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A historical grammar of Phrygian

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II Phonetics and Phonology

II.1 Old Phrygian

II.1.1 Old Phrygian alphabet

Old Phrygian was written in a native alphabet from the 8th century onward (Lejeune 1969a: 19, Young 1969: 255, Adiego 2004: 300ff., PhL 27).

The writing system cannot have been an adopted version of the Greek alphabet from the western coast of Asia Minor (cf. PhL 27): the Greek population was not only separated from Phrygia by Lydia, the earliest Ionic and Aeolic inscriptions postdate the earliest Old Phrygian inscriptions by more than a century (Young 1969: 253). The Lydian alphabet shows some affinity to the Phrygian alphabet (most notably the presence of the grapheme <↑>) suggesting common innovations between the two (Gusmani 1978: 836ff.). Since the affinities with the Greek alphabet are less pronounced (*ibid.*), the Lydians apparently adopted the alphabet from an eastern or a southeastern source. The Lydian alphabet may itself be an adaptation of the Phrygian alphabet (Young 1969: 254, Adiego 2018: 150-152) or an independent adaptation from the same source as the Phrygian alphabet that developed in parallel to it.

The Phrygian alphabet was unlikely to have been an adaptation of a local alphabet of the southwest: all of these alphabets are attested from a considerably later date than Phrygian. While true that they must have undergone their own developments before being attested, the time gap between their attestation and the attestation of Phrygian strongly suggests

that the Phrygian alphabet is earlier. The Carian alphabet is notable for the aberrant values of its Greek-derived graphemes (Adiego 2007: 230, Adiego 2018: 155) and Carian inscriptions in any case only date from the 7th century BCE onward (Melchert 2008: 64). Lycian, on the other hand, is only attested from the 5th century onward (Rieken 2017: 244-245).

The likeliest area where the Phrygian alphabet could have its origin is to the southeast, in the vicinity of Cilicia (Young 1969: 255, PhL 27; Adiego 2018: 150), which is one of the possible locations for where the Greek alphabet was originally developed by adopting the native Semitic writing system in the 9th and 8th century (Brixhe 2004b: 284-285). The two alphabets show numerous similarities and both must have sprung from a common source, a proto-alphabet that had already adapted certain Semitic graphemes to represent vowel sounds (Young 1969: 255-256; PhL 28; cf. Sass 2005: 133ff., 146).¹² The two alphabets show the identical addition of <Y> to the end of the Semitic alphabet to represent the vowel [u], with the consonantal [w] represented by a separate grapheme, this addition of <Y> presumably being the last common innovation of the two writing systems (Young 1969: 255-6).

¹² See Brixhe 2004b: 284-85 *et passim*, who argues at least certain aspects of the script must be a collaboration between Greek and Phrygian adopters.

Phoenician grapheme	Phoenician phone	Phrygian grapheme	Phrygian transliteration	Phrygian phone	Greek grapheme	Greek phone ¹³
𐤀	[ʔ]	Α	a	[a], [a:]	Α	[a], [a:]
𐤁	[b]	Β	b	[b]	Β	[b]
𐤂	[g]	Γ	g	[g]	Γ	[g]
𐤃	[d]	Δ	d	[d]	Δ	[d]
𐤄	[h]	Ε	e	[e], [e:]	Ε	[e], [e:], [ε:]
Υ	[w]	Ϝ	v	[w]	Ϝ	[w]
		Ϛ	u	[u], [u:]	Υ	[y] < [u] [y:] < [u:]
Ι	[dz]				Ζ	[zd] < [dz]
Θ	[h]				Η	[h], [ε:]
⊗	[tʰ]				Θ	[tʰ]
𐤅	[j]	ι	i	[i], [e:]	Ι	[i], [i:]
		Ϛ	y ¹⁴	[j]		
𐤆	[k]	Κ	k	[k]	Κ	[k]
𐤇	[l]	Λ	l	[l]	Λ	[l]

¹³ Where the cell is split, the left cell gives the sound the letter represents in the “blue” alphabets and the right cell gives the sound in the “red” alphabets, following Kirchhoff’s appellations from *Studien zur Geschichte des griechischen Alphabets* (1867).

¹⁴ Used for the consonant [j] after the 6th century; previously, the <i> grapheme was used (Lejeune 1969a: 60). See also Brixhe (2004: 281-84) who argues that the *yod* grapheme was part of the original Phrygian alphabetic inventory and stood for [j]; the <i> : <y> pair mirroring the <u> : <w> pair.

𐤌	[m]	𐤌	m	[m]	M	[m]
𐤎	[n]	𐤎	n	[n]	N	[n]
𐤏	[ts]				Ξ	[ks]
𐤐	[ʕ]	𐤐	o	[o], [o:]	O	[o], [o:], [ɔ:]
𐤑	[p]	𐤑	p	[p]	Π	[p]
𐤒	[sʕ]				(M)	[ts]ʔ
𐤓	[q]				(Q)	[k]
𐤔	[r]	𐤔	r	[r]	P	[r]
𐤕	[ʃ]	𐤕 ¹⁵ 𐤕 ¹⁶	s	[s]	Σ	[s]
𐤖	[t]	𐤖	t	[t]	T	[t]
		/	/	/	X	[kʰ] [ks]
		ϕ	Φ ¹⁷	[dz]	Φ	[pʰ]
		Υ	Ψ	[ʃ]	Ψ	[ps] [kʰ]
		/	/	/	Ω	[ɔ:]
		↑, 𐤕 ¹⁸	↑	[dz]		

Table #2: The alphabetic signs of Phoenician, Greek, and Phrygian (cf. Woodard 2010: 28-39 and PhL 29). The Phrygian signs are given in dextroverse orientation.

¹⁵ For an argument that this grapheme has a different source than Greek *sigma*, see Young 1969: 264, 294 *et passim*.

¹⁶ Local variant, see further in §II.1.1.5.

¹⁷ Hapax for <↑>.

¹⁸ Local variant, see further in §II.1.1.2.

II.1.1.1 Preliminary notes on Old Phrygian phonology

The differences between the Archaic Greek alphabet, which is comparatively well understood, and the Old Phrygian alphabet can shed some light on the phonology of Old Phrygian. As Young (1969: 294) already notes, the language is psilotic. There is no evidence of aspiration in Old Phrygian: had there been a phonemic series of voiceless aspirates in the language, some variant of *tēth* could have been borrowed for /t^h/, as was the case with theta in Greek, or some other strategy adopted, which was not the case. A grapheme for a /h/ was evidently also not required.¹⁹

There were evidently two very early adaptations the Phrygians made to the alphabet: the grapheme <↑> was added (Young 1969: 295) and the direction of the writing was less consistent. While the Phoenician alphabet in the time period when it would have been adapted was written sinistrovers, the oldest Phrygian inscriptions tend to be written dextrovers (or boustrophedon) (Young 1969: 266-267). Nevertheless, many inscriptions are still written sinistrovers (PhL 32).

The addition of a new grapheme to represent a native Phrygian phoneme seems to speak against any argument that the script is defective in some major fashion: if there were any additional phonemes in Phrygian that would have needed to be expressed, it seems very unlikely that a gap would remain unfilled throughout the Old Phrygian period.

One way in which the script was somewhat ambiguous, however, was in its representation of vowel sounds: vowel length was not graphically distinguished (PhL 30). The presence of at least two long vowels in Old

¹⁹ This only further confirms that there were no voiceless aspirates in Phrygian. A language with voiceless aspirated plosives is typologically almost assured to have [h] as a phoneme (Jakobson *apud* Szemerényi 1996: 140).

Phrygian is assured based on their reflexes in New Phrygian: OPh. /ā/ > NPh. /a/, which can be inferred from the differing reflexes of OPh. /āi/ > NPh. /a/ and OPh. /ai/ > NPh. /ai/, and OPh. /ō/ > NPh. /u/, but OPh. /o/ > NPh. /o/.²⁰ The existence of /ū/ cannot be assured, but is likely: it would have been a marginal phoneme at best and there is no evidence that its reflex in New Phrygian would have differed from its corresponding short counterpart /i/ and /u/.

A long vowel /ē/ did exist, evidently being a mid-high front long vowel, as suggested by its spelling with vacillating <e> and <i>. For more details, see §II.3.2.2, where we propose that it arose from earlier *ī, compensatory lengthening, and possibly contraction. It is unlikely that the diphthong /ei/ merged with /ē/ in Old Phrygian (Lubotsky 1998: 415).

This synchronic Old Phrygian and New Phrygian /ē/ is in no way to be understood as a reflex of pre-Proto-Phrygian *ē (< PIE *ē and *eh₁): that phoneme merged with /ā/, as first noted by Jokl in 1927 (*apud* Woodhouse 2009: 174). To avoid any possible ambiguity on the matter, the Proto- and Old Phrygian phoneme /ē/ not originating from earlier *ē will be consistently written with the diacritic indicating a raised vowel. Whenever a reference to ē without a diacritic is made, it refers either to the sound that eventually merged with *ā in Proto-Phrygian, or the language being discussed is not Phrygian.

²⁰ While the reflexes of OPh. /ā/ and /a/ in merge in New Phrygian, /āi/ and /ai/ show different reflexes. Since there was a distinction between a long and short diphthong in Old Phrygian, a distinction between /ā/ and /a/ for this period is structurally necessary.

II.1.1.2 The grapheme <↑>

The grapheme <↑> is a Phrygian addition to the alphabet (Young 1969: 295).

We will follow Brixhe's (CIPP2: 26-29) suggestion that the sign previously transliterated as <ś> in inscription °B-05 by Neumann (1997: 15ff) in the words *śiray* and *śemeney* is to be understood as a local variant of the sign <↑>.²¹

The sign <↑> represents a phoneme native to Phrygian whose phonetic interpretation remains difficult. It is surely no coincidence that it appears almost exclusively before [e] and [i], so we must be dealing with the result of a palatalization (Brixhe 1982: 229ff., Brixhe 1983: 114, CIPP2 26-7, *contra* Orel 1997: 13). Brixhe (2004: 28) reasons that <↑> is a modification of <T>, inspired by the plosive element of an affricate, suggesting a sound value of [ts] or [tʃ] to this grapheme. Orel (1997: 381) has proposed a value /gʲdi/, Ligorio and Lubotsky (LL 1820) proposed a voiced affricate or /z/, and Obrador-Cursach (PhL 37) suggested an allophonic [z] or [gʲ], [zd], [dz], [dʒ].

As will be shown in §II.3.2.3.4, <↑> must have represented the Phrygian reflex of a phoneme that developed from a palatalized voiced stop and which developed into the sound represented by <ζ> in the New Phrygian era (cf. PhL 36, LL 1820).²²

²¹ As also assumed by Obrador-Cursach (PhL 33-37) and Ligorio and Lubotsky (LL 1817), but argued against by Oreshko 2022: 155.

²² The sound represented by <↑>, then, must have been voiced throughout its known history. There are no grounds to assume an intermediate devoiced stage whatsoever (*contra* Brixhe 1982: 210ff.).

Other nearby writing systems may provide some clues as to the value of this grapheme.

The neighbouring Lydians used a <↑> grapheme in their alphabet (and presumably borrowed it from Phrygian). The exact phonetic value of this sign is disputed. The sound is a reflex of **d^(h)* before a front vowel (Kearns 1994: 44) and **y* (Melchert 1994: 333-4), but as Kloekhorst (2023: 130-131 *et passim*) points out, voice was not a phonemic feature of consonants in Lydian, which means we cannot use Lydian to gauge the presence or absence of voice in Phrygian <↑>. Since it is now clear that the sound [ts] in Lydian was written with a grapheme conventionally transliterated as <τ> (Melchert 1994: 333), <↑> must have represented some other sound. Some proposed phonetic values for the Lydian grapheme include [ts] or [tʃ] (Brandenstein 1929: 263), [ts]⁷ (Adiego 2018: 151), [θ] (Bossert 1931: 314), [z] or [dz] (Melchert 1991: 134) (see also Kearns 1994: 44). Kloekhorst (2023: 127) has tentatively proposed a plosive value [c]. In any case, we are dealing with a sound that was the result of palatalization, suggesting a similar value for the Phrygian <↑> grapheme.

The neighbouring Carian alphabet also shows a <↑> grapheme, conventionally transliterated as <τ>. Its phonetic value is probably [tʃ], though this is based solely on the Carian adaptation of the Egyptian name *Ṭ3j-jm=w* [tʃamōu] (Greek Ταμως, Θαμως, Σαμαυς, Σαμωϋς) (Adiego 2007: 251; Adiego 2018: 155). The value [ts] is less likely, as there is a separate grapheme, transliterated as <z>, that might have this value (Adiego 2007: 251), but Carian <z> may have in fact have represented /sd/ (Adiego 2018: 155), leaving open the possibility that Carian <↑> represented [ts].

Hieroglyphic Luwian sign *376 can also be compared to Phrygian <↑>, since it has the shape of an arrow. It is transliterated as <zi> and encoded the phonetic value [tsi] (Hawkins 2003: 164).

Of the four other arrow-shaped signs in the area, all are used to render some sound that could plausibly result from palatalization; the most likely value is that of an affricate. Furthermore, three of the four signs would have been used in languages that did not distinguish phonemic voice, and the relationship between Greek *sampi* and the arrow sign is not well established.

Oreshko (2013: 81-82) and Melchert have argued that the Lydian <↑> and Carian <τ> were borrowed from Hieroglyphic Luwian sign *376, but it is just as likely that Lydian and Carian <↑> and <τ> were actually borrowed from the Phrygian or a Phrygian-inspired alphabet, since they are both attested later than Phrygian.

While both a voiced affricate and a fricative value are equally possible results of a palatalizing process, we may be reasonably sure on the basis of the other neighbouring alphabets that the Phrygian value of <↑> was that of an affricate. Since the sound developed from a Proto-Phrygian voiced velar and was later on represented by <ζ>, which was used to represent a voiced sound as well, we may conclude that the value represented by Phrygian <↑> was that of a voiced affricate, mostly likely dental, i.e. [dz].

It is tempting to assume that, since Luwian hieroglyphs predate the Phrygian alphabet and Luwian was spoken until the 6th century BCE, the Phrygians adopted a Luwian glyph to transcribe a native phoneme that could not be better represented with any Phoenician-inspired sign (*contra* PhL 37). The territory of spoken Phrygian would have bordered a large

Luwian-speaking area to the south, and to reach Cilicia, where their alphabet most likely originated, the Phrygians would have had to pass through Luwian-speaking areas. Assuming that the Phrygian grapheme <↑> did ultimately originate in the Luwian hieroglyphs, it would not be unexpected for the Phrygians to consider Phoenician <z>, representing [z], as insufficient for representing their dental affricate if they were also familiar with Luwian sign *376, which did explicitly represent such a sound as part of a sequence transcribed as <zi>. Note that Luwian did not possess a phonemic voicing contrast in its consonants. If the Phrygians did borrow this sign from the Luwian hieroglyphs, it would have been unmarked for voice, only conveying the value of a dental affricate, which, since Luwian did not distinguish phonemic voice, may have been allophonically voiced in some environments.

The Greeks adopted the Phoenician <z> early on as a means of writing their own /dz/ or /zd/ (ultimately from PG **dʲ* and **gʲ*). The Greek and the Phrygian alphabets developed alongside each other and heavily influenced each other's creation, but it is not necessary to presume that the two would adopt an identical strategy at creating a grapheme for their respective voiced affricates. The speakers of Greek may have been content at adopting Phoenician <z> as a means of representing /dz/; the Greeks would have been present in the area along the coast only and would presumably not have been in as vigorous contact with Hieroglyphic Luwian. The different strategies of spelling /dz/ in Greek and Phrygian would have then been the result of their locations.

II.1.1.3 Grapheme <y>

The Phrygians adopted the Phoenician *yodh*, with the value [j], to represent their [j] after the 6th century BCE (PhL 32-33).

II.1.1.4 Grapheme <Ψ>

The Phrygian grapheme Ψ has generally been taken as representing [ks] until recently (Lejeune 1978). In the past few years, Hämmig (fthc.), Obrador-Cursach (PhL 38ff.), and Oreshko (2022: 146-159) have called this interpretation into question.²³ Obrador-Cursach proposes to read <Ψ> as a variant of <k>, with both having the value /k/. Oreshko proposes to read <Ψ> as /ss/, though he notes that would not be its only function and it would be used to render other types of sibilant sounds as well. The conclusion we will ultimately draw below is that <Ψ> was used to render a post-alveolar sibilant /ʃ/.

Lejeune makes the following observations regarding the phonetic value of <Ψ>:

- 1) In inscription °G-145, which reads *voineo[s/Ψ]uriiensis ku[---]*, the letter [s/Ψ] looks like <Ψ> that is extended downward into <s>. Lejeune assumes that this is the result of scribal error: the scribe began to mistakenly write <Ψ> and then made a correction into <s>.

²³ Hämmig's argument will not be discussed further in this section, as it is based on an erroneous analysis of the sigmatic optatives as thematic. In her view, <Ψ> represents the reflex of the thematic verbal suffix *-ske- when following a back vowel, which would have developed into <σσ> in New Phrygian. For a more thorough analysis of her account, see §V.3.4 and §V.3.4.1.

This would, in his view, suggest that <Ψ> represented a sound with some sort of a sibilant component.

- 2) In graffito °G-115, which reads ΨuvaΨaros, Haas (1976: 80) identified the word as an adaptation of a personal name attested in Old Persian as ^h*Uvaxšatara-*, New Assyrian ^m*Ú-ak-sa-tar* and ^m*Uk-sa-tar*, in New and Late Babylonian as ^m*Ú-ma-ku-iš-tar* or ^m*Ú-ma-kiš-tar*, in Elamite as *Ma-ki-iš-tur-ri* and *Ma-ak-iš-tar-ra*, and in Greek as Κυαξάρης (for the references, see PhL 39). Lejeune argues that the second <Ψ> of the Phrygian rendition of the name corresponds to Old Persian -xš- and to Greek -ξ- and that the sounds must therefore have the value /ks/. He assumes the first <Ψ> to be the result of a regressive assimilation of Old Persian /h-/, which was not a native phoneme of Phrygian, reading the entire name as [ksuwaksaros]. Obrador-Cursach (PhL 40) points out that graffito °G-224c likely shows an abbreviation of this name: Ψuv.
- 3) Based on the previous two analyses, Lejeune considered *daΨet* °W-01b as representing a sigmatic verbal form of the verbal root underlying αῑδακετ ‘would do’, i.e. [*dakset*], similar to the Latin pair *faciō* ‘to do (1sg present)’ ~ *faxō* ‘to do (1sg future)’. He explains the spelling with <ks> found in the same inscription in *eveteksetey* as being due to a morpheme boundary: *ev-e-tek-s-e-tey*.

Obrador-Cursach (PhL 38-39) suggests that Lejeune’s first observation is of questionable value, since the reading of the text is not as clear as previously suggested. Adiego suggested to him (through p.c.) that the scribe initially wrote <o u> and, after realising their error, tried to insert <s> between the two vowels. With not enough space for <s> present in the gap, the scribe then attempted to scratch out this mistake and added <s>

below. The copy in CIPP (132) does not suggest there was not enough space between <o> and <u> for an addition of <s>, however, which was a comparatively slim grapheme. As Obrador-Cursach himself (PhL 39) notes, an examination of the actual object is obviously the only valid way to settle this debate, but in light of the evidence available to us, his conclusion is premature.

Since this <s> was initially mistakenly written as <Ψ>, the latter grapheme was likely to have been in at least some way phonetically similar to a sibilant, as argued by Lejeune and Oreshko.²⁴

The second observation, i.e. identifying ΨuvaΨaros as an adaptation of ^h*Uvaxšatara-*, is convincing, in spite of Oreshko's objections (for which see Oreshko 2022: 150-151).²⁵ Lejeune's suggestion that a medial /ks/ would have spread to initial position by regressive assimilation is questionable. The correspondence between <Ψ> and the sounds in the original name are clear: it appears to represent an original /h/ and an original /xʃ/. Most likely the original initial /h/ had been adopted as [x], as is also suggested by the initial velar value of Greek Κυαξάρης. We may note as a possibility that this initial transformation may have taken place in some intermediary language.

²⁴ See also Oreshko (2022: 152) for a possible analysis on how the graphemes were corrected.

²⁵ It is not a given that the name would be exclusive to Median nobility. Also, the linguistic argument that the sound /h/ could not have been rendered as a velar when borrowed is entirely incorrect: in languages lacking /h/, one commonly known possibility is that it is adopted as /x/ (cf. Polish *huta* /x-/ < German *Hütte* /h-/ 'hut' or Modern Greek *χάκερ* /x-/ < English *hacker* /h-/). Oreshko himself has to immediately resort to an *ad hoc* suggestion of a folk etymology to explain the Greek rendering of ^h*Uvaxšatara-* as Κυαξάρης, instead of assuming an entirely natural /h/ as [x] > <κ> borrowing.

The third observation is valid if we analyse *daΨet* as a sigmatic optative belonging to the root *dak-*.^{26, 27} Both Obrador-Cursach (PhL 40-41) and Oreshko (2022: 152-154) disagree with this analysis, albeit on different grounds: Obrador-Cursach argues against the form being a sigmatic optative, since he considers the grapheme <Ψ> as being simply a variant of <k>, whereas Oreshko objects to the identification of the root as being *dak-* for semantic reasons.

Oreshko (2022: 149-150) rightly notes that the sequence /ks/ being spelt in two different ways in the same inscription (*daΨet* and *eveteksetey*) makes little sense and rejects Lejeune's attempt at providing an explanation for it.^{28, 29} It is particularly this argument that makes the reading of <Ψ> as /ks/ impossible.

Obrador-Cursach (PhL 38-49) argues that the grapheme <Ψ> is simply a variant of the grapheme <k> and that it represents the sound /k/.

His first argument is of a syntactic nature, made by comparing *daΨet* °W-01b to *daket* °B-05 and αδδακετ of New Phrygian. The argument is flawed, since reading *daΨet* as a sigmatic optative form is in no way syntactically excluded (as confirmed by the existence of *egeseti* in the protasis of an imprecative formula, which he himself notes) (cf. also Oreshko 2022:

²⁶ Note that Lejeune would only be surreptitiously correct in seeing in <Ψ> the sequence /ks/, since his comparison of a hypothetical **dakset* to Latin *faxō* cannot be upheld.

²⁷ The verbal formation showing the presence of the *si/e*-suffix has a number of different appellations. This work uses the term “sigmatic optative” for etymological reasons. See §V.3.4.

²⁸ Lejeune's argument that the different spellings are the result of whether or not there was a morpheme boundary is flawed in and of itself: *daΨet* [dakset] would, in fact, have a morpheme boundary between [k] and [s], same as in *eveteksetey*.

²⁹ Consider also the spelling of the name *Muksos* °G-346, which once again shows that /ks/ was spelt as simply <ks> (Oreshko 2022: 150).

149ff.) and his assumption that a consonant-final stem would have inserted a vowel before the addition of the suffix *-se/i-* is incorrect.³⁰ His analysis (PhL 42-45) of the form *anivaΨeti* as necessarily not being a sigmatic optative form already presupposes that <Ψ> did not have any sibilant value (see also Oreshko 2022: 152ff.).

