšnä* and, if indeed related, PGm. **hab*(*a*)*zan*-). But **Ks* is also possible for the Latin. Direct evidence of this is perhaps found in Lat. *pix* (whose status as a loanword I consider uncertain, s.v. *pix*). If it is from the same source as Georgian *pič'vi* 'pine' (borrowed into Armenian as *p^{c}iči*, cf. Furnée 1979: 28 for details), the latter has an affricate. Lat. *pīnus*, thought to represent either **pik-sno*- or **pit-sno*- might therefore represent **piks-no*-, the reflex of this foreign velar (which would then also have produced the sibilant of Alb. *pishë*). Some of the *-ix*/*-ex* suffixes thus may not have just entered Latin as **-Vk*- but rather **-Vks*, which was nativized into the consonant stem declension.

In any case, at least one of the substrate languages of Europe seems to have had an *n*-suffix. The trio Lat. *filix*/*felix* ~ Gk. βλῆχνον/βλῆχρον ~ PGm. **brekna*(*n*)- shows that it and the confirmed irregular velar "suffix" (§3.3.3) occurred in the same language. It may well have occurred in more than one language, seeing as a few of the examples (Lat. *laurus*, *urna*) are words with a Mediterranean distribution.

A discussion by Kretschmer (1921: 277-8, fn. 1) surrounding the potentially non-IE origin of Greek ethnonyms in -ηνός (cf. also Beekes 2003: 30) concluded, as Nehring (1925: 189) similarly would for the -αξ suffix of Greek, "Aus allem dem folgt, daß sowohl die indogermanischen wie die nichtindogermanischen Sprachen Kleinasiens mit *n*-Suffix gebildete Ethnika besaßen, ein Zusammentreffen, das nicht verwunderlich ist, wenn man sich erinnert, daß auch das Etruskische mit dem Lateinischen in mehreren Suffixen zusammentrifft." And as he would further note, Etruscan has a suffix *-na*. In fact, in Etruscan, the suffix *-na* is extremely frequent, perhaps one of the most productive suffixes of Etruscan (Steinbauer 1999: 121). If we are looking for a non-IE language

with a systematic *n*-suffix, and if Etruscan represents one of the substrate languages of Europe, then perhaps Etruscan might represent a relative/descendant. But within Etruscan, *-na* seems to produce derivational changes in meaning: the substantives on which it occurs are seemingly substantivized adjectives, cf. *θi* 'water', *θina* '(water) jug' < *'pertaining to water' (Steinbauer 1999: 107, Wallace 2008: 53). And it was in part the lack of derivational changes in meaning that led me to propose that the *n*-suffix on several substrate words was not of IE origin. But this is a mystery we should expect to have to solve. If the non-IE *n*-suffix really was a suffix, which its vacillating presence amongst the comparanda seems to suggest, then it must have had some derivational function in the source language. Perhaps derivational differences in semantics were bleached by the borrowing process, but it is also possible that the suffix's function in the source language was more subtle than that of the Etruscan *-na* suffix.

3.3.5 Reduplication

Latin attests to several types of reduplication in nouns, many of which (like the archaic pattern of *fiber* < **b^{h}e-b^{h}ru-*) are inherited (cf. André 1978, Weiss 2020: 287). But Latin, as well as many other Indo-European languages, also has more isolated instances of reduplication. Alessio (1943) collected several Latin and Greek words with CV-reduplication (with *e* and *i* vocalism of the reduplicated syllable) in nouns, which he suspected to be of Mediterranean origin and used this to propose that the Mediterranean substrate therefore had this type of reduplication.[519]

As per his methodology, many of the cases he finds are isolated; as per my methodology, these get classed as uncertain. I therefore consider many of the words he proposes as evidence to be non-diagnostic (*cicāda*, *cicōnia*, *cicūta*, *gigarus*).[520] The isolated words are suspicious because, as DV (500) notes, Latin frequently uses reduplication in affective words, explaining *cicāda* and *cicōnia* as likely onomatopoetic (DV 112, 113). I am generally suspicious of labelling words as 'affective' or 'onomatopoeic'. André (1978) was also dissatisfied with these labels and set out to better classify the cases, with comparative material from a much wider typological perspective. He classes Latin reduplicated formations, not all necessarily of IE origin, as *impressifs* of sound (like *bambalō* 'stutterer', *cucurru* 'the cry of the cock', and words in *gurg-* and *garg-* relating to swallowing and the throat), of movement (like words for back-and-forth in *pal-*, the repetitive circular motion of *furfurāculum* 'wood-boring tool, auger'), of form (like *circus* 'circle', several round fruits and vegetables including *cucurbita*), and of quantity

[519] André (1978: 12) calls into question what exactly it is about the phenomenon that makes it Mediterranean.

[520] There are several as well that I simply did not treat. This includes (poorly attested) *biblax* 'rododaphne'; *cicendula*, *cicindēla* 'firefly' for which he doubts the connection with *candēla* 'candle'; *cicimalindrum*, *cicilindrum* 'a made-up spice name in a Plautus play', *giger* 'wild parsnip', *siser* 'skirret' potentially borrowed from Greek σίσαρον 'parsnip' (though André 1978: 49 agrees on a Mediterranean substrate origin); *cicūlus* for *cucūlus* 'cuckoo', onomatopoeic; *sisarra* 'sheep older than one year', cf. Calabrese *sarra* 'fat old woman', perhaps a non-IE word after all; *vīverra* 'ferret or weasel', which DV (685) treats as inherited.