His second argument is based on an interpretation of inscription °G-249, which reads *seΨeltias*. His suggestion (PhL 41-42) that *seΨel* represents the West Semitic unit of weight, the shekel, is convincing.³¹ The name of this unit of weight originated from a Proto-Semitic root **tql*, which developed into Old Aramaic *šql* /θqel/, Akkadian *šiqlum*, and Biblical Hebrew *šeql*. Obrador-Cursach gives Greek σίκλος/σίγλος and Lycian *siχla-* as other examples of this unit of measurement being borrowed, but we may add that these latter two, being quite consistent in their vocalism and forming a vowel-final nominal stem, seem to be borrowed from some Semitic variant similar to Akkadian *šiqlum*. The vocalism of Phrygian *seΨel* and its ending is quite incompatible with an assumption that it was borrowed from the same source as σίκλος/σίγλος or *siχla-*. Obrador-Cursach is likely correct when he assumes that the contemporaneous Old Aramaic *šqel* /θqel/ or a close local variant of it ultimately underlies Phrygian *seΨel*, presumably with an epenthetic vowel used to break up the initial cluster. His implicit argument that the rendering of Semitic /q/ was <Ψ> in Phrygian does seem to be reasonable, and if <Ψ> was simply a

³⁰ The second *-e-* in *egeseti* ‘may he hold’ is not an obligatory element of the sigmatic optatives but actually the thematic vowel of the present stem, which formed the basis of the sigmatic optative stem in this instance. For the details, see §V.3.4.

³¹ Though Oreshko (2022: 151) argues emphatically against this possibility. He rather proposes that the inscription is not actually proper writing, but only imitates it, and that the object on which it is found is some sort of magic amulet. If anything, that clearly seems the more far-fetched possibility.

variant of <k>, it or <k> would have been the most reasonable graphemes with which to render non-native /q/.³²

As his final argument, Obrador-Cursach (PhL 47) considers the rendering of ^h*Uvaxšatara-* as *ΨuvaΨaros*. If <Ψ> is to be read as a variant of <k>, he proposes that *ΨuvaΨaros* [kuwakaros] is rendered in a way similar to Greek *Κυαξάρης* [kyaksárēs], with the first sound being adopted identically in the two languages, and with Phrygian simplifying the **ks* kluster into /k/. For this later development, he cites a parallel, where a word-final **ks* developed into *k*: **uanaks* > *vanak*. This parallel is word-final, however, and it is known that consonantal clusters were, as a rule, not permitted in word-final position (see also §II.3.2.3.10).

Of the arguments provided by Obrador-Cursach for the reading of <Ψ> as /k/, only the second one stands up to any scrutiny. Even there, however, the equation need not necessarily be as neat as simply Old Aramaic *šqel* /θqel/ > Phrygian *seΨel*. The Eastern Anatolian languages, as a rule, do not possess uvular stops (Melchert 1994: 92, 190, 229 *et passim*): in those, adopting /q/ as /χ/, which they would have possessed (*ibid.*: 97, 195, 234), would be quite natural. Phrygian may well have borrowed the original Aramaic /θqel/ through an Anatolian intermediary that would have adopted the initial consonant as [s] and broken up the initial cluster /sk/ (which was not phonologically permissible in many of the Anatolian languages) into /sVk/, as well as rendered /q/ as /χ/: Phrygian could have actually adopted the term **sVχel*.

³² Though do note that Obrador-Cursach's assumption (PhL 46) that Greek *σίκλος* and Lycian *siχla-* actually come from the same source as Phr. *seΨel* and that <Ψ> must therefore correspond to Greek <κ> and Lycian <χ> is unfounded.

Regardless of the weight of his arguments, the primary unaddressed problem present in Obrador-Cursach's account is that the segment /k/ already has an established corresponding grapheme in Old Phrygian. He assumes that the signs <Ψ> and <k> encode an entirely identical phonetic value and that <Ψ> is simply a variant of <k>. This is a questionable proposition.

He suggests that <Ψ>, as written in °B-07, is similar to how <k> is written in *knays* of that inscription, but I do not agree that the two signs can be compared. There is the issue that immediately before the letter <k>, there is a large gash in the stone, so the vertical bar may have been damaged, but in any case, the letter <Ψ> clearly shows three lines on top, whereas <k>, if interpreted as not having a vertical bar to the right, even though I believe it to actually be visible, only shows two. The stroke in the lower left portion of the grapheme in <k> is carved at an angle, whereas the bottom half of the grapheme <Ψ> is written with a straight stroke. If anything, the <k> of *knays* is clearly more similar to the <k> of *ke* in that inscription.



Image #1: <k> in *knays*
°B-07



Image #2: <Ψ> in
anivaΨeti °B-07



Image #3: <k> in *ke* °B-07

It is true that some minor examples exist for alternative graphemes (such as <Φ> for <↑>, and <8> for), but these alternate graphemes are extremely rare, each only appearing in a single inscription, and never co-occur with their more common counterparts within that same inscription. In the case of <Ψ> and <k>, not only is <Ψ> found in a number of different inscriptions, it is also used in inscriptions that also use <k>. Obrador-

Cursach (PhL 47) is correct in noting that not all graphemes are written identically even within the same inscription, so variants do exist, but there is clearly a notable “familial” resemblance between variants of the same grapheme in the same inscription. I fail to see any such resemblance between <k> and <Ψ>.

Oreshko (2022: 149-146-159) argues in favour of a sibilant reading of <Ψ>. He makes a compelling argument that the root underlying the form *daΨet* °W-01b is *da-* ‘to put’, and not *dak-* ‘to make’ (*ibid.* 152-153).³³ On the basis of Lejeune’s first argument for a sibilant reading, he then interprets *daΨet* as *daSet*, by assuming we are dealing with a sigmatic optative (*ibid.* 153-154), which is indeed the most reasonable assumption. By comparing *daΨet* to the sigmatic optative form δεδασσινvi, he concludes that <Ψ> represents /ss/ in this instance, which is a valid conclusion to make.³⁴ It is not necessary to go into Oreshko’s analysis of the form *anivaΨeti*, since, similarly to how Obrador-Cursach approaches it, it follows from the conclusion, rather than informing it.

Less convincing are his arguments based on the rejection of Brixhe’s reading of the supposed grapheme <ś> in °B-05 (as transliterated by Neumann 1997) as simply <s> (for which see CIPP2: 26-29). He also rejects that the <ś> of *śemeney* and *śiray* (transliterated as ↑*emeney* and ↑*iray* here and in PhL) is a local variant of <↑>, dismissing the best

³³ The syntagm *onoman daΨet* makes the most sense if it refers to ‘putting a name’ to something, i.e. replacing the name on the monument; the meaning ‘making a name’ would be unexpected.

³⁴ It is true that the comparison between *daΨet* and δεδασσινvi is not entirely straightforward: the former is a de-aoristic sigmatic optative, and the latter a de-presentive one. Nevertheless, the morpheme -s(s)e/i- would have been used identically in both. See further in section §V.3.4.

argument in favour of this identification, that of equating *śira-* to New Phrygian ζειρα-, with specious reasoning.³⁵

Both Obrador-Cursach's and Oreshko's re-interpretation of the reading of the grapheme <Ψ> provide important new arguments to consider, yet neither can be entirely endorsed, since both disregard one crucial piece of evidence.

Obrador-Cursach, in arguing against a sibilant value, entirely dismisses the one piece of evidence most suggestive of a sibilant component in the grapheme (i.e. the correction in °G-145), and Oreshko, in arguing against a velar value, entirely dismisses the best piece of evidence for a velar component in the grapheme (i.e. the comparison of ΨuvaΨaros with ^hUvaxšatara-). Neither of these dismissals is warranted.

Let us then recapitulate the evidence we have available for the value of the grapheme <Ψ>:

- 1) on the basis of °G-145, the grapheme represents a sound with some sibilant-like component;
- 2) in ΨuvaΨaros, <Ψ> in initial position likely represents a non-native /x/ or its substitution, and in internal position represents a non-native cluster /xʃ/ or its substitution;
- 3) in daΨet, <Ψ> represents the sibilant of the sigmatic optatives, which was otherwise written as <s> in Old Phrygian inscriptions (cf. *egeseti*, *dedasitiy*);

³⁵ He argues (Oreshko 2022: 155) that the two cannot be equated by saying that a diphthongisation of OPh. *i* into NPh. ει is unlikely. There is no reason whatsoever to assume that the <ει> or ζειρα represents a diphthong, and it is well known that New Phrygian could use the digraph ει to spell /i/. In fact, it is now clear that the digraph ει is in fact the expected spelling of the reflex of an inherited long /ī/ (see section §II.2.3.1.2).

- 4) in *seΨel*, <Ψ> represents the substitution of what was ultimately a non-native /q/;
- 5) <Ψ> cannot represent a synchronic [k], [s], or [ks], since all of these values were represented with other graphemes or combinations of graphemes.

Since the grapheme seems to have both a sibilant and a velar-like value, could we assume it represents a sound with an intermediate value, namely /ʃ/ *vel sim.*? That seems like a viable possibility that does not unduly dismiss any of the direct clues we have for its value. The ramifications of this interpretation are the following:

- In °G-145, the confusion between the two graphemes would be due to both encoding a sibilant sound.
- What would become the geminate sibilant of the sigmatic optatives in New Phrygian was written with <Ψ>, suggesting that geminated /ss/ was articulatorily retracted and was /ʃʃ/.³⁶ This explains the spellings of *daΨet* /daʃʃēt/ < */dassēt/ < */dāsēt/³⁷ and *egeseti* /egesēt/.³⁸ As elsewhere in Old Phrygian, the geminate value of the consonant /ʃʃ/ would not be graphically represented as *ΨΨ.
- Non-native dorsal fricatives were borrowed as the native /ʃ/ sound due to articulatory and acoustic proximity.³⁹ This would explain the rendering of /xuwaʃatara/ as /ʃuwaʃaros/. We have likewise already proposed that Old Aramaic *šqel* passed through an

³⁶ For the origin of the double sibilant in sigmatic optatives, see §V.3.4.1.

³⁷ With gemination of the *s* arising from the rule $\bar{V}s > Vss$, for which see §V.3.4.1.

³⁸ Oreshko (2022: 154) proposed that we are dealing with a simplified spelling in *dedasitiy* °B-05. We may note the possibility that perhaps the dialect of that inscription did not distinguish between /s/ and /ʃ/ either phonemically or graphically.

³⁹ Compare the pronunciation [ɪʃ] of some English speakers of the German *ich* /ɪç/ ‘I’.

intermediate language, where it was adapted to **sVχel vel sim.*, which was subsequently borrowed as Phrygian *seΨel /sefel/*.⁴⁰

This solution is very much in line with that proposed by Oreshko (2022: 158-159), who argues that <Ψ> had the function of rendering an ‘unusual *s*’. His proposal has simply been slightly expanded to give the grapheme a more concrete value and to argue that it is not the gemination of the sibilant of the sigmatic optatives that the grapheme renders, but rather its articulatory position.

We may make one additional note here. It is true that <Ψ> cannot represent a synchronic value [ks], since that sequence is written as <ks>. It is entirely possible, however, that an original **ks* cluster could have developed into /ʃ/ or /ʃʃ/; that development is well attested typologically (Kümmel 2007: 235). This opens up the possibility that *anivaΨeti* and *deΨeti*, both sigmatic optatives, as we can claim on the basis of their using the grapheme <Ψ>, can be etymologized as arising from roots that ended in a velar. Particularly *deΨeti* is telling in this case. <Ψ>, when used in a sigmatic optative, only seems to spell the reflex of a geminated /ss/. This geminated sequence only appears after originally long vowels, but the first vowel of *deΨeti* cannot have been long at any stage; otherwise, it would have surfaced as *a*.⁴¹ The <Ψ> of *deΨeti*, then, must have some source other than simply the sibilant of the sigmatic optative. Thus, <Ψ> is evidently also used to spell the reflex

⁴⁰ Once again, if Aramaic *šqel* were actually borrowed directly into Phrygian, we would expect its uvular stop to be rendered with a velar stop, which would have been written as <k>.

⁴¹ This is the case in *daΨet*, where an original long **ē* developed into **ā*, which was subsequently shortened: **dēsē-* > **dāsē-* > **dassē-* > *daΨe-*. See §V.3.4.1.

of a cluster of some consonant and *s; most likely, one such cluster would have been *ks.⁴²

II.1.1.5 Non-canonical representation of sibilants

In the North-Western area of Phrygia (most notably in inscriptions °B-04 and °B-05), the representation of the sibilant /s/ is different to that attested elsewhere:  (CIPP2: 26-29). This is a notable peculiarity of the northwestern Phrygian alphabet (*ibid.*, Oreshko & Alagöz 2023: 801).

We also find this sign used for /s/ in the newly discovered inscription °G-12 (Oreshko 2023: 54ff.). This inscription in particular is fascinating in that it apparently uses one additional sign for some sibilant:  (Oreshko 2023: 54; Oreshko & Alagöz 2023: 801). This grapheme is transliterated as <ś> and as Oreshko and Alagöz (*ibid.*: 801-803) rightly note, it is likely to represent a palatalized or retracted sibilant close to [ʃ]: it appears before <i> and when in a cluster with another consonant. This retracted value of the sibilant must be the result of a possibly local allophonic variation.

⁴² Do note that the argument being made is not that <Ψ> was used to render a synchronic value /ks/, which is counterindicated by that sequence being spelt with <ks>, as noted above. Rather, an older sequence *ks would have developed into /ʃ/ or /ʃʃ/, which would be spelt with <Ψ>. Spellings with <ks> that we do find would reflect synchronic sequences of /ks/ that arose after this sound law had ceased being operational.

II.1.2 Synchronic phonological system of Old Phrygian

	labial	dental	alveolar	palatal	velar
voiceless plosive	/p/ <p>	/t/ <t>			/k/ <k>
voiced plosive	/b/ 	/d/ <d>			/g/ <g>
affricate		/dz/ <↑>			
fricative		/s/ <s>	/ʃ/ <Ψ>		
nasal	/m/ <m>	/n/ <n>			
resonant			/r/ <r> /l/ <l>		
semi-vowel	/w/ <v>			/j/ <y>, <i>	

Table #3: The consonantal segments of Old Phrygian

	front	central	back		front	central	back
close	/i/ <i>		/u/ <u>		/ē/ <i>, <e>		/ū/ <u>
mid	/e/ <e>		/o/ <o>				/ō/ <o>
open		/a/ <a>				/ā/ <a>	

Table #4: The vocalic segments of Old Phrygian

Diphthongs:

/ai/ *ayni* ‘if’ °B-05.11

/ei/ *materey* ‘mother (DSg)’ °W-01b

/oi/ *adoikavoi* ‘PN (DSg)’ °G-02

/au/ *avtay* ‘him(self) (DSg)’ °W-01b

/eu/ *bevdos* ‘statue’ °B-01.1

/ou/ *otekonov* ‘?’ °B-01.7

/āi/ *avtay* ‘him(self) (DSg)’ °W-01b

/ōi/ *κλευμαχοι* ‘PN (DSg)’ °W-11

/āu/ *no secure example*

/ōu/? *vasous* ‘PN’ °P-03⁴³

II.1.2.1 Restrictions in coda

In word-final position, only certain sounds and combinations of sounds were permissible as a result of regular sound change (cf. §II.3.2.3.10).

The allowed codas were:

- all vowels: *-a* (*spereta* ‘?’ °B-01), *-e* (*ke* ‘and’ °B-07), *-i* (*anivaΨeti* ‘may he mourn?’ °B-07), *-o* (*tovo* ‘of him’ °G-02), *-ā* (*kubeleya* ‘DN’ °B-01), *-ō* (*lakedo* ‘may he be seized’ °W-01b), *-ū* (*ituv* ‘may he become/go’ °B-05); *no good examples attested for -u, -ē;*
- all diphthongs: *-ei* (*vanaktei* ‘king (DSg)’ °M-01a), *-oi* (*tedatoy* ‘he caused to be placed’ °W-01a), *-āi* (*avtay* ‘him(self) (DSg)’ °W-01b), *-ōi* (*adoikavoi* ‘PN (DSg)’ °G-02), *-ou* (*otekonov* ‘?’ °B-01); *no good examples attested for -ai, -au, -eu,*⁴⁴ *-āu, -ōu;*
- a vowel followed by *-s* (*ates* ‘PN’ °M-01a), *-n* (*keneman* ‘niche’ °M-01b), *-r* (*matar* ‘mother’ °B-01), *-l* (*apel* ‘fruit?’ °G-342), *-t* (*daΨet* ‘would put’ °W-01b), *-k* (*bonok* ‘PN’ °W-01a), and presumably *-p* (no example is attested, but this is likely, since *-t* and *-k* are both allowed).

⁴³ See Brixhe 1990: 70ff.

⁴⁴ Possibly attested in *apelev* °B-07.

II.1.2.2 Gemination

Geminate spellings in Old Phrygian are exceedingly rare (cf. PhL 31, 56); there are only 8 examples of identical graphemes appearing adjacent to each other in the entire Old Phrygian corpus.

Listed are all examples of geminate spellings in Old Phrygian:

- *bba* (°M-02) is a variant of *baba* ‘PN’ (°M-01b) (PhL 192);
- word divisions exist between: *alussi↑eto* (°W-08, °W-10) (cf. *si↑eto ae alus* °W-09) (PhL 174), *mamutassok-* °G-229 (cf. *mamutas* ‘PN’ °G-229) (PhL 290-291);
- *]kakra Yunni[* °G-03, *]esservasbo[* °G-130,⁴⁵ *]avaşş[* °G-142 are fragmentary inscriptions, so no judgement on the geminates is possible;
- *natimeyonna* °W-05a is unexplained.⁴⁶

In the last four examples, the inscriptions are fragmentary or, in the case of °W-05a, too short for us to be able to tell whether a word boundary may have been present between the two identical consonants.

In the end, then, we are left with four dubious cases of written “gemination”. The most reasonable conclusion to draw from such a dearth of examples is that Old Phrygian did not graphically distinguish gemination (cf. also PhL 31).

At least one, and possible more, geminates were phonemically distinct in Old Phrygian, however: see §II.3.2.3.9 and §II.3.2.3.11 below, where the

⁴⁵ Though Obrador-Cursach (PhL 345) reads *]es servas bo[*.

⁴⁶ Obrador-Cursach (PhL 308) assumes a word boundary between *natimeyon* and *na* due to the geminate spelling.

existence of a phonemic geminate /n:/ in Old Phrygian is firmly established and the existence of a phonemic geminate /s:/, though backed to [ʃ:], in at least late Old Phrygian is strongly suggested on the basis of New Phrygian data.

In the Old Phrygian script, the phonemic geminates would not have been graphically marked as distinct from their non-geminated counterparts.

II.1.2.3 Vacillation in spelling

Several lexemes appear to be spelt differently in different inscriptions. Variant spellings with *y* will not be discussed specifically: after an apparent spelling reform in the 6th century, <y> began to be used in i-diphthongs, as a facultative insertion in /i(j)V/ sequences, and in its general consonantal value (Lejeune 1969a: 37).

si = ‘this, the’ (°M-01a, °B-01) ~ *s* = (°M-01d, °B-07)

The proclitic *si* is written both as *si* and as *s* (cf. PhL 343): *si*=*keneman* ‘this niche’, *si*=*bevδος* ‘this statue’, *s*=*manes* ‘this Manes’, *s*=*materan* ‘this mother (ASg)’. Based on these examples, we may surmise that final -*i* was beginning to become syncopated in some environments in Old Phrygian. By New Phrygian, all proclitics would have lost a final -*i*.⁴⁷ The examples we do have are not particularly informative beyond this observation.⁴⁸

⁴⁷ E.g. αδ < *adi < *h₂ed-d^{hi}. See further in §VI.1 and §II.3.3.1.

⁴⁸ At most, we can speculate that the final vowel of *si* was first syncopated before resonants; this would have produced no ambiguity, since Phrygian did not possess native *sR*-onsets at the time.

imen- (°B-05 2x, °G-183) and *inmeney* (°B-05)

The examples of the noun *iman* ‘memorial’ in the oblique case consistently show a spelling *im-*, save *inmeney* (PhL 252-253); the nominative singular *iman* is always spelt as such (M-06, G-136, ...). Brixhe (2004: 62) assumes the *-nm-* spelling is a result of hypercorrection that resulted as a consequence of degemination of *-mm-* to *-m-*. The regular spelling with *-m-* would in this case also result from degemination. Vine (2010: 346-7) proposes that *imen-* is a reflex of a nominal stem **en=men-* (‘*in + remaining’ > ‘memorial’), where **-nm-* > **-mm-* > **-m-*. *inmeney* would then be an example of an etymological spelling.⁴⁹ The sequence *-nm-* is otherwise entirely absent from the Old Phrygian corpus,⁵⁰ suggesting that an assimilation of nasals of this or a similar type did take place.⁵¹ There is also another possibility. In New Phrygian, there is evidence that vowels were allophonically nasalized between two nasal consonants, which sometimes results in unexpected spellings.⁵² If the same process of nasalization was already a characteristic of the language variety of inscription °B-05, then the unexpected *-n-* may perhaps be an attempt at more explicitly marking the nasalization of the vowel, since the initial *i-* of *inmeney* does in fact appear between two nasals, being part of the syntagm *ivimun inmeney*, perhaps [iɣimun ĩmenei]. Such a spelling could be directly compared to New Phrygian κνουμανει [knũmanei] °101^{SE} (for usual κνουμανει), where a *-v-* likewise marks nasalization of the vowel.

⁴⁹ Presumably, the term would still need to be synchronically parseable to the speakers for this to be possible.

⁵⁰ Except for G-215, which reads *nm* in its entirety, and P-03, where *n* and *m* are separated by an unwritten word boundary.

⁵¹ Note, however, that a /mn/ sequence does not undergo assimilation (e.g. *umniset* B-05,7).

⁵² See §II.2.3.1.3 and §II.3.3.1.

eštat ‘he erected?’ (°B-05) alongside *ešt[* (°B-07), *estatoi*° ‘he caused to be erected’ (°G-144)

šaragiš ‘?’ °M-101 alongside *saragiš* (°B-108)

Brixhe (CIPP2: 26-9, 47, 93 *et passim*) convincingly argues that what has been previously transliterated as <š> is simply a local variant of <s>.

-eivais (°P-03) ~ *-evais* (°M-01a, °M-01b, °M-02) ~ *-ieva-* (°P-02) ~ and *-euis* (°T-02b)

This suffix appears in patronyms; its oblique stem was *-evan-* (CIPP 8). The *-eivais* ~ *-evais* difference remains unexplained; Brixhe (CIPP 231, 233) has suggested it may be an error. Both *-eiva-* and *-ieva-* appear as the second element in the same patronymic form in two inscriptions found in the same area: nom. sg. *kanutievais* ‘PN’ °P-03, gen. sg. *kanutiēvanos* °P-02. Since the first element of the names appears to be *kanuti-*, it is appealing to assume that the unconventional spellings are the result of attempting to properly render what would have been a fairly uncommon phonological /-i.e-/ sequence.

memeuis °T-02b can be directly compared to *memevais* ‘PN’ °M-01b (Brixhe 1983: 118; PhL 298). The reason for this difference in spelling remains obscure (CIPP 264-266), though Obrador-Cursach (PhL 84, 298) cites the proposed Luwic contraction **wa > u* as an influence.

vasus ‘PN’ °P-05 ~ *vasous* °P-03 ~ *vasos* °P-02

This personal name found mentioned in three inscriptions in the same area presumably refers to the same person, who is also dubbed *kanutievais* immediately after: [...] *vasos kanutievanos* °P-02,]*vasus:kanutie[* °P-05, *vasous iman mekan kanutievais* [...] °P-03. In °P-02, the form *vasos* is immediately followed by a form in the genitive singular; on this basis,

Brixhe (1990 *apud* PhL 238) concluded that the name is in the genitive case as well, which is hard to dispute. Since *vasous* appears with *kanutievais*, which is in the nominative singular, it is likely to be in the same case. The actual case form of *vasus* is not known, since the inscription is broken before the ending of the following nominal form, but Brixhe (1990 *apud* PhL 238), Ligorio & Lubotsky (LL 1825), and Obrador-Cursach (PhL 238) all assume that it is a graphic doublet of *vasous*; Brixhe (1983: 117) proposes that the form underlying both spellings originally ended in **-ous*, Ligorio and Lubotsky assume *vasous* to be the expected spelling of *vasōus*, with *vasus* being a variant spelling of the rare diphthong /ōu/, whereas Obrador-Cursach finds *vasus* to be the most likely original nominative singular form of a *u*-stem, with *vasous* showing hesitation in spelling and a possible correction during engraving.⁵³

In any case, treating *vasous* and *vasus* as representing the same underlying form is the best approach for the time being.

II.1.2.4 Vowel raising

There are numerous instances of mid-vowel raising in Old Phrygian. It appears to be most common in coda position and takes place primarily before nasals (Brixhe 1983: 119-120, LL 1820).⁵⁴

There is little to be said about sequences /on/ and /un/ in final position; /un/ is certainly far more common, being used for every identifiable etymological sequence of PPh. **-on*. This would, at first glance, seem to suggest that at some point in the pre-history of Old Phrygian, a

⁵³ The actual declension of *vas(o)us* will be examined in §III.3.4.

⁵⁴ Inscription °W-11 from Dokimeion will be dealt with separately in §II.2.4.

development **-on* > *-un* took place. This is inconsistent with New Phrygian data, however: etymological sequences of PPh. **-on* are written with both <-ov> and <-ouv> (Brixhe 1983: 120). This distribution in New Phrygian rather suggests that the phonetic value of the reflex of **-on* was [-ɔn] at that time. This is incompatible with the assumption that PPh. **-on* developed into *-un* in Old Phrygian.⁵⁵

The preferable solution, then, is to assume that the reflex of PPh. **-on* was /-on/, phonetically realised as [-ɔn], and written by Old Phrygian scribes as <-un> as a matter of convention.

In at least one example, we can be certain that a word-final spelling *-on* reflects a phonological sequence /-ōn/: *kuryaneyon* is a loanword from some early Greek dialectal form **korjanejōn* (which is better known from its epic counterpart κοῦρανέων ‘commander, master’) (cf. PhL 283, LL 1820).⁵⁶ Another example has recently been adduced: *tekiseton* ‘?’, a 3pl *si* impv. act. verbal form, likewise seems to show *-on* being used to spell /-ōn/; in this case, the 3pl impv. desinence is *-tōn* < **-tō* + *-n*.

These two examples suggest that a word-final /-ōn/ was consistently spelt as *-on* (Tamsü Polat et al. 2020: 51).⁵⁷

⁵⁵ That is, unless we also assumed that a lowering of OPh. *-un* > NPh. [-ɔn] took place afterwards. This is quite a problematic assumption: mid-vowels would have first been raised before nasals, only to then be lowered again in the same environment. Do note that this raising into a fully high vowel would have seemingly only affected PPh. **o*, but not PPh. **e* (as suggested by OPh. words ending in *-en*).

⁵⁶ Alternatively, one might suppose that Proto-Greek **kurjanejōn* and OPh. *kuryaneyon* are cognates. In this case, we would likewise expect the final vowel of the Phrygian form to be long.

⁵⁷ It is certainly possible, and indeed likely, that at least some unexplained spellings with *-on* may have also been used as a means of writing the reflex of **-on*, i.e. /-on/. Examples of word-final *-on* spellings in Old Phrygian need to be evaluated on a case-by-case basis.

Instances of *-en* and *-in* in final position do not show any kind of a clear distribution and the analyses are hampered by the fact that they do not map onto known inflectional endings as neatly as *-un* and *-on*. We may reasonably assume that both *-en* and *-in* would have been used to spell the reflex of word-final **-en* (cf. Brixhe 1983: 119), which would have presumably remained /-en/ in phonological terms.

Brixhe (1983: 115-6) argues that the opposition between mid- and high-vowels was neutralized before a final nasal. This is difficult to verify, however, as sequences reflecting earlier **-un#* and **-in#* would have been comparatively rare to begin with and no secure examples are known.⁵⁸ If true, we would expect them to be spelt as *-on* and *-en* on occasion. The few examples we do have, however, suggest this did not happen. Thus, for the moment, this suggestion is not sufficiently supported by the evidence.⁵⁹

In a non-final position, no specific development related to the nasals seems to have affected either /o/ or /e/, at least in open syllables.⁶⁰

The two synchronic rules we may postulate for Old Phrygian are:

OPh. /e/ > [ɛ] / *_n#*

OPh. /o/ > OPh. [ɔ] / *_n#*

⁵⁸ The functional load of such a phonemic opposition would be minute in any case.

⁵⁹ Consider also that the New Phrygian examples that show the reflex of an earlier PPh. **-in* are apparently consistently written with <-iv>. See also §II.2.3.1.3.

⁶⁰ See §II.3.2.2.1 for closed syllables.

Another known spelling variation in the vowels is the use of <i> for expected <e>, where the underlying phoneme is almost certainly known to be /e/. The two examples are:

- *ḡkinanogavan* (°M-04) alongside the more common *akenanogavos* ‘(religious title)’ (°M-01a, °W-01a 2x, possibly also *Jaḡke-ḡnōḡ* [°M-09) (PhL 170);
- *kubileya* (°W-04) alongside the more expected *kubeleya* ‘DN’ (°B-01.3) (PhL 280-281).

This type is discussed alongside two New Phrygian forms, ζιμελως ‘men (DPl)’ and αββιρετο- ‘would/will cause to be brought’, in §II.3.4. It appears that the conditioning factor was the placement of the accent: the phoneme /e/, when accented and in an open syllable before a resonant, was allophonically raised to [e̞] and spelt with either <e> or <i>. In formal terms: PPh. *é > OPh. [e̞], NPh. [e̞] / _\$RV

We may possibly extend this rule to the other mid-vowel, /o/, if the following example is included:

- *kakuioi* (°P-04b) alongside the more expected *kakoioi* ‘would harm’ (°G-02).

Alternatively, however, this may simply be an example of sporadic height dissimilation (cf. PhL 265).

II.2 New Phrygian

II.2.1 New Phrygian writing system

The New Phrygian inscriptions date to the second and third century CE and are written in the Greek alphabet.

The following table shows the values of alphabetic signs in contemporary Koiné Greek (Allen 1968). These are the values we expect the graphemes to have in New Phrygian inscriptions.

α	[a], [ā]	ι	[i], [ī] ⁶¹	ρ	[r]
β	[b] or [β]	κ	[k]	σ	[s]
γ	[g] or [ɣ]; [ŋ]	λ	[l]	τ	[t]
δ	[d] or [ð]	μ	[m]	υ	[y], [ȳ]
ε	[ε]	ν	[n]	φ	[p ^h] or [f]
ζ	[z]	ξ	[ks]	χ	[k ^h] or [x]
η	[ē]	ο	[ɔ]	ψ	[ps]
θ	[t ^h] or [θ]	π	[p]	ω	[ō]

Table #5: The values of alphabetic signs in Koiné Greek at the beginning of the Common Era

Other notes:

<ει> - [ī], [ē] prevocally

Has a value [ē] in Classical Attic, but merges with [ī] by the Roman era, where this digraph is consistently represented with <ι> (Allen

⁶¹ But <ρι> /rī/ was most likely pronounced as [rē].

1968: 66). In pre-vocalic position, however, it remains [ē] until the 2nd century CE at the latest, after which it merges with [ī] in this position as well (Allen 1968: 69). In Phrygian, in addition to a monophthongal value in some instances, this digraph represents the diphthong /ei/, as that would have been the only way for the writing system to represent such a diphthong.

<η> - [ē]

Has a value of [ē] in Classical Attic. Begins getting confused with <ι> around 150 CE, but is still confused with <ε> for over a century, indicating it had not yet merged with [ī] (Allen 1968: 71). In Phrygian, this grapheme is used to represent the result of the ongoing monophthongization /ei/ > /ē/.

<αι> – [ē]

Having an early Koiné value [ai], this digraph began to represent a monophthongal pronunciation that began to develop some time before 100 CE and was seemingly completed by 200 CE (Allen 1968: 75-6). In Phrygian, this digraph stands for the diphthong /ai/, either because it was adopted from a language variety of Koiné where [ai] > [ē] had not taken place yet, or because it would have been the only way for the writing system to represent a diphthong /ai/.

<οι> – [ȳ], [ō]

This digraph begins being confused with <υ> in the 1st or 2nd century CE, indicating a high rounded front vowel. The development to [ȳ] probably had an intermediate stage [ō]; this raising was parallel to earlier [ē] > [ī] (Allen 1968: 77). In Phrygian, this digraph stands for the diphthong /oi/, as that would have been the only way for the writing system to represent this diphthong.

<φ>, <θ>, <χ> - aspirated plosives or fricatives

While it is uncertain whether these graphemes represented aspirated plosives or fricatives at the beginning of the common era, they are exceedingly rare in New Phrygian inscriptions (cf. Brixhe 1999: 298-299) and their interpretation is not relevant for Phrygian. The term ευκι- ‘a vow’, a loan of Greek εὐχή ‘id’, for instance, is written without aspiration.

<β>, <δ>, <γ> - voiced plosives or voiced fricatives

It is uncertain when voiced plosives of the classical era became fricatives in Greek (Allen 1968: 27-30). These graphemes do seem to represent voiced plosives in New Phrygian (Brixhe 1999: 297-298), as the spellings of consonants in lexemes agree with their Old Phrygian counterparts.

Vowel length

Distinctive vowel length appears to have been lost in Koiné by the 3rd century CE. Earlier confusion of long and short vowels need not necessarily reflect loss of vowel quantity, but rather a convergence of quality (Allen 1968: 88-9).

II.2.1.1 Phonemic system of Koiné Greek at the beginning of the Common Era

The question of the sound system of Koiné Greek is relevant since scribes at the time were presumably Koiné Greek speakers and were accustomed to the peculiarities of that language.

	labial	dental	alveolar	velar
voiceless	<π> [p]	<τ> [t]		<κ> [k]
voiced	<β> [b] ~ [β]	<δ> [d] ~ [ð]		<γ> [g] ~ [ɣ]
voiceless aspirate / fricative	<φ> [p ^h] ~ [f]	<θ> [t ^h] ~ [θ]		<χ> [k ^h] ~ [x]
sibilant		<σ> [s] <ζ> [z]		
nasal	<μ> [m]	<ν> [n]		(<γ> [ŋ])
liquid			<λ> [l] <ρ> [r]	

Table #6: The consonantal segments of Koiné Greek at the beginning of the Common Era (Allen 1968: 10ff.)

	front		central	back
close	<ι> [i]	<υ> [y]		
close-mid				
mid	<ε> [ɛ]			<ο> [ɔ]
low			<α> [a]	

Table #7: The short vowels of Koiné Greek at the beginning of the Common Era (Allen 1968: 59ff.)

	front		central	back
close	<ι>, <ει> [ī]	<υ> [ȳ]		<ου> [ū]
close-mid	<η>, <ι> [ē]	<οι> [ō]		
mid	<αι> [ē]			<ω> [ō]
low			<α> [ā]	

Table #8: The long vowels of Koiné Greek at the beginning of the common era (Allen 1968: 59ff.)

Diphthongs: <αυ> [au], <ευ> [eu]

II.2.2 Preliminary notes on the New Phrygian sound system

II.2.2.1 New Phrygian metre

New Phrygian malediction formulae had a metrical structure (Lubotsky 1998: 413). The most common protasis (ιος νι σεμουν κνουμανει κακουν αδδακετ ‘whoever would do something bad to this grave’) has a dactylic rhythm and Lubotsky argues (*ibid.*: 418) that his reconstruction of the apodosis (με ζεμελωσ κε δεωσ κε Τιη τιτ(τ)ετικμενος ειτου ‘may he be condemned by Ti- among men and gods’) also has a dactylic rhythm. Heavy syllables only appear *per positionem* or as diphthongs: there is no evidence for vowel length. The variants of the standard formula all seem to be approximations of a dactylic rhythm, most commonly a hexameter (*ibid.*: 416-7). Lubotsky provides attested “extensions” of the protasis, all of them producing an imperfect hexameter (*ibid.*: 417).

The numerous variants of the malediction formula in practice only rarely emerge with a consistent dactylic rhythm, with a number of variants substituting them in favour of trochees. The metrical inconsistency of a majority of the inscriptions has two explanations, which are the result of two phases: 1) the Phrygians were having difficulty understanding and/or adapting the hexameter to their own language (presumably as a result of lacking vowel length); 2) the incompletely imitated hexameter was further distorted by sound changes and/or synchronic variants of the language. The result is a system whose origin is clearly discernible from a diachronic point of view, but which would be understood only vaguely by those who used it.⁶² The initial composition of the curse formulae would most likely be closely reminiscent of a dactylic hexameter, while later variants would show significant erosion in comprehension of the form.

Inscription °W-11, dated to the late 4th or early 3rd century BCE, is considerably less haphazard in its imitation of the hexameter: while syllable weight does not necessarily fit a dactylic rhythm, each line is composed of 17 syllables, better resembling the form (Lubotsky 2017: 437ff.). While this may be due to the special nature of this obviously Hellenic-inspired isolated text, it is representative, it would seem, of a stage anterior to the second and likely the first phase: the form of the dactylic hexameter is evidently understood to some degree (and remains understood until the beginning of the New Phrygian era, possibly indicating a period of relative linguistic stability).

⁶² As already Lubotsky (1998: 417ff.).

II.2.3 Synchronic phonological system of New Phrygian

	labial	dental	alveolar	palatal	velar
voiceless plosive	/p/ <π>	/t/ <τ>			/k/ <κ>
voiced plosive	/b/ <β>	/d/ <δ>			/g/ <γ>
fricative		/s/ <σ> /z(:)/ <ζ>			
nasal	/m/ <μ>	/n/ <ν>			
resonant			/r/ <ρ> /l/ <λ>		
semi-vowel				/j/ <ι>	/w/ <ου>, <ο>

Table #9: The consonantal segments of New Phrygian

	front	central	back
close	/i/ <ι>, <ει>		/u/ <ου>, <υ>
mid-close	/e/ <η>, <ει>, <ι>		/o/ <ω>, <ο>
mid	/e/ <ε>	([ẽ] ~ [ẽ̃] <Vv>, <V>)	/o/ <ο>
open			/ɑ/ <α>

Table #10: The vocalic segments of New Phrygian

II.2.3.1 Vocalism

II.2.3.1.1 Vowels of New Phrygian

The vowel phonemes of New Phrygian are /a/, /e/, /i/, /o/, /ɔ/, /u/ (cf. Lubotsky 1998: 414), and /ē/ (cf. Brixhe 1983: 117).

There were most likely five, possibly six, diphthongs: /ai/, /ei/, /oi/, /au/, /eu/, (/ou/) (Lubotsky 1998: 415-416).

The vowels and the diphthongs are for the most part written consistently in non-final position (cf. Lubotsky 1998: 414-416):

- /a/ as <α> (αδδακετ ‘would do’), /e/ as <ε> (σεμουν ‘this (DSg)’), /i/ as <ι> (τιττετικμενος ‘condemned’), /o/ as <ο> (ιος ‘whoever’), /u/ as <ου> (κνουμανει ‘grave (DSg)’), /ɔ/ as <ω> (δεως ‘gods (DPl)’),⁶³ and /ē/ as <ει> (τοτοσσειτι ‘would give’);
- /ai/ as <αι> (αινι ‘if’), /oi/ as <οι> (αββερετοι ‘will cause to be brought’), /au/ as <αυ> (αυτος ‘he himself’), /eu/ as <ευ> (τεντους ‘may he be driven?’), /ei/ as <ει> (κνουμανει ‘grave (DSg)’), while /ou/ would most likely be written <ου> and thus be indistinguishable from /u/.

The reflexes of Old Phrygian ē and ey and their spellings will be treated in the following section.

On occasion some of the vowels are written with different graphemes, which may shed some light on their phonetic realization:

/a/ is written with <ο> a handful of times (e.g., in δοκετ ‘would do’, γεγραμμενον ‘written’, ουτον ‘punishment’, all °106^E); this might point to

⁶³ For an explanation of this spelling choice, see §II.3.3.1.

it being a back-vowel, perhaps [a] (*contra* Brixhe 1983: 119, who assumes velarization). This is likely a dialectal realization (§II.3.3.3).

Before a vowel, both <ε> and <ι> appear interchangeably (cf. $\tau\epsilon\alpha\mu\alpha\varsigma$ ‘?’ °14NW ~ $\tau\iota\alpha\mu\alpha\varsigma$ °87^W), indicating a neutralization of a contrast between them in this position (*ibid.*).

/u/ is sometimes written simply with <υ> instead of <ου> (cf. $\kappa\nu\upsilon\mu\alpha\nu\epsilon\iota$ °62^C). It seems unlikely this reflects a phonetic reality and is presumably just a case of simplified spelling (*ibid.*: 121; Brixhe 1999: 307-308).

/i/ is at times written as <ει> (cf. Brixhe 1999: 303; PhL 58-59). This digraph stood for /ī/ in contemporary Greek, where it is also used for /i/ on occasion, an example of hypercorrection (Allen 1968: 87; Brixhe 2010: 232). The same holds for Phrygian, which would not have properly distinguished vowel length at this stage.

/ɔ/ is consistently written with <ω>, but does appear three times as simply <ο> (cf. $\delta\epsilon\omicron(\varsigma)$ °6^W, °7^W, °116^W) (Lubotsky 1998: 2).

/oi/ is written as <υ> in at least two instances ($\upsilon\kappa\epsilon$ °2^W < $^+\omicron\iota\kappa\epsilon$ ‘and him’ (Brixhe 1979: 92), $\kappa\alpha\rho\upsilon\varsigma$ < $^+\kappa\alpha\rho\iota\upsilon\varsigma$ ‘fruit (API)’ °130^{NW}). Greek /ȳ/, which was spelt with <υ>, would presumably be the closest sound to a diphthong with both a front and a rounded element.

<η> stood for /ē/ in contemporary Greek and has a very limited distribution in New Phrygian (Lubotsky 1989a: 82-83, Brixhe 1999: 301-303). It seems to appear as a substitute for <ι> or <ει> in some cases (cf. *ibid.*; PhL 58-59).

II.2.3.1.2 The reflexes of Old Phrygian *ē* and *ē̄*

In New Phrygian, Old Phrygian *ē̄* (<PGPh. **ī*, **eje*, **e* / *_s*{*r*,*l*?}) developed into a segment that is spelt with <ει> and <ι>:

- OPh. /-sē-/ ‘(sigmatic optative suffix)’ > NPh. -σι- (1x), -σσι- (1x), -σσσι- (2x);
- OPh. ↑*ira*- /dzēṛā-/ ‘hand’ > NPh. ζεῖρα °12^S, °106^E (cf. Brixhe 1983: 117);
- PGPh. **g^hri*- ‘to smear, annoint’ > γρει- °32^E, °33^E, °34^E, °36^E, °59^E, °60^E, 76^C, °105^E, °106^E, °108^E; γρι- °58^E.

As can be plainly seen, the spelling of the reflex of OPh. *ē̄* with <ει> (14x) is far more common than the spelling with <ι> (3x). Indeed, the distribution is so skewed in favour of the former spelling (~3:1) that the segment being represented cannot have been simply [i].⁶⁴ It thus seems quite beyond reproach that the reflex of OPh. *ē̄* cannot have been simply merged with one of the other short vowels.⁶⁵

We would certainly expect a synchronic New Phrygian diphthong [ei] to be written primarily as <ει> (cf. PhL 58-59, however). While true that the digraph εἰ stood for [ī] in Koiné Greek at the time of New Phrygian inscriptions, no other digraph could have reasonably represented [ei].⁶⁶

⁶⁴ Recall that in Koiné Greek of the time, <ι> could spell /i/ and /ī/, whereas <ει> spelt /ī/.

⁶⁵ Compare also the spelling distribution of the DPl *o*-stem ending as -ως (at least 37x with ζεμελο- and δεο-) and -ος (3x) (~12:1).

⁶⁶ εἰ at least has the benefit of being graphically decomposable into ε [e] + ι [i], i.e. [e.i], which would certainly be the best option possible at representing a monosyllabic [ei].

In word-internal position, by far the most common (and possibly the only known) New Phrygian reflex of PGPh. **ej* was in the present verbal stem $\epsilon\iota$ - ‘to go’ < PIE **h₁ei-* (cf. PhL 261-262).⁶⁷ This stem appears spelt with $\epsilon\iota$ over 50 times and the spelling is mostly consistent, with the only variant spellings being $\eta\tau\omicron\upsilon$ °5^W and $\iota\nu\omicron\upsilon$ °35^E, °71^W (*ibid.*), though in the latter two cases we might be dealing with the reflex of a zero-grade **i* in the plural or, alternatively, the result of pre-nasal raising. It is likely that $\epsilon\iota$ was used to spell a monophthongized reflex of earlier *ey*.

There is some evidence that the diphthong *ey* was already becoming monophthongized word-internally in two late Old Phrygian inscriptions: specifically in the forms *eketoy* ‘caused to be made’ < **e-k^wei-toi* °B-07 and *ituv* ‘may he become’ < **eitō* °B-05. The fact that it was spelt as <*e*> in one instance and as <*i*> in another suggests that its monophthongal value was similar to that of Old Phrygian / $\bar{e}$ /. The reflex of that phoneme was commonly written as < $\epsilon\iota$ > in New Phrygian. This suggests that, at least word internally, then, the reflexes of OPh. $\bar{e}$ and *ey* would have merged by New Phrygian.

The treatment of the reflex of OPh. *ey* in word-final position can be gleaned from how the reflex of the OPh. dative singular consonant stem ending *-ey* is spelt.

This case ending is often found appended to $\kappa\nu\omicron\upsilon\mu\alpha\nu$ - ‘grave’ when in a malediction formula. As an ending of this lexeme, it is most commonly written as < $\epsilon\iota$ > (39x), but also as < ϵ > (20x), < ι > (8x), and once as < η >.⁶⁸

⁶⁷ Most likely, the historical full grade variant of the stem was levelled through the forms of the present paradigm. See also §V.3.1.1.

⁶⁸ Listed in §II.3.3.3. Cf. the slightly different count by Elti di Rodeano (2015: 119): < $\epsilon\iota$ > (48x), < ϵ > (21x), < ι > (8x), < η > (1x).

Regardless of the spelling, κνουμᾶν<ει/ε/ι/η> metrically scans as UU–, indicating that this ending must have been either a long vowel or a diphthong when the malediction formula was composed. Since no other historically long vowels scan as long (cf. **ad dāket* > αῖδακετ ‘would do’, metrically -UU) (LL 1819), its preservation as a diphthong until at least the loss of inherited long vowels is likely.⁶⁹

The dative singular ending of Tἰ- ‘Ti-’ paints a more difficult picture. As already noted by Lubotsky (1998: 415), Tἦ (6x) appears before consonants and Tἰ (13-14x) before vowels; Tἦε (16x) appears before both consonants and vowels. The grapheme <ἦ> had several phonetic realizations: in prevocalic position it stood for /ei/ or its reflex (cf. Lubotsky 1998: footnote 11 and Lubotsky 1989a: 82ff.; *contra* Brixhe 1999: 301, who assumes [j] – there is no reason to assume a purely consonantal reflex), in preconsonantal position it stood for the second part of a diphthong, i.e. [i]/[j] (Lubotsky 1998: footnote 11; cf. δεκμουταῖς ‘?’ ~ δεκμουταις), while its general value between consonants is unclear, but was presumably [ĕ] (Haas 1966: 202; cf. PhL 59-60).