(like *grex* ‘herd, crowd’, *populus* ‘people’, and *calculus* ‘pebble’), as well as nursery words. From Alessio’s list, he classifies *cicōnia* and *cicāda* as expressive of sound (along with *cicūta* for its use in making flutes), and *cucurbita* and *gigarus* as expressive of form (the latter apparently due to its root; though while this could apply to *giger* ‘wild parsnip’, it does not feel particularly fitting for *gigarus*). Given that he includes cases like *siser* ‘skirret’, which he believes to be of non-IE origin, under reduplicated formations due to impression of form, a word’s appearance in his list does not necessarily mean that it is of inherited origin. If non-IE words show the same motivations for reduplication that inherited words do, one might wonder if the tendency within Latin for expressive (André’s “impressif”) formations was influenced by language contact. But given the frequency of such a phenomenon in the world’s languages, an explanation like that does not seem necessary.

On the other hand, it is likely that substrate languages were a source of multi-syllabic roots. This is for instance probable in Lat. *arāneus* ~ Gk. ἀράχνη and for the Greek comparanda of Lat. *ervum* (ἐρέβινθος, ὄροβος). Some of them may have resulted in what looks like reduplication. In fact, André (1978: 12) makes this explicit in his analysis: since the two consonants of an IE root must differ in nature, roots with shapes like **bab-* and **pip-* are automatically suspected of being reduplicated “except for substrates (of languages whose root may be of a different structure), like *sisarra*, loans (*popina*, *lalisio*), phonetic treatments (*cocus*, *barba*, *quinque*).”[521] It also means that, without positive evidence one way or the other, an isolated word with a reduplicated shape could be classed as more or less permissible Latin reduplication or a non-IE root shape produced by a substrate disyllabic root.

Two words stand a chance of representing some sort of reduplication, but neither is simple. Lat. *cucumis* has Greek, Armenian, and probably Slavic comparanda. Arm. *sex* reconstructs to something like **ḱekʰ-* where the consonants are not the same. Thus, despite other forms like Hsch. κύκυον looking like reduplication, we cannot ascertain that it would have existed this way in the source language. Lat. *cucurbita* looks like a reduplicated form a group of lexemes attested in Sanskrit (*cirbhaṭī*, *carbhaṭa*, *cirbhiṭa*) but this might be due to chance. A geographically closer match is PGm. **hwerhwetjō-*, but its relationship to *cucurbita* is not straightforward. Is it a metathesis of ***hwehwert-* (thus implying the reconstruction of **kuko*/*urdʰ-* for Latin with a **dʰ* ~ **t* alternation) or does it correspond to the base *-curbit-* (implying the reconstruction **kuko*/*urb*(*ʰ*)*-Vt-* for Latin with an otherwise unattested labial ~ dental alternation)?

Lat. *cicer* looks like a reduplicated formation as do its Armenian and (possibly) Albanian comparanda. But because they can reconstruct to the same pre-form, it cannot be ruled out that the formation is old. Even if it is considered a substrate word, without a secure simplex form, it cannot be used to confirm that the source language had morphological

[521] “Exception faite des substrats (de langues dont la racine peut être de structure différent), comme *sisarra*, des emprunts (*popina*, *lalisio*), des traitements phonétiques (*cocus*, *barba*, *quinque*).”

reduplication (cf. this as a requirement for confirming reduplication in André 1978: 13).

On the evidence of Fal. *haba*, Lat. *faba* does not represent true reduplication as its initial consonant is the reflex of a voiced aspirate but its medial *b* must be from a plain **b*. Lat. *pōpulus* is probably related to Slavic and Baltic words, none of which can securely represent reduplicated formations. Lat. *cicōnia* is isolated, but is attested once as *cōnia* (also perhaps in the Hesychius gloss γνίς), and a few more cases of simplex-reduplicated alternations seem to occur within Greek (τιθύμαλος, θύμαλος 'euphorbia'; κίκνωψ, κνώψ 'wild beast'; σέσηλος, σελάτης 'snail', Alessio 1943; Beekes 2014: 27 on potential reduplication in Pre-Greek). But this does not seem like certain enough evidence to propose that the substrate language had reduplication.

3.3.6 Morphological Conclusions

There are a very limited number of Latin lexemes of non-inherited origin that seem to contain suffixes otherwise widespread in the Greek substrate vocabulary. These likely reflect a combination of indirect loans from Greek (and its substrate languages) and Mediterranean substrate words borrowed independently into Latin and Greek. The phenomenon of *a*-prefixation (with concomitant vowel reduction) and the Lat. *-ix*/*-ex* suffixes that show irregular correspondences with comparanda are difficult to explain from an inherited perspective and meet the criteria of non-inherited features. The *n*-suffix seems likely to have its source in non-IE languages due to its vacillating presence on words with other irregular correspondences. These last three features appear with a quite widespread distribution. The implications of this will be explored in §4. Finally, though reduplication has been reported to be a feature of the substrate lexicon of Latin, it is difficult to confirm that disyllabic roots actually reflect reduplication in the source language.