Lubotsky’s suggestion (1998: 415) that the development **ei* > <ε, ι, η> (in final position) took place late in the New Phrygian era accounts for all the data, but should be understood as happening earlier than proposed. The evidence from κνουμᾶναι does suggest that while final εἰ had a diphthongal value at the beginning of the New Phrygian period in some contexts, it had a monophthongal realisation in others, where it was spelt as <ε, ι>.

⁶⁹ Do note that the reflex of OPh. *ē* does not appear in the reconstructed metrically correct malediction formula. While theoretically possible that it may have scanned as long at some point, this is not demonstrable.

As already noted, ***T̥i̥ɛi* never appears (*ibid.*), indicating an early development of the diphthong /ei/ after <ι>. If we assume that the pre-New Phrygian form was *+T̥i̥ [ti̥ḗ] <+tiyey*, the absence of *T̥i̥* in pre-vocalic position can be easily explained. If prevocalic <η> represented [ei], a <*T̥i̥ V*> spelling would then encode [ti̥ej V], which would not have been the synchronic form anymore. Spellings with <η> in preconsonantal position and spellings <ε> in general must represent a synchronic form [ti̥ḗ].⁷⁰ The spelling *T̥i̥* has two possible explanations: 1) elision of this final [ḗ] before another vowel; or 2) contraction.

The second explanation merits additional explanation: since <ε> and <ι> are non-contrastive in prevocalic position (cf. Brixhe 1983: 120, Lubotsky 1998: 414),⁷¹ we can assume they merged into a single phoneme. The speakers would have interpreted this phoneme as /i/, meaning that the dative form would be [ti̥ji] < [ti̥ḗ V-] < *+ [ti̥jei V-]*, with [i̥ji] being a sequence very prone to contraction into [i̥], giving *T̥i̥* [ti̥]. To explain the lightness of this syllable in scansion, we may assume an allophonic, but non-phonemic, preservation of a long vowel, which would be scanned as short for metrical purposes due to vowel length playing no part in New Phrygian metrics.⁷²

Inscription ^o56^E shows the unexpected sequence *ατ τιε ειτου*. Since we have assumed that -ε was only lost in pre-vocalic position, the fact that it appears here suggests that we should rather be thinking in terms of phrases within the context of a malediction formula: it would have been the entire phrase (*ατ*) *τι (αδ)ειτου* that would have been repeated and written down;

⁷⁰ We may safely assume that the final vowel of this form would not have been long for the purposes of metrics, since it does not form a long syllable.

⁷¹ Cf. *ταμας* ^o14^{NW} ~ *τιμας* ^o87^W.

⁷² This also suggests that the diphthongs have not yet undergone monophthongization by the time the curse formula was originally composed.

the fact that $\tau\epsilon\epsilon\iota\tau\upsilon$ can even exist suggests that the contraction/ellipsis rule $[ij\epsilon V] > [\bar{i} V]$, which is still needed to explain the copiously attested form $\tau\iota$, stopped being synchronically productive at some point and that the sequence was re-composed.⁷³

The conclusions we may draw from this analysis are:

- 1) the New Phrygian reflex of OPh. $/\bar{e}/$ was a phonemic segment $/\epsilon/$ most commonly written as $\langle\epsilon\iota\rangle$, most likely $[\bar{\epsilon}]$;⁷⁴
- 2) the New Phrygian reflex of an earlier ei in non-final position was consistently written as $\langle\epsilon\iota\rangle$ and probably had a value $[\bar{\epsilon}]$;
- 3) the reflex of the Old Phrygian diphthong ey following $/i/$ was phonetically realised as $[\check{\epsilon}]$ (which explains the pre-consonantal spellings with $\langle\epsilon\rangle$ and, through contraction, the pre-vocalic spellings with $\langle\iota\rangle$);
- 4) the regular reflex of the Old Phrygian diphthong ey in final position was a sound rendered as $\langle\epsilon\iota, \epsilon, \iota, \eta\rangle$, the latter three spellings presumably indicating a phonetic monophthongisation during the New Phrygian era.

While making a firm judgement on the synchronic phonemic system of a language requires the stringent criterion of being able to name minimal pairs, which is obviously impossible in a language as sparsely attested as

⁷³ If we assume that the phrase $\tau\iota(\alpha\delta)\epsilon\iota\tau\upsilon$ was interpreted as a single element, we cannot really say when the contraction/ellipsis rule stopped being productive. If the sequence was so common as to be interpreted as a stock phrase within the context of funerary inscriptions, that could have theoretically happened at any point. The $\tau\epsilon\alpha\delta\epsilon\iota\tau\upsilon$ example would then be a hypercorrection of a synchronically opaque stock phrase.

⁷⁴ Since vowel length was most likely not contrastive in New Phrygian, the phonemic segment is only defined in terms of quality, rather than length, even if this segment was pronounced as longer in actual pronunciation.

Phrygian, we may note that New Phrygian merged the reflexes of OPh. $\bar{e}$ and ey word-internally. In word-final position, the diphthong /ei/ was clearly graphically marked, though the phoneme is evidently known to have shown allophonic variants from before the New Phrygian era. The diphthong /ei/ in final position certainly tended towards phonetic monophthongisation, but the diphthong was at least phonemically still present in the earliest New Phrygian inscriptions. It is unclear how the phonetic monophthongisation would have impacted the development of the vowel system after that point.

II.2.3.1.3 Vowels before a final nasal

Mid-vowels followed by a nasal in final position mostly show the same situation as in Old Phrygian, that is, they are raised to mid-high vowels (cf. Brixhe 1983: 119-120).

<ov> alternates with <ouv> in the accusative singular *o*-stem ending *-on* (<PIE *-om) regardless of the following environment (e.g. $\kappa\alpha\kappa\omicron\nu$ ‘bad’ ~ $\kappa\alpha\kappa\omicron\nu\nu$) (*ibid.*).

This ending and the closely related dative singular ending (found primarily in $\sigma\epsilon\mu\omicron\nu\nu$ ‘this (DSg)’), the two of which had likely merged by the New Phrygian era, also appear written as <uv> ($\sigma\epsilon\mu\omicron\nu\nu$ °62^C; $\kappa\alpha\kappa\omicron\nu\nu$ °62^C), <iv> ($\sigma\epsilon\mu\iota\nu$ °76^E, °100^E, °107^E; $\kappa\alpha\kappa\iota\nu$ °14^{NW}), <ων> ($\kappa\alpha\kappa\omega\nu$ °11^S), <εν> ($\kappa\alpha\kappa\epsilon\nu$ °40^W, °97^{W+}, °119^W), °76 <ευν> ($\kappa\alpha\kappa\epsilon\upsilon\nu$ °45^{SE})⁷⁷, and <ν> ($\sigma\epsilon\mu\nu$ °34^E) (Šorgo 2019: 120-121, 124). In a limited number of cases, the final

⁷⁵ Possibly $\sigma\epsilon\mu\omicron\nu\nu$ (Brixhe 1999: 307).

⁷⁶ Sometimes seen as a variant of the adverb $\kappa\alpha\kappa\epsilon$ (in e.g. PhL 264-265), but the supposed hypercorrect addition of a nasal has no parallel elsewhere in the corpus.

⁷⁷ Possibly $\kappa\alpha\kappa\omicron\nu\nu$ (Brixhe 1999: 294).

nasal is not written or is not written with <v>: <ουμ> (σεμουμ °5^W), <ου> (σεμου °19^N) (cf. *ibid.*).⁷⁸

While writing with <υ> may simply be a writing convention that can be seen in internal position in κνυμανει (with numerous examples, though not in °62^C itself) and <ων> is most likely just an attempt to write [ɔn], the examples with <εν> and <ιν> are puzzling. The unexpected spellings suggest that non-low vowels were beginning to merge before a final nasal for some speakers.

The two desinences <ουμ> and <ου> may betray traces of another process that affected word-final combinations of a vowel and a nasal: loss of a final nasal with possible nasalization of the vowel (Šorgo 2019: 121). <ουμ> may have been an attempt at transcribing a nasalized vowel: it appears before <κ> and assimilation of place of articulation in Phrygian is anticipatory, meaning a bilabial /m/ is both entirely unexpected and against the apparent constraint against final -μ# that is not the result of assimilation with a following sound.

The three examples that will be dealt with in §II.2.3.2.1 may prove telling in this instance as well: αδακεν με °5^W, αδδακεμ μανκαι °35^E, αδ[δα]κε μανκαι °60^E. While these cases are a result of an assimilation of a final unreleased stop,⁷⁹ it is possible that the result of this assimilation itself resulted in a nasalized vowel:

*-eɪ̯m- > *-eɪ̯̃m- > *-eṽm- > *-ẽm- <-εν μ-> ~ <-εμ μ-> ~ <-ε μ-> (Šorgo 2019: 124).

⁷⁸ We may potentially add κακε °21^C, °88^C, °99^{NW}, °124^C to this list, though it is more likely that this form actually represents an adverb ending in -ε; cf. OPh. *kakey* °B-05 (PhL 264-265). See further in §VI.4.

⁷⁹ As is argued in §II.3.3.2.

Assuming nasalization to have been a possible feature of final vowels, it is likely it would have shifted the relative articulations of the vowels, seemingly centralizing the back vowels (first proposed by Orel 1994: 60; expanded on in Šorgo 2019: 121), resulting in uncertainty as to which grapheme or combination of graphemes would best represent this resulting central vowel. Even the enigmatic $\kappa\alpha\kappa\epsilon\upsilon\nu$ °45^{SE}, if this is indeed the correct reading instead of $\kappa\alpha\kappa\upsilon\nu$ and we discount scribal error or an error in our transmission chain as an explanation, is explainable within this framework as an attempt to transcribe a sound like [õ], i.e. a nasalised rounded central vowel (*ibid.*). It needs to be stressed that the nasalization and centralization of back vowels before a final nasal is only observable in a handful of inscriptions.

Final <εν> and <ιν> in general do not appear to be distinguished at first glance (Brixhe 1983: 119). The pronoun $\kappa\iota\nu$ (°9^W, °30^S, °98^{NW}, °100^E), however, showing an inherited high vowel (< PIE **k^wim*), is consistently written with <ι>. This suggests that high-vowels remained phonetically distinct from the raised allophone of mid-vowels before a final nasal and that the strong version of Brixhe's proposal of a complete merger of mid- and high-vowels before a final nasal (1983: 119-120) must be rejected.

Brixhe (1999: 296) has proposed that the spellings $\kappa\nu\upsilon\mu\mu\alpha\nu\epsilon\iota$ °44^S, °53^{SE} and $\kappa\nu\upsilon\nu\mu\alpha\nu\epsilon\iota$ °101^{SE} show examples of hypercorrect gemination and drew direct parallels to $\alpha\delta\delta\alpha\kappa\epsilon\mu$ με and $\alpha\delta\delta\alpha\kappa\epsilon\nu$ με. Since these have now received alternative explanations, it seems preferable to assume that the spellings are a result of the presence of an allophonic nasalised vowel, which most likely emerged as a result of being surrounded by nasal consonants on both sides; i.e. [knũman-]).

II.2.3.2 Consonantism

II.2.3.2.1 Word boundaries and sandhi

There are only three plosives that appear in word-final position in New Phrygian: -τ#, -κ#, -δ#.

Almost all examples of -τ# can be found in only two categories (Šorgo 2019: 123): 1) in the 3rd person singular ending (αδδακετ ‘would do’, αββερετ ‘would bring’, ...); or 2) in the preposition αδ before a dental (ατ τε, ...). We shall leave aside the question of this preposition here, as that -τ# must have clearly emerged as a result of assimilation.

It is puzzling that a consonant only appears in coda in a single grammatical ending. This can be explained by examining all cases where this ending is expected, but not actually found. The instances are: αδδακεν με °5^W < *αδακετ με, αδδακεμ μανκαι °35^E < *αδδακετ μανκαι, αδ[δα]κε μανκαι °60^E < *αδδακετ μανκαι, αδδακεκ γεγρειμ[ε]ναν °32^E < *αδδακετ γεγρειμεναν, αδ[α]κε ατε[τικμενο]ς °51^{SE} < *αδακετ ατετικμενος, αδδακε ταικαν °62^C < *αδδακετ ταικαν (*ibid.*). There are three examples where it appears that the ending was assimilated to some degree to the following consonant (into [+nasal] in °5^W, fully in °35^E, into [+velar] in °32^E). It is possible to interpret αδ[δα]κε μανκαι and αδδακε ταικαν as likewise being due to full assimilation and a subsequent simplification of a geminate (μμ > μ; ττ > τ). The usual reasoning is that these cases are examples of an irregular assimilation of final -τ (PhL 158).

An alternative explanation is possible, however: that these spellings fundamentally more closely represent the spoken reality of final /-τ/ and

that the very common spelling with final -τ found otherwise for this grammatical ending is an example of either an etymological spelling or a phonetic restoration. This may suggest that final dentals in New Phrygian were phonetically unreleased (cf. Šorgo 2019: 123-124). Synchronically speaking, the underlying form of this grammatical ending would still have been understood as /-t/.⁸⁰ Phonetically, one attractive possibility is that it was realized as unreleased [t̚] (*ibid.*).

This argument, if used to explain the 3rd person singular ending alone, offers some advantage. There exist, however, further phenomena that can be explained more readily if we proceed with this assumption.

Word-final -κ appears in only two positions: before a vowel and before a velar (*ibid.*). All cases of -κ in front of a vowel are in fact examples of the conjunction κε with elision of the final vowel in prevocalic position (compare with elision in Greek καί). All instances of final -κ before a consonant are: αδιθρερακ ξευνεοι °31^S, αδδακεκ γεγρεμ[ε]ναν °32^E, ουταν ακ κε οι βεκος °33^E, δαδωνκε οκκ αυγοι °69^{SE}, αδειτου ακ κε οι βεκος °76^E, μπου ικ κναικαν °116^W.

The two instances of ακ are assimilated forms of the preposition αδ. οκκ most likely stands for οτ κε (cf. κε οτ εκτει[...] °92^W and οτ τιτετικμενος °124^C with the same preposition). ικ appears to be a preposition with its final element assimilated again (see §VI.1.4). αδδακεκ has been dealt with above. The remaining example αδιθρερακ is interpreted as the personal name Αδιθρερας (Neumann 1986), with final -κ explained by Orel (1997: 332) as an example of -σ#κ > -κ#κ assimilation.⁸¹ There is no inherent

⁸⁰ No doubt reinforced by the presence of 3sg act. primary -τι or the 3sg middle endings -τορ and -τοι.

⁸¹ For which see further below in this section.

reason to assume that the name must have ended in a sibilant, and it may have well originally ended with a plosive (cf. Šorgo 2019: 123):⁸² the best option seems to be -κ itself.⁸³ Of the examples we do have, only two could have actually ended with an underlying element other than a dental stop. While uncertain, it is quite possible that -κ# was also pronounced unreleased, i.e. as [k̚].

The best evidence for the fate of final plosives in New Phrygian comes from the “geminating” preposition αδ. Usually, it surfaces as ατ in front of a dental stop (cf. ατ τι(η) ‘by Ti-’) and as ακ before a velar stop (cf. ακ κε), but also occurs as simply α before a dental stop (cf. α τιε). The single time it is found before a vowel, it is written αδ (αδ ατεαμας °14^{NW}) (Šorgo 2019: 123).

The preverb αδ must also derive from this preposition. Its final consonant assimilates into the following stop, with the resulting cluster then written with either a single or a geminate spelling. Crucially, however, it is written as αδ and never doubled when coupled with εἶτου ‘may he become’ (i.e., in αδεῖτου ‘~id.’). The New Phrygian data points to the conclusion that the underlying synchronic form of the preverb was αδ at that point as well and that this δ was assimilated with a following consonant, but preserved before a vowel.^{84 85}

⁸² Recall Old Phrygian *vanak* ‘king’ < **vanak(t)s* instead of ***vanaks* or ***vanas*, demonstrating that word-final clusters of a velar and sibilant were simplified to the velar at that point.

⁸³ If the final plosive were -τ, the NSg form would presumably be ***Αδιθρεατς* > *Αδιθρεας*, which is identical to -ς. Final -π is theoretically possible, but seems unlikely.

⁸⁴ While true that αδεῖτου might be an example of a lexicalized verb, the presence of εἶτου would make this a somewhat transparent formation to speakers of Phrygian. Furthermore, αδ ατεαμας cannot be a compound, so the synchronic New Phrygian pre-vocalic form of the preposition/preverb must have been phonetically realized as [ad-].

⁸⁵ The possibility that -δ- emerged as a result of secondary voicing between vowels is quite unlikely, since no evidence exists that such a development ever took place. In Old

As noted above, $-\tau\#$ may have had an unreleased realization in New Phrygian, and the assimilation of $-\delta\#$ to a following consonant suggests the same could hold true for it as well.

As we have seen above, the prepositions $\omicron C$ and ιC seem to show the assimilation of their final elements to a following consonant as well. The same holds for the preverb $\tau\iota C$, found in $\tau\iota\tau(\tau)\epsilon\tau\iota\kappa\mu\epsilon\nu\omicron\varsigma$ and $\tau\gamma\gamma\epsilon\gamma\alpha\rho\iota\tau\mu\epsilon\nu\omicron\varsigma$. All of them must have then ended in some consonant that was assimilated to a following consonant.

In Old Phrygian, however, we are able to identify the preposition/preverb *tit*,⁸⁶ which is evidently ancestral to NPh. $\tau\iota C$, which we may now re-write as $\tau\iota\tau$.

The fact that the ending $-\epsilon\tau$ is spelt with $\langle\tau\rangle$ before a vowel, whereas $\alpha\delta$ is spelt very consistently with $\langle\delta\rangle$, shows that the phonetic reflexes of $/-t/$ and $/-d/$, both of which emerged in late Proto-Phrygian after the original Proto-Graeco-Phrygian restriction against the presence of final stops was lifted, were not merged and that a phonological distinction was maintained.⁸⁷

Phrygian, the preverbs *tit* and *met* preserve their final unvoiced consonant before a vowel in *tit=edatoy* ‘~ caused to be placed’ °B-05 and *met=ebaes* ‘spoke with?’ °G-12, and in New Phrygian the same holds for $\omicron\pi$ and $\omicron\tau$ in $\omicron\pi\epsilon\sigma\tau\alpha\mu\epsilon\nu\alpha\nu$ ‘~ erected’ °9^W and $\omicron\tau\epsilon\kappa\tau\epsilon$ ‘?’ °92^W. See also §VI.1.5, §VI.1.6, §VI.1.7, and §V.1.9.

⁸⁶ See §VI.1.9.

⁸⁷ It follows that final stops in general were not phonetically merged in final position. Without the pre-vocalic examples, one could also in principle suggest that word final stops lost their place of articulation entirely and merged as [ʔ], which would also explain the ease of their assimilation. Phonetic restoration of $-\tau$ would be more difficult in this case, however.

In summary, the following development took place at some point before New Phrygian (cf. Šorgo 2019: 122-124): $-C\# > -\bar{C}\#$, followed by $-\bar{C}_1 / _C_2- > -C_2C_2-$ or $-\bar{C}_2C_2-$, which commonly simplified as $-C_2C_2- > -C_2-$

As already mentioned, it has been suggested that a word final $-\varsigma$ was phonetically assimilated when followed by a word-initial κ - (Orel 1997: 332). The single example comes from an inscription from the area around Parorea: $\iota\kappa \kappa\nu\alpha\iota\kappa\alpha\nu$ °116^W.

The proposed assimilation in $\iota\kappa \kappa\nu\alpha\iota\kappa\alpha\nu < *\iota\varsigma \kappa\nu\alpha\iota\kappa\alpha\nu$ is far from a certainty. The final segment of the preposition ιC could have been $-\tau$ or $-\delta$, both of which would have regularly assimilated into $-\kappa$. Orel (1997: 131) assumes that the preposition was $\iota\varsigma$ on an underlying level, and it does appear two other times in the same inscription, though the meanings and contexts in which it appears are quite unclear.⁸⁸ A large number of counterexamples to the assimilation of $-\varsigma$ before κ - are known to exist,⁸⁹ so any potential assimilation of $-\varsigma$ before $-\kappa$ is to be understood as a sporadic phenomenon.

If we take $\iota\kappa/\iota\varsigma$ to be a reflex of $*eks$ ‘out’, a preferable possibility emerges. As we propose in §VI.1.4, $*eks$ would have developed into New Phrygian $\iota\varsigma$ with reduction of unaccented $*e$ before two consonants followed by the

⁸⁸ See further in §VI.1.4.

⁸⁹ This is most notable in the $\zeta\epsilon\mu\epsilon\lambda\omega\varsigma \kappa\epsilon \delta\epsilon\omega\varsigma \kappa\epsilon$ ‘men and gods (both DPl)’ formula, where a final sibilant is not assimilated. For this case, however, an explanation can be provided. The absolute vast majority of instances of a sibilant followed by κ in New Phrygian inscriptions has the κ being the first sound of a conjunction $\kappa(\epsilon)$. It is entirely possible that the assimilation would not have taken place for simple reasons of grammatical transparency when a form would be followed by an enclitic conjunction or that assimilation only took place over word boundaries and not with enclitic elements. This would also serve to explain the sequence $\iota\varsigma \kappa\epsilon \epsilon\nu \tau\omicron\iota\varsigma \nu\iota\omicron\iota \kappa\nu\omicron\upsilon\mu\alpha\nu$ of inscription °116^W, where $\iota\kappa \kappa\nu\alpha\iota\kappa\alpha\nu$ itself is found. There do exist at least three examples of $-\varsigma$ coming into contact with κ - of a fully accented lexical item, i.e. $\delta\epsilon\kappa\mu\omicron\upsilon\tau\alpha\iota\varsigma \kappa\iota\nu\omicron\upsilon\mu\alpha$ °9^W, $\alpha\alpha\varsigma \kappa\nu\omicron\upsilon[-$ °20^C, $\sigma\kappa\epsilon\rho\epsilon\delta\rho\iota\alpha\varsigma \kappa\alpha\kappa\omicron\upsilon\nu$ °56^E. They certainly do seem to suggest that the assimilation of $-\varsigma$ did not take place in those inscriptions.

development **ks* > /ʃ/, which would have either developed into /s/ or been spelt as <σ> in New Phrygian. If the sound was underlyingly still /ʃ/, this might explain why we do not find the -σ > -κ assimilation in other situations: in those, the underlying sound would have been /s/, and only /ʃ/ would have assimilated to a following velar. This is phonetically plausible: [ʃ] would be more likely than [s] to be backed before a velar and if it was pronounced closer to [x] in such an environment, one way to write a sequence [-x k-] would be as <-κ κ->.

II.2.3.2.2 Geminate spellings

There can be no doubt that both Old and New Phrygian possessed a phonemically relevant geminate consonant /n:/, spelt as <n> in Old Phrygian and as <vv> in New Phrygian, which originated from PGPh. **-ntV* (PhL 68, cf. LL 1822, §II.3.2.3.8).

New Phrygian likewise certainly possessed a phonemically relevant geminate sibilant /s:/, written as <σσ> (§II.3.2.3.11). This segment likely existed in Old Phrygian already and was certainly present from at least some time before the New Phrygian era.

Some forms in which these two geminate consonants appear are: τοτοσσειτι ‘may he give’ °18^W, °99^{NW}, εγγουννου ‘may they hold’ °130^{NW}, δεδασσιννι ‘they would place’ °130^{NW}, ιννου ‘may they become’ °71^W.

Quite clearly, New Phrygian did at least on occasion mark phonemic geminates with graphic doubling of the consonant.

In addition to the two word-internal geminate consonants that must be comparatively old (preceding Old Phrygian, in the case of /n:/), the

category of geminate consonants was vastly expanded in New Phrygian (cf. PhL 56) as a result of consonant cluster assimilation across word boundaries and univerbation.

In practically all cases, a geminate consonant emerges when a stop-final preverb or preposition is followed by a stop-initial head. This is most clearly seen with the preverbs $\alpha\delta$ - and $\tau\iota\tau$ -, as well as the prepositions $\omicron\text{C}$ and $\alpha\delta$.

The preverbs developed from prepositions. Prepositions would have functioned as proclitics at first. Due to their inherently unstressed nature, a final *-i* was lost in clitics at some point around the Old Phrygian era (for which see §II.3.2.2). This would have resulted in the appearance of stop-final prepositions and preverbs. As we have observed in §II.2.3.2 above, word-final stops became phonetically unreleased before the New Phrygian era. It is not surprising, then, that when a stop-final proclitic attached itself to a following fully accented stop-initial word, its final consonant was assimilated to the following segment.

PPh. $-C_1i\ C_2-$ > pre-NPh. $^+C_1\ C_2-$ > pre-NPh. $[-C_1]=C_2-$ > NPh. $-C_2C_2-$

PPh. $^+adi\ ber-$ > pre-NPh. $^+ad\ ber-$ > > NPh. $\alpha\beta\beta\epsilon\rho$ ⁹⁰

While this explains the emergence of geminated stops in New Phrygian, more can be discovered if New Phrygian inscriptions are closely examined. By far the most common words with gemination in the corpus are $\alpha\delta\delta\alpha\kappa\epsilon\tau$ ‘would do’ and $\tau\iota\tau\tau\epsilon\tau\iota\kappa\mu\epsilon\nu\omicron\varsigma$ ‘condemned’, both a part of the standard malediction formula. The majority of spellings of these two words show gemination versus simple writing (52:25 for $\alpha\delta\delta$:- $\alpha\delta$ -; 35:23 for $\tau\iota\tau\tau$:- $\tau\iota\tau$ -),

⁹⁰ The preverb $\alpha\delta$ developed from an earlier **adi*. See further in §VI.1.1.

but the single spellings still need to be explained (see also Šorgo 2019: 125 for a quick overview of the following argument).

There is a metrical component to the standard malediction formula: its foot was a dactyl, with heavy syllables either long by position (where gemination was one means of producing a heavy syllable) or having a diphthong (Lubotsky 1998: 416ff.). One proposal has been that geminates were simplified in New Phrygian (Lubotsky 1998: 416) and that geminate spellings represent etymological spellings. As a result, gemination in spelling would have been used as metrical license to create heavy syllables (Lubotsky 1998: 416). While this is certainly a possibility to bear in mind, it does not appear accurate. The majority of all instances where we would expect geminate spellings based on etymological considerations actually shows geminate spellings. This surely points to the fact that a pronunciation with geminates was still present in at least some stage of New Phrygian; assuming these are all etymological spellings harkening back to an unwritten tradition is unlikely, but will be explored below.

Perhaps it is better to assume that geminate stops as a class were in the process of disappearing in New Phrygian.⁹¹ This would need to be a change affecting the entire language system, not simply individual lexemes, and this seems to be confirmed by the data: the majority of inscriptions show a

⁹¹ Based on the data available, we can only clearly say that the loss of gemination affected the stops. Whether continuants would have likewise been simplified is currently impossible to say. This need not concern us, however; the example of Old Phrygian shows that it is quite possible for a language to only permit gemination in certain classes of phonemes. From here on out in this section, the term “geminate” will refer to geminated stops only.

consistent spelling with either a simple or a geminate spelling in all instances where that is applicable.⁹²

It is, of course, possible that gemination was entirely unwritten in some inscriptions even if phonetically present or consistently written for etymological reasons even when not phonetically present. Entirely consistent inscriptions, then, have little value for determining the state of geminates in a specific New Phrygian inscription, but the consistency itself shows that the reduction of geminates affected all of them simultaneously. It is, however, in inscriptions where gemination is written inconsistently that the broader question of the intra-New Phrygian development of gemination can be further pursued.

Before proceeding, the question of the interpretation of the meter of the standard malediction formula (Lubotsky 1998: 417ff.) needs to be reopened.⁹³ If we wish to uphold Lubotsky's view that we are dealing with a dactylic rhythm in both the standard protasis (ιοϝ νι σε|μουν κνουμα|νει κακου|ν αδδακετ –UU –UU –UU –UU 'whoever would do something bad to this grave') and the standard apodosis (με ζεμε|λωϝ κε δε|ωϝ κε τι|η τιτε|τικμενοϝ | ειτου –UU –UU –UU –UU –UU –U 'among men and gods may he become condemned by Ti-'), as seems most reasonable, we run into the issue of needing to assume that the form τιτετικμενοϝ 'condemned' did not show a geminate consonant.⁹⁴ On the other hand, the majority of spellings of τιτ(τ)ετικμενοϝ do show a geminate spelling.⁹⁵

⁹² This holds for those inscriptions where at least two cases of an etymological geminate exist. Fragmentary inscriptions are thus of limited value in this instance.

⁹³ See also §II.2.2.1 above.

⁹⁴ The sequence τιτετικμενοϝ scans as –U-UU, which is incompatible with a dactylic rhythm.

⁹⁵ Though note that the ratio is ~3:2 in favour of the geminates, as opposed to the ~2:1 ratio in favour of the geminates found in αδδακετ.

There are three possible explanations that come to mind:⁹⁶

- 1) Phrygian never possessed etymological geminate stops as such. *αδδακε-* would then be an instance of metrical gemination, while *τιτετικ-* would appear as spoken. This possibility is unlikely. If *αδδακε-* was created due to metrical requirements, the many instances of *τιτετικ-* are puzzling. It is also overly convenient that the only metrically created geminate would appear precisely where we would etymologically expect it to appear if we assumed that some pre-stage of New Phrygian possessed gemination of stops.⁹⁷
- 2) When the formula was composed, the language had geminates in the two discussed forms. *αδδακε-* ‘to do’ represents the original state of affairs, while *τιτετικμενο-* shows a metrically conditioned simplification of the geminate. This would explain why the ratio of geminate versus non-geminate spellings of *αδδακε-* and *τιτετικ-* is skewed. As the metrical understanding of the formula broke down, we would expect a non-metrically conditioned common form *τιτετικμενο-* to begin reasserting itself, whereas no change would be needed in *αδδακε-*. This is what the distribution suggests:

⁹⁶ Assuming an original state of affairs where *αδδακετ* had a geminated stop and *τιτετικμενος* did not is quite convoluted if one assumes a consistent phonological treatment of the geminates: one would need to assume the existence of 1) a non-geminating compositional phase during which *τιτετικ-* would be lexicalised, followed by 2) a geminating compositional phase, during which *αδδακετ* emerges, followed by 3) the creation of the standard malediction formula, and, finally, 4) a re-composition of *τιτετικ-* from the constituent elements that originally created *τιτετικ-* (in order to account for its existence).

⁹⁷ Do note that appealing to an etymological spelling for *αδδακετ* (and *τιτετικμενος*) presupposes that gemination *would* have been present in the form when the formula was composed in the minds of the speakers, either purely phonologically or as part of a deliberately archaic sociolect. This contradicts the first condition this assumption is based on: that etymological gemination did *not* exist in this form. For a modified version of this objection, see option 3.

αδδακε-:αδακε- shows a ratio of ~2:1, whereas τιττετικ-:τιτετικ- shows a ratio of ~3:2.

- 3) When the formula was composed, gemination was no longer a synchronic phonetic feature of the language. Nevertheless, either within an archaic or dialectal speech variety or in phonological terms, forms with gemination would still exist.
 - a) Assuming αδδακε- to have been taken from a deliberately archaic or dialectal speech variety does explain its use in the malediction formula. Since τιττετικ- does exist, we need to further assume that it was, at a later stage, once the metrical structure of the formula was no longer transparent, adopted from either the same or a similar speech variety as αδδακε- was originally. This is reasonable in a more non-formulaic context. Within the context of a formula composed of stock phrases, however, it is dubious.
 - b) Assuming αδδακε- to have synchronically shown a phonetic single stop while still preserving an underlying phonological geminate is, in practical terms, similar to the previous option: the phonetic realization of a geminate in αδδακε- would have first emerged as a deliberate poetic breaking of the preverb and the verb into two separate elements. If this was initially only required for αδδακε-, as the metrical structure of the formula became less understood, this poetic lexical breaking may have been re-interpreted as a feature of the poetic speech variety, producing the gemination of τιττετικ-, which may or may not have still preserved a phonological geminate.

Option 1 is obviously problematic, since it fails to explain $\tau\iota\tau\epsilon\tau\iota\kappa-$, but further consideration needs to be given to options 2, 3a, and 3b.

We must note here that the canonical malediction formula was obviously no longer perceived as metrical by the beginning of the New Phrygian era. Quite clearly, as evidenced by the many re-shuffles and variants, by attested New Phrygian, the malediction formula is better understood as a composite of older stock phrases. The fact that these variants exist shows that the original metrical scheme was no longer followed by the time attested inscriptions appear.

The fact that the majority of inscriptions show a state of affairs where both $\alpha\delta\delta\alpha\kappa\epsilon-$ and $\tau\iota\tau\epsilon\tau\iota\kappa-$ appear with either a consistent geminate or a consistent non-geminate spelling do suggest that the stock phrases in question, when their metrical make-up was no longer relevant, underwent a simplification of the geminates as a systemic process.⁹⁸

We may distinguish four types of spelling patterns of $\alpha\delta\delta\alpha\kappa\epsilon-$ and $\tau\iota\tau\epsilon\tau\iota\kappa-$:⁹⁹

type 1: both spelt with gemination, $\alpha\delta\delta\alpha\kappa\epsilon-$ and $\tau\iota\tau\epsilon\tau\iota\kappa-$,
inscriptions: $\circ 2^W$, $\circ 3^W$, $\circ 12^S$, $\circ 39^{SW}$, $\circ 45^{SE}$, $\circ 53^{SE}$, $\circ 57^E$, $\circ 62^C$, $\circ 76^E$,
 $\circ 77^E$, $\circ 80^E$, $\circ 126^W$, $\circ 130^{NW}$;

type 2: both spelt without gemination, $\alpha\delta\alpha\kappa\epsilon-$ and $\tau\iota\tau\epsilon\tau\iota\kappa-$,
inscriptions: $\circ 5^W$, $\circ 14^{NW}$, $\circ 20^C$, $\circ 28^{SW}$, $\circ 61^{SE}$, $\circ 67^{SE}$, $\circ 72^E$, $\circ 93^{SW}$,
 $\circ 94^S$, $\circ 97^{W+}$, $\circ 99^{NW}$, $\circ 102^S$, $\circ 106^E$, $\circ 127^{SW}$;

⁹⁸ For one stock phrase to undergo degemination and the other not to is difficult to motivate.

⁹⁹ Do note that since not every inscription is preserved well enough to show both verbal forms, some inscriptions cannot be classified according to this scheme. It should also go without saying that non-formulaic inscriptions cannot be classified in accordance with their use of formulaic language.

type 3: αδδακε- and τιτετικ-, inscriptions °69^{SE}, °82^C, °86^W, °119^W, °128^C, °133^N;

type 4: αδακε- and τιττετικ-, inscriptions °21^C, °68^{SW}, °112^W, °115^W.

A small number of other inscriptions that use another verbal form (αββερετ instead of αδδακετ) or another preverb that could have shown gemination (such as ατετικμενος < *αδ τετικμενος) can also be assigned to the four basic types outlined above.

Type 1: °6^W (αββερετ, τιττετικμενος), °25^{SW} (αββιρετο<ι>, τιττετικμενος), °40^W (αδδακετορ, τιττετικμενος), °63^C (αδδακετορ, τιτετετικμενος), °75^E (αββερετορ, τιττετικμενος), °88^C (αδδακετ, τιγγεγαριτμενος), °90^W (αδδακετ, εττετικμενος), °91^W (αββερετοι, τιττετικμενος), °114^{SW} (αββερετ, τιττετικμενος), °124^C (αδδακετ, οττιττετικμενος), °131^C (αββερετοι, τιττετικμενος).

Type 2: °51^{SE} (αδακε, ατετικμενος), °67^{SE} (αδακετ, ατετικμενος).

Type 3: °133^N (αδδακετ, τιτετικμενος).

Instances where we can observe both a geminate and a simple spelling must now be more carefully considered.

The type 3 pattern would have written the metrically still correct renderings of the stock variants of the malediction formula, whether it originated as a result of the development of option 2, or options 3a and 3b above.

In type 4, the less common spelling pair τιττετικμενος and αδακετ cannot be part of an original dactylic rhythm, however, and so cannot represent metrical adjustment in the original formula. αδακετ can, in essence, only

represent a phonetic reality or be part of an inscription where all geminates are simplified. *τιττετικμενος*, on the other hand, can represent either a phonetic reality or an etymological (= formulaic) spelling. Combinations of these two forms alongside each other are inherently contradictory within the context of the same speech variety.

Presuming the existence of an original malediction formula whence stock phrases originated, type 3 (*αδδακε-* and *τιτετικ-*) is entirely expected. Fully consistent spellings of the two elements, i.e. types 1 and 2 (either *αδδακε-* and *τιττετικ-* or *αδακε-* and *τιτετικ-*), are likely to represent a language-wide treatment of gemination.

Type 4 (*αδακε-* and *τιττετικ-*), the rarest type, as we may note, however, cannot in any reasonable way represent a natural representation of the spoken language; rather, the nonsensical written gemination is the product of speakers that no longer distinguished gemination, either phonetically or phonologically, where the geminate spelling or pronunciation was a means of hypercorrectly attempting to emulate, either graphically or verbally, a more prestigious language variety.

Ascertaining the chronology of entire inscriptions remains problematic, but we may use the data available to determine the synchronic status of the language variety in which different types were used. It needs to be stressed again that the metrical structure of the malediction formula was not understood by the speakers for the vast majority, if not the entirety, of the written New Phrygian era.

Type 1 inscriptions belong to a synchronic language variety that did distinguish phonetic gemination. The stock lexical item *τιτετικ-* of the

formula had its gemination re-introduced on the basis of the actual spoken language; no other possibility is likely.¹⁰⁰

Type 2 inscriptions belong to a synchronic language variety that did not distinguish gemination. The stock phrases would have been spelt as spoken.

Type 3 inscriptions belong to a synchronic language variety that did distinguish gemination, either in terms of underlying representation or as spoken segments, at least when emulating the register of the formulaic phrases.

Type 4 inscriptions must belong to a synchronic language variety that no longer distinguished gemination in any meaningful way. The speakers would have been familiar with the notion of gemination being a feature of the formulaic register and would have a vague understanding of the forms in which it could appear, but the spelling pattern they employed would have been entirely arbitrary.

We must remark that, since knowledge of stock phrasing and the gemination present in it, even if applied incorrectly, was present in the speech community throughout written New Phrygian (with the possible exception of type 2 inscriptions), some of the type 1 and 3 inscriptions we observe may actually belong to the language variety of type 4 inscriptions, when gemination was not understood and was hypercorrectly used, but was, due to chance, actually used in the etymologically or formulaically expected place. Nevertheless, the relative frequencies of the four types are telling: *type 1*: 23x (~48%); *type 2*: 16x (~32%); *type 3*: 6x (~12%); *type 4*: 4x (~8%). Especially for type 1, even if some of those inscriptions are

¹⁰⁰ One could argue that, perhaps, like type 4, type 1 is also due to an incorrect emulation of a poorly understood language variety with gemination, but the fact that it is far more common (appearing 24 times) than type 4 (appearing 4 times) makes this an unlikely proposition.

accidentally etymologically “correct”, the type is too common to be due to chance. The same holds for type 2 as well. It is only types 3 and 4 that are so closely matched in attestation that they may both be ascribed entirely to hypercorrection.

It is possible, then, to formulate a rough relative chronology based on the following considerations:

- the language variety in which the basic formula originated (*type 0*) before the New Phrygian era did distinguish gemination on a spoken level;
- type 1 inscriptions belong to a language variety that distinguished gemination on a spoken level;
- type 2 inscriptions belong to a language variety that no longer distinguished gemination on a spoken level and possibly no longer recognized gemination as a feature of the formulaic speech variety;
- type 4 inscriptions belong to a language variety that no longer distinguished gemination on a spoken level, but did recognize gemination was a feature of the formulaic speech variety, even if it employed it incorrectly;
- type 3 inscriptions are ambiguous: they are either faithful renderings of the type 0 pattern, are a subset of type 4, or both.

The rough relative chronology of Phrygian formulaic inscriptions, based on considerations of language alone, then, is the following:

**type 0* >> (possibly some instances of *type 3*) >> *type 1* >> *type 4* (and possibly some instances of *type 3*) >> *type 2*

Throughout the earlier part of written New Phrygian history, then, the language must have possessed spoken gemination in at least some, presumably prestigious, registers.

Inscriptions preserving only a single geminated verbal form out of two obviously cannot be securely classified:¹⁰¹

- inscriptions that belong to either *type 1* or *3*: °10^S (αδδακετ), °11^S (αββερετ), °13^S (αββερετ), °18^W (αδδακετ), °29^{SW} (αδδακ[ετ]), °32^E (αδδακεκ), °33^E (αδδακετ), °34^E (αδδακετ), °35^E (αδδακεμ), °38^W (αδδακ[ετ]), °43^W (αδδακετ), °48^{NW} (αδδακετ), °55^E (αδδακ[ετ]), °59^E (αδδακετ), °60^E (αδδακε), °63^C (αδδακετορ, τιτετετικμενος)¹⁰², °73^W (αββερετορ), °78^E (αδδακετ), °79^E (αδδακετ), °101^{SE} (αδδακετ), °113^W (αββερετορ), °120^W (αδδακετ), °129^W (αββερετοι);
- inscriptions that belong to either *type 2* or *3*: °19^N (ετιτετεικμενος), °92^W (τιτετικμενος), °96^W (τιτετικμενος), °100^E (τιτετικμενος), °103^C (ατιτικμενος);
- inscriptions that belong to either *type 1* or *4*: °7^W (τιτετεικμενοι), °26^S (τιτετεικμενος), °56^E (τιτετεικμενος), °65^{SE} (θιτετεικμενος), °71^W (τιτετεικμενοι), °108^E (τιτετεικμενος), °121^W (τιτετεικμενος), °123^C (τιτετεικμενος);
- inscriptions that belong to either *type 2* or *4*: °4^W (αδακετ), °20^C (αδακετ), °36^E (αδακετ), °87^W (αδακετ), °105^E (αδακετ), °111^{NW} (αδακετ), °118^W (αδακετ).

¹⁰¹ Recall that some instances of *type 3* can also be interpreted as a subset of *type 4*.

¹⁰² Where the written τιτετετικμενος is obviously a spelling mistake. It is unclear whether it should be read as τιτ{ε}τετικμενος or τιτε{τε}τικμενος.

Inscription 103 ($[(\alpha\beta)]\beta\epsilon\rho\epsilon\tau$, $\alpha\tau\epsilon\tau\iota\kappa\mu\epsilon\nu\omicron\varsigma$, where the form of the first preverb, if it was even present, cannot be read) can belong to types 2, 3, or 4.

So far, we have focused on word-internal geminates that emerged as a result of the univerbation of a preverb and a verbal form. The situation is a bit different when dealing with a combination of a preposition and a noun. Do note that the prepositions would have behaved as proclitics, the same as the preverbs; the following analysis will show, however, that the preverbal proclitic elements underwent univerbation, whereas prepositional nominal phrases did not.

The combinations of the preposition $\alpha\delta$ and a noun hold some clues as to the developments of the preverbs. The final consonant of the preposition is assimilated to the following one in many instances, but also appears unwritten on occasion (Brixhe 1999: 309-313).

All the spelling variations of consonant-final prepositions are listed below, classified according to the preverbal type of the inscription they appear in:

- preverbal *type 1*, and the preposition is written with a final consonant: $^{\circ}12^S$ ($\alpha\delta\delta\alpha\kappa\epsilon\tau$, $\tau\iota\tau\epsilon\tau\iota\kappa\mu\epsilon\nu\alpha$, $\alpha\tau$ $\tau\iota\epsilon$), $^{\circ}39^{SW}$ ($\alpha\delta\delta\alpha\kappa\epsilon\tau$, $\tau\iota\tau\epsilon\tau\iota\kappa\mu\epsilon\nu\omicron\varsigma$, $\alpha\tau$ $\tau\iota\epsilon$), $^{\circ}45^{SE}$ ($\alpha\delta\delta\alpha\kappa\epsilon\tau$, $\tau\iota\tau\epsilon\tau\iota\kappa\mu\epsilon\nu\omicron\varsigma$, $\alpha\tau$ $\tau\iota\epsilon$), $^{\circ}57^E$ ($\alpha\delta\delta\alpha\kappa\epsilon\tau$, $\tau\iota\tau\epsilon\tau\iota\kappa\mu\epsilon\nu\omicron\varsigma$, $\alpha\tau$ $\tau\iota$), $^{\circ}62^C$ ($\alpha\delta\delta\alpha\kappa\epsilon$, $\tau\iota\tau\epsilon\tau\iota\kappa\mu\epsilon\nu\omicron\varsigma$, $\alpha\tau$ $\tau\iota\eta$), $^{\circ}76^E$ ($\alpha\delta\delta\alpha\kappa\epsilon\tau$, $\tau\iota\tau\epsilon\tau\iota\kappa\mu\epsilon\nu\omicron\varsigma$, $\alpha\tau$ $\tau\iota\epsilon$, $\alpha\kappa$ $\kappa\epsilon$), $^{\circ}77^E$ ($\alpha\delta\delta\alpha\kappa\epsilon\tau$, $\tau\iota\tau\epsilon\tau\iota\kappa\mu\epsilon\nu\omicron\varsigma$, $\alpha\tau$ $\tau\iota$), $^{\circ}80^E$ ($\alpha\delta\delta\alpha\kappa\epsilon\tau$, $\tau\iota\tau\epsilon\tau\iota\kappa\mu\epsilon\nu\omicron\varsigma$, $\alpha\tau$ $\tau\iota$);
- preverbal *type 2*, and the preposition is written without a final consonant: $^{\circ}102^S$ ($\alpha\delta\alpha\kappa\epsilon\tau$, $\tau\iota\tau\epsilon\tau\iota\kappa\mu\epsilon\nu\omicron\varsigma$, α $\tau\iota\epsilon$);
- preverbal *type 2*, and the preposition is written with a final consonant: $^{\circ}51^{SE}$ ($\alpha\delta\alpha\kappa\epsilon$, $\alpha\tau\epsilon\tau\iota\kappa\mu\epsilon\nu\omicron\varsigma$, $\alpha\tau$ $\tau\iota$), $^{\circ}61^{SE}$ ($\alpha\delta\alpha\kappa\epsilon\tau$,

τιτετικμενος, ατ τιε), °72^E (αδακετ, τιτετικμενος, ατ τι), °94^S (αδακετ, τιτετικμενος, ατ τιε), °106^E (αδοκετ, τιτετικμενος, ατ τι).

- preverbal type 3, and the preposition is written with a final consonant: °69^{SE} (αδδακετ, τιτετικμενος, οκκ αυγοι (< *οτ κε αυγοι), °86^W (αδδακετ, τιτετικμενος, ατ τη).

Ambiguous in terms of preverbal types are:

- preverbal type 1 or 3, and the preposition is written with a final consonant: °11^S (αββερετ, ατ τι), °33^E (αδδακετ, ακ κε, ακκαλος), °101^{SE} (αδδακετ, ατ τι);
- preverbal type 1 or 4, and the preposition is written with a final consonant: °56^E (τιττετικμενος, ατ τιε), °65^{SE} (θιττετικμενος, ατ τη), possibly °108^E (τιττετικμενος, α]τ [τι]),
- preverbal type 1 or 4, and the preposition is written without a final consonant: °7^W (α κε, α τι, τιττετικμενος)
- preverbal type 2 or 3, and the preposition is written without a final consonant: °87^W (αδακετ, α τι), °103^C ([α(β)]βερετ, α τι, ατιτικμενος);
- preverbal type 2 or 4, and the preposition is written with a final consonant: possibly °92^W (τιτετικμενος, ατ τιε), possibly °100^E (τιτετικμενος, ατ τιε);
- entirely ambiguous: possibly °44^S (ατ τι), possibly °70^{SE} (ατ τιε), °85^E (ατ τι).

What should be immediately obvious is that a preposition with a word-final stop is found with simplification of the resulting geminate in only a handful of inscriptions (i.e., °7^W, °87^W, °102^S, and °103^C). In all other cases, such a preposition is always spelt with its final segment preserved, albeit

assimilated, regardless of whether the geminates originating from preverbs combining with verbs appear to be preserved.

This is most easily explicable if we assume that the preverb and verb combinations had become unverbated at a comparatively early point and show a word-internal geminate that subsequently became reduced. On the other hand, combinations of a preposition and a noun were still treated as two separate elements, with the resulting geminate being the result of assimilation across word boundaries which was not treated identically to the word-internal geminates. It is uncertain whether the few inscriptions where the “sandhi” gemination across word boundaries seems to have been graphically simplified actually reflect the very latest stage of New Phrygian, where even this type of gemination was simplified.¹⁰³

II.2.3.2.3 A relative chronology of New Phrygian inscriptions

We may now emend the relative chronology of New Phrygian inscriptions given above based on the preceding analysis. The preverbal type is given in subscript. A preceding superscript x marks inscriptions where only one verb with a preverb is attested, meaning its placement in the chronology may be ambiguous.

Stage 1

The stock vocabulary of the formulaic language is faithfully represented. Some *type 3* and *type 1/3* inscriptions likely belong to this chronological stage.

¹⁰³ The single outlier in the pattern is inscription °7^w, the only example of an inscription with gemination present word-internally, but simplified across word boundaries. No doubt, this inscription must belong to *type 4*, where gemination was no longer present in the spoken language, but a vague understanding that it existed in some forms still persisted.

Stage 2

The formulaic register of the language preserves spoken gemination, but the metrically adapted forms of stock vocabulary are levelled out in favour of their non-metrically conditioned counterparts.

This stage includes all *type 1* inscriptions and is the most prolifically represented in the corpus. At least some *type 1/3* and *type 1/4* inscriptions also belong to this stage.

Stage 3

The speakers of the language can no longer correctly use the formulaic register of the language, but retain the knowledge that specific vocabulary items showed gemination. This results in hypercorrect geminated and degeminated spellings.

This stage is characterised by *type 4* inscriptions. Most likely, some *type 3* inscriptions belong to this chronological stage as well as a result of accidentally correct spelling. Some of the ambiguous *type 1/3*, *1/4*, *2/3*, and *2/4* inscriptions must likewise belong here.

Stage 4

The speakers of the language no longer preserve word-internal gemination and apparently no longer attempt to emulate the geminated consonants of the formulaic language, suggesting they may no longer be familiar with it or find it relevant.

This stage is characterised by *type 2* inscriptions. Some of the ambiguous *type 2/3* or *type 2/4* inscriptions likely belong to this stage as well.

Stage 5

Gemination of stops is no longer tolerated in the language at any level. Most likely, a surface filter automatically simplifies what would otherwise surface as geminated consonants across a word boundary. No attempt is made to emulate the ancient formulaic register.

This stage can most likely be seen in inscriptions °87^W, °102^S, and °103^C, which would then be the latest New Phrygian inscriptions in terms of the language variety used.¹⁰⁴

Stage 1	°69 ^{SE} ₃ , °82 ^C ₃ , °86 ^W ₃ , °119 ^W ₃ , °128 ^C ₃ , °133 ^N
	x°10 ^S _{1/3} , x°11 ^S _{1/3} , x°13 ^S _{1/3} , x°18 ^W _{1/3} , x°29 ^{SW} _{1/3} , x°32 ^E _{1/3} , x°33 ^E _{1/3} , x°34 ^E _{1/3} , x°35 ^E _{1/3} , x°38 ^W _{1/3} , x°43 ^W _{1/3} , x°48 ^{NW} _{1/3} , x°55 ^E _{1/3} , x°59 ^E _{1/3} , x°60 ^E _{1/3} , x°63 ^C _{1/3} , x°73 ^W _{1/3} , x°78 ^E _{1/3} , x°79 ^E _{1/3} , x°101 ^{SE} _{1/3} , x°113 ^W _{1/3} , x°120 ^W _{1/3} , x°129 ^W _{1/3}
Stage 2	°2 ^W ₁ , °3 ^W ₁ , °6 ^W ₁ , °12 ^S ₁ , °25 ^{SW} ₁ , °39 ^{SW} ₁ , °40 ^W ₁ , °45 ^{SE} ₁ , °53 ^{SE} ₁ , °57 ^E ₁ , °62 ^C ₁ , °63 ^C ₁ , °75 ^E ₁ , °76 ^E ₁ , °77 ^E ₁ , °80 ^E ₁ , °88 ^C ₁ , °90 ^W ₁ , °91 ^W ₁ , °114 ^{SW} ₁ , °124 ^C ₁ , °126 ^W ₁ , °130 ^{NW} ₁ , °131 ^C ₁
	x°26 ^S _{1/4} , x°56 ^E _{1/4} , x°65 ^{SE} _{1/4} , x°71 ^W _{1/4} , x°108 ^E _{1/4} , x°121 ^W _{1/4} , x°123 ^C _{1/4}
Stage 3	x°7 ^W ₄ , ¹⁰⁵ °21 ^C ₄ , °51 ^{SE} ₄ , °67 ^{SE} ₄ , °86 ^W ₄ , °112 ^W ₄ , °115 ^W ₄
	x°19 ^N _{2/3} , x°92 ^W _{2/3} , x°96 ^W _{2/3} , x°100 ^E _{2/3} x°4 ^W _{2/4} , x°20 ^C _{2/4} , x°36 ^E _{2/4} , x°105 ^E _{2/4} , x°111 ^{NW} _{2/4} , x°118 ^W _{2/4}
Stage 4	°5 ^W ₂ , °14 ^{NW} ₂ , °20 ^C ₂ , °28 ^{SW} ₂ , °51 ^{SE} ₂ , °61 ^{SE} ₂ , °62 ^C ₂ , °67 ^{SE} ₂ , °93 ^{SW} ₂ , °94 ^S ₂ , °97 ^{W+} ₂ , °99 ^{NW} ₂ , °102 ^S ₂ , °106 ^E ₂ , °127 ^{SW} ₂
Stage 5	x°87 ^W ₂ , ¹⁰⁶ °102 ^S ₂ , x°103 ^C ₂

Table #11: A possible relative chronology of the language varieties used in the New Phrygian inscriptions

¹⁰⁴ It is notable that all three inscriptions seem to share some slight familial resemblance: both °87^W and °102^S fill out the protasis by the addition of αινι τεμας ‘or *teamas*’ °87^W ~ αινι α τεμας °102^S, whereas both °87^W and °103^C seem to include variants of the same enigmatic sequence: παρτης ‘?’ °87^W ~ παρταν ‘?’ °103^C.

¹⁰⁵ Inscription °7^W shows the wholly unexpected use of an internal geminate and a simplification of a geminate across word boundaries. As such, it must belong to the chronological stage underlying proverbial type 4, when gemination was used hypercorrectly.

¹⁰⁶ Inscriptions °87^W and °103^C likely belong to the very latest stage of New Phrygian inscriptions, where etymological geminates were simplified even across word boundaries, as suggested by their spelling of prepositions.

It should be borne in mind that the preceding table is only a rough schematic representation of the relative chronology of Phrygian inscriptions given for convenience: any single inscription may well not necessarily belong to the chronological stage to which it was assigned; rather, the chronology operates with the broad concept of types of geminate spellings that need not always map onto a specific inscription absolutely.

It must also be stressed that the relative chronology provided marks the relative archaicity of the language variety used in a particular inscription when compared to a pre-New Phrygian prestigious formulaic register. It is in no way to be taken as a statement on when a particular inscription was actually written: the familiarity with the formulaic register would have differed depending on the time, place, social status, and knowledge of both the person who commissioned an inscription and the scribe. Rather, the relative chronology should only be used to infer a broad pan-Phrygian phonetic and sociolinguistic trend towards a progressive simplification of geminated stops.

II.2.3.2.4 Other geminate spellings

Next to the gemination of stops we have analysed in the previous sections, some other instances of geminated spellings are known in New Phrygian.

Most prominently, the inherited Old Phrygian geminates /n:/ and /s:/ are consistently spelt with two graphemes:

NPh. ειννου ‘may they become’ < PPh. **-ntō*;

NPh. δεδασσιννι ‘they would place’ < PPh. **-nti*;

NPh. δεδασσι- ‘would place’ < OPh. <*dedasi*> /dedassē-/ < PPh. **dedāsī-* (§V.3.4.1);

NPh. $\tau\omicron\tau\omicron\sigma\sigma\epsilon\iota$ - ‘would give’ < OPh. $^{+}/\tau\omicron\tau\omicron\sigma\sigma\bar{\epsilon}/$ < PPh. $*\tau\omicron\tau\omicron\sigma\bar{\iota}$ - (§V.3.4.1).

Other geminate spellings are far less transparent; at least in some cases, they appear to be the result of hypercorrection, an attempt at spelling a nasalised vowel, or simple spelling error.

In $\mu\mu\upsilon\rho\alpha$ ‘foolishness (NAPI)’ $^{\circ}25^{SW}$ and $\kappa\nu\omicron\upsilon\mu\mu\alpha\nu\epsilon\iota$ ‘grave (DSg)’ $^{\circ}44^S$, $^{\circ}53^{SE}$ the gemination is probably used to attempt to spell a nasalised vowel that would have emerged allophonically when a vowel appeared between two nasal consonants: in $\kappa\nu\omicron\upsilon\mu\mu\alpha\nu\epsilon\iota$ that environment is evident (and the spelling $\kappa\nu\omicron\upsilon\mu\mu\alpha\nu\epsilon\iota$ also suggests a nasalised vowel was present), and $\mu\mu\upsilon\rho\alpha$ appears as part of a phrase $\alpha\iota\nu\iota\ \mu\mu\upsilon\rho\alpha$ ‘or foolishness’, which, if taken as a whole, sees the final $-\iota$ of $\alpha\iota\nu\iota$ likewise appear between ν and μ . Recall the phrases $\alpha\delta\delta\alpha\kappa\epsilon\mu\ \mu\alpha\nu\kappa\alpha\iota$ and $\alpha\delta\delta\alpha\kappa\epsilon\nu\ \mu\alpha\nu\kappa\alpha\iota$ that also appear to spell a nasalised vowel (§II.2.3.1.3).¹⁰⁷

The spelling $\mu\alpha\kappa\kappa\alpha$ $^{\circ}94^S$ is clearly a non-standard spelling of $\mu\alpha\nu\kappa\alpha$ ‘stele’. If not an outright scribal error, it may be an attempt at spelling what would have been pronounced $[m\tilde{a}\tilde{n}\kappa a]$, with the scribe re-interpreting the cluster $/\text{ank}/$ as a sequence of a nasalised vowel (a result of the vowel once again being nasalised between two nasal consonants) and a geminated consonant in an effort to preserve syllable weight.

Two outliers are the spellings of ἵκκῖτορ and what has been read as $\kappa\omicron\upsilon\sigma\sigma\lambda\lambda\omicron\nu$, both in inscription $^{\circ}72^E$. We must note that inscription $^{\circ}72^E$

¹⁰⁷ As discussed in §II.2.3.1.3 and §II.3.3.1.

was already badly worn when first read and the copy made by Calder (1913: 103-104) is not necessarily without error, as the copier himself admits.

For]κκίτορ, Calder supposes that it is an attempt at spelling αδ(δ)ακετορ ‘he will cause to be placed’ (*ibid.*), but it is entirely unclear why κ would be geminated or why ε would be entirely uncharacteristically be written with <ι>. If the sequence is an attempt at spelling αδδακετορ, we are likely dealing with some kind of a scribal quirk or error.¹⁰⁸ On the other hand, it is also entirely possible that the sequence spells some other verbal form. Perhaps the first -κ belongs to a preverb and the actual verb is κίτορ, whose root element κί- we could compare to that of the 3sg aorist middle form *od=eketoy* ‘~ she caused to be made’, namely *kē-* ‘to make’ < PIE **k^wei-*, which would have been spelt as either κει- or κι- in New Phrygian.¹⁰⁹

In any case, the lack of an understandable context surrounding]κκίτορ renders this sequence difficult to analyse and it would be premature to draw any conclusions from it.

As for κουσσλλον, the reading is very much in question; the various editors disagree quite substantially on how the about four letter long sequence between κ[vo]υσ[and]ov should be read.¹¹⁰ Obrador-Cursach’s reading (PhL 590-591) of the sequence as κνου {σεμον} with scribal error as an explanation is appealing, though we might be dealing with some new Phrygian word as well. In any case, the reading κουσσλλον is almost certainly incorrect: not only does the term appear nowhere else in the Phrygian corpus, the presence of two adjacent sequences of geminates is too unexpected to be likely.

¹⁰⁸ Damage to the stone that made the sequence KETOP appear more similar to KKITOP is also a remote possibility, but regarding this sequence of letters Calder (*ibid.*) emphatically states that “[t]he last six letters in line 5 are, however, certain[.]”

¹⁰⁹ See further in §II.2.3.1.2.

¹¹⁰ For the references and alternate readings, see PhL 590-591.

II.2.4 Inscription from Dokimeion (°W-11)

The inscription from Dokimeion (°W-11) is the first Phrygian inscription written with the Greek alphabet and dates to the late 4th or early 3rd century BCE (CIPP2 7ff.), putting the language of this inscription at the half-way point between Old and New Phrygian – Middle Phrygian (CIPP2 7, PhL 52-54). The text shows obvious influences from Greek: the names Νικοστρατος and Κλευμαχος are evidently of Greek origin (CIPP2 20). Furthermore, the inscription seems to be divided into segments of 17 syllables each (Lubotsky 2017: 438); the regular structure and the obvious Hellenistic influence can be explained best if we assume the author of the text attempted to emulate a dactylic hexameter (*ibid.*: 438-9).

The phonetic and graphic characteristics of the inscription are the following:

- /āi/ is already written as α (cf. σα), but /ai/ remains written as αι (cf. αιδουμενου < **h₂eid^homh₁no*- ‘blazing’);
- -ov in word-final position is raised to -ουv (except once, in βλασκον ‘?’) (CIPP2 16);
- o and v stand for /w/ (κων ‘(pronominal chain)’, υταν ‘?’, and κοροαν ‘girl (ASg)’ (Lubotsky 2017: 440-1);
- /ōi/ seems to be written as οι, but possibly only in Greek loans (κλευμαχοι ‘PN (DSg)’ and σοροι ‘tomb (DSg)’ ¹¹¹);
- OPh. /ō/ is already raised to ου (CIPP2 16-7);
- ει does not appear; it is uncertain whether this is a coincidence or the result of a different spelling (perhaps with <η>?);

¹¹¹ If Brixhe’s assertion (2004: 18) that it is a loan from Greek σορός is correct.

- $v\#μ > μ\#μ > μ$, with assimilation of the final nasal and subsequent degemination seems likely (CIPP2 18): cf. *ματι μακραν* ‘big *mati* (ASg)’ in line 3, and *ματιν* ‘?’ (ASg)’ in line 5.

The changes seem to be in line with developments from Old Phrygian to New Phrygian: a) long diphthongs lost their glide; b) long vowels were possibly already shortened; c) pre-nasal raising of mid-vowels is still obviously in effect; d) if we uphold the $vμ > μ$ rule, this demonstrates that this was one of the first environments where word-final nasalization took place.

On the other hand, there is no evidence to suggest that word-final stops had become unreleased yet.

The ending *-οι*, if only present in loanwords, might be a Greek case-form: it would indicate that the Greek declensional ending *-ω* was perceived as */oi/* without vowel length by Phrygians, suggesting that vowel length in Phrygian was lost before the 3th century BCE.

The one example that clearly preserves an inherited geminate is *πεννιτι* ‘will pass by’, where Obrador-Cursach (2020: 42ff.) has convincingly argued that *πενν-* is a reflex of PIE **pent-*. The difficulty with segmentation makes the state of other geminates unclear; where two identical graphemes appear adjacent to each other, there may well be a word boundary between them. On the other hand, the only two graphemes that appear with an identical adjacent grapheme are *<v>* and *<σ>*, and it is certain that Phrygian at this time would have permitted both */n:/* and */s:/* (§II.3.2.3.11). As a result, attempts at segmentation of this inscription need to be made with the

knowledge that two identical consonants alongside each other need not suggest a word boundary.

Unfortunately, the inscription as a whole is rather poorly understood. As our understanding of Phrygian increases, other as-of-yet unrecognised developments may serve as a control for the developments that are and will be proposed for the period between Old and New Phrygian.

II.3 Developments from Proto-Indo-European to Phrygian

II.3.1 Developments from Proto-Indo-European to Proto-Graeco-Phrygian

While many matters regarding the segmental system of Proto-Indo-European are settled science, the question of how to best reconstruct certain elements of that system are still very a matter of vigorous scholarly debate. Traditionally, the PIE stops are taken to distinguish five places of articulation, labial, dental, palatovelar, velar, and labiovelar, and three manners of articulation, voiceless, voiced, and voiced aspirated (Fortson 2004: 51).

Since a system distinguishing between voiceless, voiced, and voiced aspirated stops is typologically highly questionable, a number of alternate proposals have emerged over the years which have re-interpreted this three-way contrast in different ways. The various approaches are further

developments of the “glottalic theory”, which re-interpreted the traditional “voiced” series as glottalized (CIEL 128-129).

The specific approach followed in this work interprets the three-way contrast of stops in Late PIE (i.e. the stage immediately preceding the separation of Proto-Graeco-Phrygian) as one consisting of voiceless stops (**p*, **t*, **k*^ʰ, **k*^w), pre-glottalized voiced stops (*(*ʔ**b*), **ʔ**d*, **ʔ**g*^ʰ, **ʔ**g*^w), and breathy-voiced stops (**ḡ*, **ḡ*^ʰ, **ḡ*^w) (cf. Clackson 2008: 48).¹¹²

The issue is, of course, still heavily debated. The arguments adduced by Kortlandt (1985) that the traditionally reconstructed *mediae* were pre-glottalized voiced stops are convincing and serve to explain a number of phenomena in the daughter languages. As far as the breathy-voiced stops are concerned, I believe their reconstruction is necessary for Proto-Graeco-Phrygian to account for the voiceless aspirate reflex in Greek and the voiced reflex in Phrygian. I project this interpretation into Late PIE as well, since, if breathy voiced stops were not inherited, their emergence in Proto-Graeco-Phrygian and Proto-Indic would need to have been independent, which seems questionable to me.

The three “laryngeals” of Late PIE are taken to have had the following phonetic realisations (cf. Kümmel 2022: 201ff.):

- **h*₁ was a glottal stop [ʔ];
- **h*₂ was a voiceless uvular fricative [χ];
- **h*₃ was a voiced uvular fricative [ʁ].

¹¹² The interpretation of stops followed in this work is most closely aligned with that described by Wikander (2022).

The six resonants of PIE (**m*, **n*, **r*, **l*, **u*, **i*) also had vocalic allophones (**m̥*, **n̥*, **r̥*, **l̥*, **u*, **i*), which could form syllable nuclei in certain phonotactic environments (CIEL 138).

As is conventional, for ease of readability, the traditional notation used in Indo-European studies will be used throughout this work when reconstructed forms in PIE and PGPh. are provided. This is in no way an endorsement of the traditional reconstruction of the phonetic value of segments.

	labial	dental	alveolar	palatal	palatovelar	velar	labiovelar	laryngeal
V	* <i>p</i> [p]	* <i>t</i> [t]			* <i>k̥</i> [k]	* <i>k</i> [k]	* <i>kʷ</i> [kʷ]	* <i>h₁</i> [ʔ]
G	(* <i>b</i>) ([ʔb])	* <i>d</i> [ʔd]			* <i>ǵ</i> [ʔg]	* <i>g</i> [ʔg]	* <i>gʷ</i> [ʔgʷ]	
B	* <i>bʰ</i> [b]	* <i>dʰ</i> [d]			* <i>ǵʰ</i> [g]	* <i>gʰ</i> [g]	* <i>gʷʰ</i> [gʷ]	
F		* <i>s</i> [s]						* <i>h₂</i> [χ] * <i>h₃</i> [ʰ(w)]
N	* <i>m</i> [m]	* <i>n</i> [n]						
R	* <i>u</i> [w]		* <i>r</i> [r] * <i>l</i> [l]	* <i>ḷ</i> [j]				

Table #12: The consonantal phonemes of Late PIE. The abbreviations in the first column are: V = voiceless stop; G = pre-glottalized stop; B = breathy-voiced stop; F = fricative; N = nasal; R = resonant and semi-vowel.

The vowels of Late PIE were the following:

	front		mid	back	
high	(* <i>i</i>)			(* <i>u</i>)	
mid	* <i>e</i>	* <i>ē</i>	(* <i>ə</i>)	* <i>o</i>	* <i>ō</i>
low			(* <i>a</i>)		

Table #13: The vocalic segments of Late PIE.

The vocalic segments **i*, **u*, **a*, and **ə* were not phonemic (cf. CIEL 120).

**i* and **u* are vocalic allophones of the consonantal phonemes **ǵ* and **ǵ*.

**a* is an allophone of the phoneme **e* when appearing next to **h*₂.

**ə* is an epenthetic vowel. The most prominent example is “schwa secundum”, a vowel which emerged in certain types of clusters composed of three or more consonants.

II.3.1.1 Vocalism

II.3.1.1.1 Development of vowels, diphthongs, and syllabic resonants

The vowels of Proto-Indo-European remained unchanged in Proto-Graeco-Phrygian in most environments.

PIE **e* > PGPh. **e*

PIE **b^her-* ‘to bear, carry’ > PGPh. **b^her-* ‘id.’ > Gr. φερ- ‘id.’,
NPhr. βερ- ‘id.’ (PhL 62)

PIE **k^we* ‘and’ > PGPh. **k^we* ‘id.’ > Gr. τε ‘id.’, OPh. *ke* ‘id.’, NPh.
κε ‘id.’ (PhL 62)

PIE **seǵʰ-* ‘to hold’ > PGPh. **heǵʰ-* ‘id.’ > Gr. ἐχ- ‘to hold, have’,
OPh. *eg-* ‘id.’, NPh. *εγ-* ‘id.’ (LL 1823)

PIE **o* > PGPh. **o*

PIE **-os* ‘(nom. sg. masc. them.)’ > PGPh. **-os* ‘id.’ > Gr. -ος ‘id.’,
OPh. *-os* ‘id.’, NPh. -ος ‘id.’ (PhL 63)

PIE **i* > PGPh. **i*

PIE **kʷi-* ‘(interrogative pronoun)’ > PGPh. **kʷi-* ‘id.’ > Gr. τι ‘id.’,
OPh. *ki-* ‘id.’, NPh. *κi-* ‘id.’ (PhL 63)

PIE **-ti* ‘(3sg. act. pres. athem.)’ > PGPh. **-ti* ‘id.’ > Gr. -σι ‘id.’,
OPh. *-ti* ‘id.’, NPh. -τι ‘id.’ (LL 1823)

PIE **u* > PGPh. **u*

PIE **up-s-* ‘up, above’ > PGPh. **ups-* ‘id.’ > Gr. ὑψόθ-εν ‘from on
high, from above’, NPh. ουψοδ-αν ‘above’ (Lubotsky 1993, PhL
64)

PIE **ē* > PGPh. **ē*

PIE **meh₂tēr* ‘mother’ > PGPh. **mātēr* ‘id.’ > Gr. μήτηρ ‘id.’, OPh.
matar ‘id.’, NPh. *ματαρ* ‘id.’ (PhL 63)

PIE **ō* > PGPh. **ō*

PIE **-tōd* ‘(3sg. act. pres. impv.)’ > *PGPh. **-tō* ‘id.’ > Gr. -τω
‘id.’, OPh. *-tu* ‘id.’, NPh. -του ‘id.’ (PhL 64)

PIE **ei* > PGPh. **ei*

PIE **h₁ei-* ‘to go’ > PGPh. **ei-* ‘id.’ > Gr. εἰ- ‘id.’, OPh. *i-* ‘id.’, NPh. εἰ- ‘id.’ (cf. PhL 261-262).

PIE **eu* > PGPh. **eu*

PIE **b^heud^h-* ‘to perceive’ > PGPh. **b^heud^h-* ‘id.’ > Gr. ἄ-πευθ-ής ‘ignorant’, OPh. *bevd-os* ‘image, perception, statue’ (Lubotsky 2008, PhL 65)

PIE **g^heu-* > PGPh. **g^heu-* > Gr. χεῦμα ‘that which is poured’, Ph. ζεῦμαν ‘spring, well, fountain’ (Brixhe 1982: 244)

PIE **oi* > PGPh. **oi*

PIE **loisd^h-* ‘(?)’ > PGPh. **loizd^h-* ‘at last, at the end’ > Gr. λοῖσθ-ιον ‘id.’, NPh. λοιδ-ιμον ‘id.’ (Lubotsky 1993: 130)

PIE **-oi* ‘(nom. pl. masc. pron.)’ > PGPh. **-oi* ‘id., (nom. pl. masc. them.)’ > Gr. -οι ‘id.’, NPh. -οι ‘id.’ (PhL 65)

PIE **ou* > PGPh. **ou* (PhL 65)

no good Phrygian example

PIE **ēi* > PGPh. **ēi*

no good Phrygian example

PIE **ōi* > PGPh. **ōi*

PIE **-ōi* ‘(dat. sg. masc./neut. them.)’ > PGPh. **-ōi* ‘id.’ > Gr. -ω ‘id.’, OPh. -oy ‘id.’, NPh. -ov ‘id.’ (PhL 65)

PIE **-ōis* ‘(inst. pl. masc./neut. them.)’ > PGPh. **-ōis* ‘(dat. pl. masc./neut. them.)’ > Gr. -οις ‘id.’, NPh. -ως ‘id.’ (PhL 65)

PIE **ēu* > PGPh. **ēu* (PhL 65)

no good Phrygian example

PIE **ōu* > PGPh. **ōu*

no good Phrygian example (but cf. *Vasous* in LL 1819)

II.3.1.1.2 Developments of laryngeals

Laryngeals **h₂* and **h₃* coloured an adjacent **e* to **a* and **o*, respectively, in Proto-Indo-European already; subsequently, they were lost when adjacent to a vowel in Proto-Graeco-Phrygian. In pre-consonantal position, a sequence of a vowel followed by a laryngeal resulted in loss of the laryngeal with compensatory lengthening of the vowel.

PIE **h₁e* > PGPh. **e*

PIE **h₁e* ‘(augment)’ > PGPh. **e* ‘id.’ > Gr. ē-, OPh. *e-*, NPh. ε- (cf. PhL 103)

PIE **h₁ei-* ‘to go’ > PGPh. **ei-* ‘id.’ > Gr. εi- ‘id.’, OPh. *i-* ‘id.’, NPh. εi- ‘id.’ (PhL 261-262)

PIE $*h_2e$ > PGPh. $*a$

PIE $*h_2eu$ ‘again’ > PGPh. $*au-to-$ ‘self; he, she, it’ > Gr. $\alpha\upsilon\tau\acute{o}-$ ‘id.’, OPh. $avto-$ ‘id.’, NPh. $\alpha\upsilon\tau\omicron-$ ‘id.’ (PhL 65)

PIE $*h_3e$ > PGPh. $*o$

no good Phrygian example

PIE $*eh_1$ > PGPh. $*\bar{e}$

PIE $*d^heh_1-$ ‘to put’ > PGPh. $*d^h\bar{e}-$ ‘id.’ > Gr. $\theta\eta-$ ‘id.’, OPh. $da-$ ‘id.’, NPh. $\delta\alpha-$ ‘id.’ (PhL 63)

PIE $*eh_2$ > PGPh. $*\bar{a}$

PIE $*meh_2t\bar{e}r$ ‘mother’ > PGPh. $*m\bar{a}t\bar{e}r$ ‘id.’ > Gr. $\mu\acute{\eta}\tau\eta\rho$ ‘id.’, OPh. $matar$ ‘id.’, NPh. $\mu\alpha\tau\alpha\rho$ ‘id.’ (PhL 62)

PIE $*b^hreh_2ter-$ ‘brother’ > PGPh. $*b^hr\bar{a}ter-$ ‘id.’ > Gr. $\phi\rho\acute{\alpha}\tau\epsilon\rho-$ ‘id.’, NPh. $\beta\rho\alpha\tau\epsilon\rho-$ ‘id.’ (LL 1821)

PIE $*eh_3$ > PGPh. $*\bar{o}$

no good Phrygian example

PIE $*oh_{1/2/3}$ > PGPh. $*\bar{o}$

no good Phrygian example

The only direct origin of the Proto-Graeco-Phrygian long diphthong $*\bar{a}i$ was the PIE sequence $*eh_2ei$.

PIE **eh₂ei* > PGPh. **āi*

PIE **-eh₂-ei* ‘(dat. sg. fem. them.)’ > PGPh. **-āi* ‘id.’ > Gr. -η ‘id.’,
OPh. -ay ‘id.’, NPh. -α ‘id.’ (PhL 64-65)

A laryngeal between two consonants is reflected as a vowel whose quality is determined by which laryngeal it developed from.

PIE **Ch₁C* > PGPh. **CeC*

PIE **d^hh₁s-o-* ‘sacred’ > PGPh. **d^heh-o-* ‘god’ > Gr. θεό- ‘id.’, OPh. *devo-* ‘id.’, NPh. δεο- ‘id.’ (LL 1823)

PIE **d^hh₁-to-* ‘something placed’ > PGPh. **d^he-to-* ‘id.’ > Gr. θετό- ‘id.’, MPh. δετο- ‘id.’ (PhL 62)

PIE **Ch₂C* > PGPh. **CaC*

PIE **ph₂tr-* ‘father (obl.)’ > PGPh. **patr-* ‘id.’ > Gr. πατρ- ‘id.’,
OPh. *patr-* ‘id.’, NPh. πατρ- ‘id.’ (cf. PhL 328-329)

PIE **Ch₃C* > PGPh. **CoC*

PIE **dh₃-ti-* ‘gift’ > PGPh. **do-ti-* ‘id.’ > Gr. δόσις ‘id.’, OPh. *toti-* ‘id.’ (Ligorio 2016, PhL 64)

PIE **h₃nh₃mn* ‘name’ > PGPh. **onom_h* ‘id.’ > Gr. ὄνομα ‘id.’, OPh. *onoman* ‘id.’ (LL 1822, PhL 317)

In initial pre-consonantal position, a laryngeal is reflected as a vowel whose quality is determined by which laryngeal it developed from.

PIE $*h_1C-$ > PGPh. $*eC-$

PIE $*h_1su-$ ‘good, well’ > PGPh. $*ehu-$ > Gr. εὖ-, OPh. *ev-* (PhL 62)

PIE $*h_2C-$ > PGPh. $*aC-$

PIE $*h_2nē-$ ‘man’ > PGPh. $*anēr$ ‘id.’ > Gr. ἀνὴρ ‘id.’, NPh. *anap* ‘id.’ (PhL 62)

PIE $*h_3C-$ > PGPh. $*oC-$

PIE $*h_3nh_3m̃-$ ‘name’ > PGPh. $*onomā$ ‘id.’ > Gr. ὄνομα ‘id.’, OPh. *onoman* ‘id.’ (LL 1822, PhL 317)

Laryngeals in initial position before $*j$ and $*i$ show a special development (Bozzzone 2013: 6ff.).

PIE $*h_2/_3j-$ > PGPh. $*j / \#_-$

PIE $*h_1i-$ > PGPh. $*\zeta / \#_-$

PIE $*h_1io-$ ‘(rel. pron.)’ > PGPh. $*\zeta o-$ ‘id.’ > Gr. ὅ- ‘id.’, OPh. *yo-* ‘id.’, NPh. *io-* ‘id.’

PIE $*h_1i-$ > PGPh. $*\zeta i-$ ¹¹³

PIE $*h_1i-$ ‘(anaph. pron.)’ > PGPh. $*\zeta i-$ > Gr. ἵ-*va* ‘then’, OPh. *i-* ‘(dem. pron.)’, NPh. *ι-* ‘(id.)’

¹¹³ This development would also be fed by the $*\partial_2 > *i$ development.

In final position after a consonant, laryngeals are also reflected as a coloured vowel.

PIE $*-Ch_1 > \text{PGPh. } *-Ce$ (cf. LL 1823)

no good Phrygian example

PIE $*-Ch_2 > \text{PGPh. } *-Ca$

PIE $*-h_2$ ‘(nom./acc. pl. neut. them.)’ $> \text{PGPh. } *-a$ ‘id.’ $> \text{Gr. } -\alpha$ ‘id.’, NPh. $-\alpha$ ‘id.’ (LL 1823)

PIE $*-ih_2$ ‘(nom. sg. fem.)’ $> \text{PGPh. } *-(i)ja > \text{Gr. } -\iota\alpha$, OPh. $-iya$ (cf. Hämmig 2013: 134-138)

PIE $*-Ch_3 > \text{PGPh. } *-Co$ (cf. LL 1823)

no good Phrygian example

II.3.1.1.3 Development of the syllabic resonants

The syllabic resonants were still preserved as unitary segments in Proto-Graeco-Phrygian, as evidenced by their different reflexes in the various Greek dialects and their reflexes in Phrygian.

PIE $*r$ > PGPh. $*r$

PIE $*mr-$ ‘to die’ > PGPh. $*mr-$ ‘id.’ > Gr. (poetic) βροτός ‘mortal’,
MPh. μοῖρα ‘death(?)’¹¹⁴ (PhL 305)

quasi-PIE $*pr$ ‘forward’ > PGPh. $*pr$ > OPh. *por* (cf. PhL 64)¹¹⁵

PIE $*l$ > PGPh. $*l$

no good Phrygian example

A sequence of a consonant, a resonant, and a laryngeal develops in two different ways depending on whether the following segment is a vowel or a consonant.

PIE $*CRHV$ > early PGPh. $*CaRHV$ > PGPh. $*CaRV$ ¹¹⁶

PIE $*g^hrHi-$ > PGPh. $*g^h\text{ari-}t$ > Gr. χάριτ-, NPh. γαριτ- (LL 1823)

PIE $*CRh_1C$ > PGPh. $*CR\bar{e}C$ (cf. LL 1823)

no good Phrygian example

PIE $*CRh_2C$ > PGPh. $*CR\bar{a}C$

The development of PIE $*CRh_2C$ into Greek $*CR\bar{a}C$ is secure (CIEL 151). Unfortunately, in the only Phrygian example of this development, PIE $*(s)lh_2g^w-$ ‘to take, grasp, seize’ > OPh. *lak-* ‘id.’ (Lubotsky 2004: 234, PhL 285), it is uncertain whether the vowel *a* is long or short. The matter is complicated by the fact that the Greek

¹¹⁴ See further in §II.3.2.2.2, however.

¹¹⁵ See §VI.1.8.

¹¹⁶ If the vowel following the laryngeal is $*e$, it is coloured in accordance with the laryngeal colouring rules laid out in §II.3.1.1.2.

thematic aorist stem $\lambda\alpha\beta\text{-}\varepsilon/\text{o-}$ that developed from the PIE root $*(s)lh_2g^w\text{-}$ shows an unexpected short vowel that must have emerged analogically (EDG 829). Nevertheless, it is likely on the basis of the Greek reflex and for systemic reasons that the regular Proto-Graeco-Phrygian reflex of PIE $*CRh_2C$ was PGPh. $*CR\bar{a}C$.

PIE $*CRh_3C > \text{PGPh. } *CR\bar{o}C$

PIE $*g^h lh_3\text{-}ro\text{-}$ ‘green, yellow’ $> \text{PGPh. } *g^h l\bar{o}ro\text{-}$ ‘id.’ $> \text{Gr. } \chi\lambda\omega\rho\acute{o}\varsigma$ ‘id.’, OPh. $\gamma\lambda\omicron\upsilon\rho\text{-}\varepsilon\omicron\text{-}$ ‘golden’ (PhL 202, CIPP2 17)

II.3.1.1.4 Development of the syllabic nasals

The fate of the two syllabic nasals $*m$ and $*n$ is slightly different to that of the two resonants $*r$ and $*l$.

In final position, the two syllabic nasals merge into a single segment, which we may suppose was likely $*\eta$:

PIE $*\text{-}\eta > \text{PGPh. } *\text{-}\eta$

PIE $*\text{-}mn > \text{PGPh. } *\text{-}m\eta > \text{Greek } \text{-}\mu\alpha, \text{OPh. } \text{-}man, \text{NPh. } \text{-}\mu\alpha\nu \text{ (cf. PhL 67, LL 1822)}$

PIE $*\text{-}\eta > \text{PGPh. } *\text{-}\eta$

PIE $*\text{-}\eta$ ‘(acc. sg. of C-stems)’ $> \text{PGPh. } *\text{-}\eta > \text{Gr. } \text{-}\alpha, \text{OPh. } \text{-}an, \text{NPh. } \text{-}\alpha\nu \text{ (cf. PhL 67, LL 1822)}$

We have no secure examples of a syllabic **ŋ* in Phrygian before a consonant, so it is uncertain whether the two sounds merged or remained distinct in that position, but the otherwise identical treatment of nasals in Greek and Phrygian suggests a merger took place.

PIE *-*ŋC*- > PGPh. *-*ŋC*- (cf. Rix 1992: 66)

PIE *-*ŋs* ‘(acc. pl. masc./fem.)’ > PGPh. *-*ŋs* > Gr. -ας, NPh. -αις
(LL 1820)

PIE *-*ŋC*- > PGPh. *-*ŋC*- (cf. Rix 1992: 66)

PIE **g^wm*- ‘to go’ >> PGPh. **g^wŋ-ske/o-* > Gr. βάσκε ‘go! (impv.)’;
no good Phrygian example

The only environment where the reflexes of the two syllabic nasals differ is as part of a sequence with a laryngeal, where they develop along the same lines as **r* and **l* (see §II.3.1.1.4).

PIE **CnHC* > PGPh. **Cnē/ā/ōC* (CIEL 151)

PIE **ǵnh₃-ti-* > PGPh. **gnōti-* > Gr. γνῶσις;
no good Phrygian example

PIE **CmHC* > PGPh. **Cmē/ā/ōC* (CIEL 151)

PIE **k^hm₂-to-* ‘fatigued’ > PGPh. **kmāto-* ‘id.’ > Gr. ἄ-κμητος
‘indefatigable’ (EDG: 632);
no good Phrygian example

PIE **CnHV* > PGPh. **CanV* (CIEL 151)

PIE **d^hnh₂-eto-* ‘death’ > PGPh. **d^hanato-* ‘id.’ > Gr. θάνατος ‘id.’
(EDG 2010: 533-534);

no good Phrygian example

PIE **CmHV* > PGPh. **CamV* (CIEL 151)

PIE **k^hmh₂-eto-* ‘fatigue’ > PGPh. **kamato-* ‘id.’ > Gr. ἀ-κάματος
‘without fatigue’ (Beekes 1969: 201, 206ff.);

no good Phrygian example

II.3.1.1.5 Laryngeal hardening

Laryngeal hardening is a term that refers to the process by which an original Proto-Indo-European laryngeal developed into a stop.

Martinet (1955) originally proposed a development of this type that would explain unexpected occurrences of *-k-* in a final syllable in certain Latin and Greek forms, and Olsen (2009) subsequently endorsed and elaborated on the idea. Among the examples cited are: the Latin suffix *-ix* < **-ih₂s*; the Latin pair *senātus* ‘senate’ < **seneh₂-tu-* ~ *senex* ‘old man’ < **seneh₂-s*; etc. Olsen formulated the law as follows:

PIE **-VHs#* > **-Vks#* (NB: without laryngeal colouring)

More recently, Kortlandt (2018) has presented his own scenario on how a process akin to laryngeal hardening can be used to explain certain

unexpected instances of *-k-* in a final syllable.¹¹⁷ His proposal does not assume a direct development of a laryngeal into a stop, but rather the insertion of an epenthetic **k* between a word-final sequence of a laryngeal followed by an obstruent:

PIE **-VHC#* > **-VHkC#*

PIE **steh₂-t* ‘to erect (3sg aor. act.)’ > **steh₂kt* > **stākt*

The two proposals differ in how they treat the actual development of the laryngeal and the ramifications of that for the development of an immediately preceding vowel, as well as the conditioning factors at play (i.e. whether it was operational word-internally and whether only a following **s* caused hardening); ultimately, both accounts need to assume that analogical remodelling of the vowel took place in some of the forms with an otherwise unexpected *-k-*.

Nevertheless, the shared assumption that a word-final sequence **-VHs* produced reflexes with **k* is extremely appealing and serves to explain certain otherwise enigmatic forms.¹¹⁸

Provisionally, when individual forms are discussed, Kortlandt’s account will be taken as the basis, but the analyses impacting Greek and Phrygian forms are not contingent on this fact.¹¹⁹

¹¹⁷ Henceforth, Kortlandt’s proposal will, like Martinet’s and Olsen’s proposals, be treated under the cover name “laryngeal hardening” for convenience, even though, strictly speaking, his account does not presuppose any hardening of the laryngeal itself and would better be described as “laryngeal *k*-epenthesis”.

¹¹⁸ The traditional alternative to assuming laryngeal hardening is to posit that any such unexplained **k* is a suffix of some sort. Such morphological explanations do not generally provide any additional insight into the forms being discussed and only serve as an *ad hoc* means of providing an explanation for the presence of **k*.

¹¹⁹ Though, if Olsen’s account is preferred, the *k*-formant in PGPh. **dēk-* must be taken as originating in the 2nd person singular.

For the purposes of Phrygian, we may provisionally give the following sound law:

PIE **-VHC* > PGPh. **-V[?]kC#*

PIE **d^heh₁t* ‘to put (3sg aor. act.)’ >(>) PGPh. **dēkt* ‘id.’ >>
 PGPh. **dēk-* ‘id. (aor. and perf. stem)’ > Gr. *θηκ-* ‘to put
 (sing. aor. stem, perf. stem)’, Phr. *dak-* ‘id. (perf. stem.)’
 (see further in §V.3.9.3)

II.3.1.2 Consonantism

II.3.1.2.1 Development of stops

Stops in Proto-Graeco-Phrygian preserved a three-fold phonological distinction found in Proto-Indo-European.

PIE **t* > PGPh. **t*

PIE **-to-* ‘(adjective-forming suffix)’ > PGPh. **-to-* > Gr. *-το-*,
 OPh. *-to-*, NPh. *-το-* (cf. PhL 108)

PIE **d* > PGPh. **d*

PIE **diu-* ‘Sky-deity (oblique)’ > PGPh. **diu-* > Gr. *δι-*, OPh. *tiv-*,
 NPh. *τι-* (PhL 74)

PIE **d^h* > PGPh. **d^h*

PIE **d^hh₁-s-o-* ‘sacred’ > PGPh. **d^heho-* ‘deity’ > Gr. *θεο-*, OPh.
devo-, NPh. *δεο-* (LL 1823)

Same as with the dentals, the place of articulation of the labials and the labiovelars was preserved unchanged:

PIE $*p > \text{PGPh. } *p$

PIE $*ph_2tr-$ ‘father (oblique)’ $> \text{PGPh. } *patr-$ $> \text{Gr. } \pi\alpha\tau\rho-$, OPh. $patr-$, NPh. $\pi\alpha\tau\rho-$ (PhL 74)

PIE $*b^h > \text{PGPh. } *b^h$

PIE $*b^her-$ ‘to bear’ $> \text{PGPh. } *b^her-$ $> \text{Gr. } \varphi\epsilon\rho-$, NPh. $\beta\epsilon\rho-$ (PhL 73)

PIE $*k^w > \text{PGPh. } *k^w$

PIE $*k^we$ ‘and’ $> \text{PGPh. } *k^we > \text{Gr. } \tau\epsilon$, OPh. ke , NPh. $\kappa\epsilon$ (PhL 74)

PIE $*g^w > \text{PGPh. } *g^w$

PIE $*g^wnh_2-$ ‘woman (oblique)’ $>> \text{PGPh. } *g^wnaik-$ $> \text{Gr. } \gamma\upsilon\nu\alpha\iota\kappa-$, OPh. $knayk-$ (PhL 74) (for the stem $*g^wnaik-$, see §III.3.10.2)

PIE $*g^{wh} > \text{PGPh. } *g^{wh}$

PIE $*d^hreg^{wh}-$ $> \text{PGPh. } *d^hreg^{wh}-$ $> \text{Gr. } \tau\rho\epsilon\varphi-$ ‘to feed’, NPh. $\delta\rho\epsilon\gamma-$ ‘id.’ (PhL 73)

The palato-velars are reflected as plain velars, making Proto-Graeco-Phrygian a centum-language (cf. PhL 73-74):¹²⁰

¹²⁰ Phrygian secondarily underwent a conditioned palatalization of its plain velars, but this development is posterior to the shift of palatovelars to plain velars. See §II.3.2.3.4 below.

PIE $*k' > \text{PGPh. } *k$

PIE $*dik-$ ‘to point (weak stem)’ $> \text{PGPh. } *dik- > \text{Gr. } \delta\iota\kappa-, \text{NPh. } \tau\iota\kappa- \text{ (PhL 74)}$

PIE $*g' > \text{PGPh. } *g$

PIE $*megh_2-$ ‘big, large’ $> \text{PGPh. } *mega- > \text{Gr. } \mu\epsilon\gamma\alpha-, \text{Oph. } meka-, \text{NPh. } \mu\epsilon\kappa\alpha- \text{ (PhL 74)}$

PIE $*g^h > \text{PGPh. } *g^h$

PIE $*g^hriH-$ ‘to smear’ $> \text{PGPh. } *g^hri- > \text{Gr. } \chi\rho\iota- \text{ ‘to smear, anoint’}, \text{NPh. } \gamma\rho\epsilon\iota- \text{ ‘anoint’ (PhL 73)}$

A cluster of two dental stops developed an epenthetic $*s$ in PIE already. The resulting sequence remained unchanged in Proto-Graeco-Phrygian.

PIE $*-Tt- > \text{PIE } *-tst- > \text{PGPh. } *-tst-$

PIE $*uoid-th_2e$ ‘know (2sg perf. act. ind.)’ $> \text{PGPh. } uoitsta > \text{Gr. } \omicron\iota\sigma\theta\alpha \text{ (Norbruis 2023)}$

PIE $*-Td- > \text{PIE } *-dzd- > \text{PGPh. } *-dzd- \text{ (Meier-Brügger 2010: 268)}$

PIE $*-Td^h- > \text{PIE } *-d^{(h)}z^{(h)}d^h- > \text{PGPh. } *-d^hzd^h- \text{ (Meier-Brügger 2010: 268)}$

pre-Proto-Phrygian $*ad=d^hi > \text{Proto-Phrygian } *adz d^hi > *adzdi > *azdi > \text{Late PPh. } *adi > \text{NPh. } \alpha\delta \text{ ‘(preposition)’ (see §VI.1.1)}$

In word-final position, plosives are lost.

PIE $*C_{[+plosive]}$ > PGPh. $\emptyset$ / $_ \#$ (cf. Rix 1992: 88-89)

PIE $*-t\bar{o}d$ ‘(3pl act. impv.)’ > PGPh. $*-t\bar{o}$ > Gr. $-\tau\omega$, OPh. $-tu$, NPh. $-\tau\upsilon$ (cf. PhL 102)

PIE $*-id$ ‘(nom.-acc. neut. pronominal)’ > PGPh. $*-id$ > Gr. $-\iota$ (in, e.g., $\tau\acute{\iota}$ < $*k^{wid}$), OPh. $-i$ (in si < $*\acute{k}-id$) (*contra* PhL 89)

PIE $*nt$ > PGPh. $*n$ / $_ \#$

PIE $*-ent$ ‘(3pl act. secondary)’ > PGPh. $*-en$ > Gr. $-\epsilon\nu$, NPh. $-\epsilon\nu$ (in $\delta\alpha\kappa\alpha\epsilon\nu$) (cf. PhL 105)

Word-final clusters of a non-dental stop and $*s$ are preserved as a cluster of a voiceless stop and $*s$.

A final cluster of a dental and $*s$ is simplified into $*s$ (PhL 70).

PIE $*Ks$ > PGPh. $*ks$ / $_ \#$ (Rix 1992: 95)

early PGPh. $*\mu anakts$ > $*\mu anaks$ > Myc. $wa-na-ka$ [$\mu anaks$] >> OPh. $vanak$ ‘id.’ (cf. PhL 70)

PIE $*Ps$ > PGPh. $*ps$ / $_ \#$

no good Phrygian example

PIE $*Ts$ > PGPh. $*s$ / $_ \#$

PIE $*nep\bar{o}ts$ ‘nephew’ > PGPh. $*nep\bar{o}s$ > OPh. $nepos$ ‘grandson?’ (cf. PhL 70)

PIE **b^heh₂-* ‘to shine’ > PGPh. **b^hō-t-s* and **b^hā-t-s* (nom. sg.) > Gr. nom. sg. φώς ‘man, hero’, gen. sg. φωτός, NPh. nom. sg. βας ‘Bas’, acc. sg. βαταν (cf. PhL 193-194)

II.3.1.2.2 Dental-velar clusters in Proto-Graeco-Phrygian and beyond

The development of the dental-velar clusters is difficult to ascertain for Proto-Graeco-Phrygian.

In Greek, the cluster underwent metathesis:

PIE **tk* > Proto-Greek **kt* (Rix 1992: 96)

PIE **tV-tk-* ‘to produce’ > PG **tik_t-* ‘to beget’ > Gr. τικτ- ‘id.’

PIE **d^hg^h* > Proto-Greek **k^ht^h* (cf. Rix 1992: 81-82)

quasi-PIE **d^hg^hōm* ‘earth (NSg)’ > PG **k^ht^hōn* ‘id.’ > Gr. χθών ‘id.’

In Phrygian, we only have a single unambiguous piece of evidence for the development of a **TK* cluster in initial position.

quasi-PIE **d^hg^hemelo-* > NPh. ζεμελο- (= *zemelo-*) ‘man’ (cf. LL 1824)

Since a PIE **g^h* regularly develops into New Phrygian ζ /z/ before a front vowel (§II.3.2.3.4), a number of intermediate stages are possible:

	scenario 1	scenario 2	scenario 3
quasi-PIE	<i>*d^hg^hemelo-</i>		
PGPh.	<i>*dgemelo-</i>	<i>*gdemelo-</i>	<i>*Xemelo-</i>
early PPh.	<i>*dgemelo-</i> or <i>*gemelo</i>	<i>*gemelo-</i>	<i>*dzemelo-</i>
late PPh./OPh.	<i>*dzemelo-</i>	<i>*dzemelo-</i>	
NPh.	ζεμελο-		

Table #14: Possible developments of the word for ‘man’ in Phrygian.

In scenario 1, no special development is required to account for the Phrygian forms: a dental-velar cluster would have simply developed entirely in accordance with the rest of the system, with possible simplification of the initial cluster. In this case, the Greek metathesis would need to have been post-Proto-Graeco-Phrygian.

In scenario 2, Phrygian would have undergone the same metathesis as Greek, meaning that the metathesis would need to have been of Proto-Graeco-Phrygian age. In this case, the resulting **gd* cluster would need to have been simplified into simply **g* in Proto-Phrygian.

Scenario 3 assumes a development more in line with that assumed for **TK* clusters in many other core Indo-European languages (i.e. except Anatolian and Tocharian), which has been suggested to be a common innovation of Core Proto-Indo-European (Fortson 2004: 59). In Indo-Iranian, Italic, and Greek an original PIE sequence **TK* has been suggested to have been metathesized with its now second element lenited into a fricative (*ibid.*):

PIE **d^hg^hom-* ‘earth’ > Core PIE **g^hǵ^(h)om-* > Skt. *kṣám-*,
Av. *zam-*, Lat. *hom-*, Gr. *χθον-*

PIE **h₂rtk^o-* ‘bear’ > Core PIE **h₂rk^o-* > Skt. *ṛkṣa-*, Lat. *ursu-*,
Gr. *ἄρκτο-*

If one assumes this development for Phrygian, i.e. from Core PIE **K^ob*, Phrygian would show a special development of **g^hǵ^h* into PPh. **dz* at least in initial position, while the fricative element would have undergone fortition in Greek (i.e. *g^hǵ^h* > **g^hd^h* > *k^ht^h*).

One telling example that may help us discern the actual prehistoric reflex of an initial dental-velar cluster in Phrygian can be found in NPh. *γουμεις* °130^{NW}. If we interpret the syntagm *σως γουμεις* (dat. pl.) ‘these *goum*’s’ as referring to the burial grounds in a locative meaning, NPh. *γουμ-* ‘earth, ground, (burial) plot’ would be directly cognate to Greek *χθον-* ‘earth, ground’, with both descended from PGPh. **d^hg^hom-*.¹²¹ With this identification, the situation becomes somewhat clearer. While the Greek development is entirely regular in its metathesis, the Phrygian reflex of initial **d^hg^h* must then have been simply *g-*. This would be entirely in line with the treatment of *ζεμελο-*, with the difference being that the velar was later palatalised before a front vowel:

¹²¹ Synchronically, NPh. *γουμ-* is an *m*-stem, the only known example belonging to this type in synchronic Phrygian. While it is conceivable that it is a loanword, the PIE word for ‘earth’ is the only known *m*-stem in that language as well, which makes this identification likely on both semantic and formal grounds. See further in §III.3.8.

PIE **TK* > PGPh. **TK* > PPh. **K* / #_ ; then

PPh **k, g* > PPh. **(t)s, dz* / _V[+front]

PIE **d^hg^hom-* > PPh. **gom-* > NPh. γουμ-;

PGPh. **d^hg^hem-* > PPh. **gem-* > LPPh. **dzem-* > NPh. ζεμ-.

If we uphold this etymology, this effectively disproves the “thorn”-treatment of the initial cluster (scenario 3), unless we assume the following series of developments:

PIE **TK* > PGPh. **Kb* > PG **KT*, PPh. **K*

It is questionable whether this confers any benefit to the treatment of Phrygian and Greek data: in either case, both languages would have shown a special development of an original **TK* cluster, with the thorn scenario simply adding an unnecessary intermediate step. The only reason to postulate the thorn scenario is if one assumes that the development into **Kb* was of PIE age already. While this matter is still under discussion, it ultimately seems unnecessary (Kloekhorst 2014: 65 *et passim*), and one of the arguments in favour of a thorn development in any case is the Greek metathesis, which is less likely to be inherited when Phrygian data is taken into account.

To decide between scenarios 1 and 2, we may more closely examine the forms *ektetoy*, *ktevovs*, and perhaps εκτε-. It is clear that *ektetoy* and εκτε- must be augmented forms belonging to a PPh. root **kt(e)-* (§V.3.2.3); whether the vowel *-e-* is the thematic vowel or a reflex of **h₁* is unclear from a purely phonological standpoint. Since both *ektetoy* and *ktevovs* appear in °B-01, it is likely that the *kt* element belongs to the same original

root and is in the zero grade. Leaving the question of the vowel *-e-* aside, the root in question must have had a basic shape **K^wT(h₁)/-***ḲT(h₁)-* or **TK^w(h₁)/-***TḲ(h₁)-*, if we assume metathesis took place.¹²² What we may conclude is that the initial *kt-* of *ktevōys* and the other forms cannot be a reflex of **tḱ-* > **tk-*, since the **k* would have otherwise been palatalised (**tke-* > *kte-* would suggest a parallel **d^hg^he* > ***gde-*, instead of attested **d^hg^he* > *ζε-*). Thus, *kt-* can only be a reflex of original **K^wt-*, **Tk^w-*, or **Ḳt-* (with the latter element being voiceless in Proto-Phrygian).

Taking into account the likely meaning of the forms discussed, I propose that *ektetoy* and *ktevōys* are zero-grade forms belonging to the PIE verbal root **ǵ^hed-* ‘to seize, grasp, take’ (cf. Gr. *χαλδάνω* ‘to take in, hold’),¹²³ in which case the following development took place: PGPh. **g^hd* > PPh. **gt* > OPh. *kt*. This then suggests that an initial cluster **KT* remained unaffected by any special development. In other words, the reflexes of original PIE **TḲ* and **ḲT* clusters did not merge at any point in Phrygian pre-history, disproving scenario 2.¹²⁴

Based on these considerations, it seems most likely that in initial position the dental-palatovelar clusters underwent the following development:

PIE **TḲ* > PGPh. **TK* > PPh. **K*.

¹²² *ektetoy* can descend either from **kth₁-C* or **kt-e-C-*, and *ktevōys* can be either a *vo*-adjective, **kth₁-uo-*, or an *evo*-adjective, **kt-evo-*. For the latter type, see §III.3.1.5. See also the previous footnote.

¹²³ See §V.3.2.3.

¹²⁴ If **gt* < **ǵ^hd* did not go under palatalization in Proto-Phrygian, we would expect the same for ***gd* < PGPh. **d^hǵ^h-*, which is contradicted by *ζε-*.

On the other hand, PIE palatovelar-dental clusters remained unchanged:

PIE **K̑T* > PGPh. **KT* > PPh. **KT*.

The proposed Phrygian development of the dental-palatovelar clusters in initial position is fundamentally identical to that of Italic and Balto-Slavic; the development would need to have been independent in all three instances.¹²⁵

PIE **TK* > PIIt. **K*, PBSl. **K*, PPh. **K*

PIE **dʰgʰe/om-* ‘earth’ > Lat. *hum-*, OCS *zem-*, NPh. ζεμ-, γουμ-

As far as the dental-palatovelar clusters in non-initial position are concerned, there are no good Phrygian examples that permit an analysis.

II.3.1.2.3 Development of resonants

The resonants **r* and **l* are preserved in all positions.

PIE **r* > PGPh. **r*

PIE **bʰer-* ‘to bear’ > PGPh. **bʰer-* > Gr. φερ-, NPh. βερ- (PhL 69)

PIE **l* > PGPh. **l*

PIE **-elo-* ‘(nominal suffix)’ > PGPh. **-elo-* > Gr. -ελο-,

NPh. -ελο- (in ζεμελο-) (PhL 85)

¹²⁵ Also note that the cluster **TK* in initial position before a consonant was certainly simplified into **K* in Core PIE already (cf. Skt. gen. sg. *jmás*; Gr. χαμαί). The Italic, Balto-Slavic, and Phrygian developments would then simply be an extension of this simplification to all word-initial environments.

The nasal **n* was preserved in all positions.

PIE **n* > PGPh. **n*

PIE **penk^we* ‘five’ > PGPh. **penk^we* > Gr. πέντε, NPh. πινκε (LL 1820)

The nasal **m* was mostly preserved unchanged, except in final position, where it developed into **n*.

PIE **m* > PGPh. **m*

PIE **meh₂tēr* ‘mother’ > PGPh. **mātēr* > Gr. μήτηρ, OPh. *matar* (PhL 66)

PIE **m* > PGPh. **n* / *_#*

PIE **-om* ‘(acc. sg. thematic)’ > PGPh. **-on* > Gr. -ov, OPh. -un, NPh. -ouv (PhL 67)

In initial clusters **sr*, **sl*, **sm*, and **sn*, **s* developed into **h*.¹²⁶ (Rix 1992: 76) In other environments, these clusters underwent separate developments in Phrygian and in the various Greek dialects, passing through the common stages **hr*, **hl*, **hm*, **hn*.

PIE **sl* > PGPh. **hl* / *_#_V*

PIE **sleh₂g^w-* ‘to seize, take’ > PGPh. **hlāg^w-* > Gr. dial. λθαβ- (aor.),¹²⁷ OPh. *lak-* (PhL 69, 70, Rix 1992: 76)

¹²⁶ Compare PIE **s_u* > PGPh. **h_w*.

¹²⁷ With secondary short vowel (EDG 829).

PIE **sr* > PGPh. **hr* / #_V

no good Phrygian example

PIE **sn* > PGPh. **hn* / #_V

no good Phrygian example

PIE **sm* > PGPh. **hm* / #_V

no good Phrygian example

PIE **sR* > PGPh. **hR*

PIE **g^hesr-* ‘hand’ > PGPh. **g^hehr-* > Gr. χεῖρ-, OPh. ↑*ira-*, NPh. ζεῖρα- (§III.3.5)

PIE **-e-sm-o-* ‘(pronominal)’ > PGPh. **-ehmo-* > NPh. -εμο- (in σεμο- ‘this (oblique)’ < **k^sesmo-*) (§IV.3.2)

II.3.1.2.4 Development of semi-vowels

The two semivowels **u̯* and **i̯* were preserved in almost all environments.

PIE **u̯* > PGPh. **u̯*

PIE **u̯erǵ-* ‘to work’ > PGPh. **werg-* > Gr. ἐργ-ο- ‘work’; cf. OPh. *vrek-o-* ‘sculpture’ (PhL 243-244) (for the apparent Schwebeablaut in OPh. *vreko-*, see §III.3.1.3)

PIE **i̯* > PGPh. **j*

PIE **-e-i̯o-* ‘(adjective-forming suffix)’ > PGPh. **-ejo-* > Gr. -εο-, NPh. -εο- (in γλουρεο- < **ǵ^hlh₃reio-*) (PhL 84-85)

The clusters **s_u* and **s_i* saw the element **s* lenited (cf. Rix 1992: 80).

PIE **s_w* > PGPh. **h_w*

PIE **sue* ‘self’ > PGPh. **hwe* > Gr. ἔ, OPh. *ve-*, NPh. *οε-* (cf. PhL 69)

PIE **s_i* > PGPh. **h_j*
no good Phrygian example

II.3.1.2.5 Development of fricatives

The PIE fricative **s* underwent lenition in initial position before a vowel and between vowels.

PIE **s* > PGPh. **h* / #_V

PIE **seg^h-* ‘to hold’ > PGPh. **heg^h-* > Gr. ἔξω ‘to have (fut.)’, OPh. *eg-* ‘to hold’, NPh. *εγ-* (PhL 69)

PIE **s* > PGPh. **h* / V_V

PIE **d^hh₁-s-o-* > PGPh. **d^heho-* > Myc. *te-o-* [t^hcho-] ‘god’, OPh. *devo-* ‘id.’, NPh. *δεο-* (PhL 70)

In clusters with stops, PIE **s* is preserved.

PIE **s* > PGPh. **s* / _C, C_ (LL 1823)

PIE **steh*₂- ‘to stand’ > PGPh. **stā*- > Gr. *στη*-, OPh. *sta*-, NPh. *στα*- (PhL 232)

PIE **uēh*₂*g^h*-*s*- ‘to wail (*s*-aorist stem)’ > PGPh. **uāks*- > OPh. *vaΨ*- (§II.1.1.4)

Word-finally, **s* is preserved.

PIE **s* > PGPh. **s* / _#

PIE **-os* ‘(nom. sg. *o*-stem ending)’ > PGPh. **-os* > Gr. *-ος*, OPh. *-os*, NPh. *-ος* (PhL 70)

II.3.2 Developments from Proto-Graeco-Phrygian to Old Phrygian

II.3.2.1 The segmental system of Proto-Graeco-Phrygian

	labial	dental	alveolar	palatal	velar	labio- velar	glottal
T	* <i>p</i>	* <i>t</i>			* <i>k</i>	* <i>k^w</i>	
M	* <i>b</i>	* <i>d</i>			* <i>g</i>	* <i>g^w</i>	
MA	* <i>b^h</i>	* <i>d^h</i>			* <i>g^h</i>	* <i>g^{wh}</i>	
fricative		* <i>s</i>					* <i>h</i>
nasal	* <i>m</i>	* <i>n</i>					
resonant	* <i>w</i>		* <i>r</i> * <i>l</i>	* <i>j</i> * <i>ç</i>			

Table #15: The consonantal segments of Proto-Graeco-Phrygian.

	front		mid		back	
high	* <i>i</i>	* <i>ī</i>			* <i>u</i>	* <i>ū</i>
mid	* <i>e</i>	* <i>ē</i>			* <i>o</i>	* <i>ō</i>
low			* <i>a</i>	* <i>ā</i>		

Table #16: The vocalic segments of Proto-Graeco-Phrygian.

Diphthongs: **ai*, **ei*, **oi*, **āi*, **ēi*, **ōi*, **au*, **eu*, **ou*, **āu*, **ēu*, **ōu*

Vocalic resonants: **r*, **l*, **ŋ*

II.3.2.2 The development of vowels

The majority of Proto-Graeco-Phrygian vowels remained unchanged by Old Phrygian.

PGPh. **a* > OPh. *a*

PGPh. **patr-* ‘father (oblique stem)’ > OPh. *patr-*, NPh. *πατρ-* (cf. PhL 62)

PGPh. **e* > OPh. *e*

PGPh. **b^her-* ‘to bear’ > NPh. *βερ-* (cf. PhL 62-63)

PGPh. **ped-* ‘foot’ > OPh. *pet-*, NPh. *πετ-* (cf. Kloekhorst 2015: 115)

PGPh. **i* > OPh. *i*

PGPh. **k^wi-* ‘who’ > OPh. *ki-*, NPh. *κτ-* (cf. PhL 63)

PGPh. **o* > OPh. *o*

PGPh. **-os* ‘(nom. sg. *o*-stem ending)’ > OPh. *-os*, NPh. *-ος* (cf. PhL 63-64)

PGPh. **u* > OPh. *⁺u* > NPh. /u/ <ov>, <v>

PGPh. *upsod^hη* ‘up, above’ > Gr. **ύψόθα* (cf. *ύψόθ-εν* ‘from above’), NPh. *(o)υψοδαν* (cf. Lubotsky 1993, PhL 64)

PGPh. **ā* > OPh. *ā* <*a*>

PGPh. **māter-* ‘mother’ > OPh. *mater-*, NPh. *ματερ-* (cf. PhL 62)

PGPh. * $\bar{o}$ > OPh. $\bar{o}$ <*o*>

PGPh. *- $t\bar{o}$ ‘(3sg impv. act. ending)’ > OPh. -*to*, NPh. -*του* (cf. PhL 64)

PGPh. * $\bar{u}$ > OPh. $^{+}\bar{u}$ <*u*> > NPh. *ou*

PGPh. **knū-* ‘to dig, scrape’ > NPh. *κνουναν-* ‘grave’ (cf. PhL 64)

The front long vowels of Proto-Graeco-Phrygian underwent specific developments.

PGPh. * $\bar{e}$ > OPh. $\bar{a}$ <*a*>

PGPh. **mātēr* ‘mother (nom. sg.)’ > OPh. *matar*, NPh. *ματαρ* (cf. PhL 62)

PGPh. * $\bar{i}$ > OPh. $\bar{e}$ <*e*>, <*i*>

PGPh. * $\bar{i}$ - ‘(optative suffix)’ > OPh. -*s-i/e-* ‘(sigmatic aorist optative suffix)’, NPh. - $\sigma(\epsilon)\iota$ - ‘id.’ (see §V.3.4.3)

The new mid-high front long vowel $\bar{e}$ also emerged as a result of contraction and compensatory lengthening (cf. Brixhe 1983: 117).

PGPh. **-eje-* > PPh. $\bar{e}$

PGPh. **-eje-* ‘(denominal verb-forming suffix)’ > MPh. - ι -, NPh. - ι - (§V.3.1.4)

PGPh. **e* > Ph. $\bar{e}$ / $_hr$

PGPh. **g^hehr*- ‘hand (oblique)’ > PPh. **g^hehrā* ‘hand (*a*-stem)’ >

OPh. $\uparrow ira$ -, NPh. $\zeta\epsilon\rho\alpha$ - (§III.3.5)

The diphthongs remained unchanged, with the exception of PGPh. **ēi*, which would have developed into OPh. *āi*.

PGPh. **ai* > OPh. *ay*

PIE **h₁eh₂i* > PGPh. **ai* ‘when, if’ > PPh. **ai* + *ni* > OPh. *ayni* ‘if’
(cf. PhL 64, 65)

PGPh. **ei* > OPh. *ey*

PGPh. **mātereī* ‘mother (dat. sg.)’ > OPh. *materey* (cf. PhL 65)

PGPh. **oi* > OPh. *oy*

PGPh. **-toi* ‘(3sg middle primary ending)’ > OPh. *-toy* ‘id.’ (cf. PhL 65)

PGPh. **au* > OPh. *av*

PGPh. **auto*- ‘he, himself’ > OPh. *avto*- (cf. PhL 65)

PGPh. **eu* > OPh. *ev*

PGPh. **b^heud^hos* ‘image’ > OPh. *bevdos* ‘statue’ (cf. PhL 65)

PGPh. **ou* > OPh. *u*?

possibly pre-OPh. **vasous* > OPh. *vasus* ‘PN’ (cf. PhL 65-66)

PGPh. **āi* > OPh. *ai*

PGPh. **-āi* ‘(dat. sg. *a*-stem ending)’ > OPh. *-ai* (e.g. *esai* ‘this (dat. sg.)’) (cf. PhL 64-65)

PGPh. **ēi* > OPh. *ai*

PGPh. **-ēi* ‘(3sg subj. act. ending)’ > OPh. *-ai* (e.g. *podaskai* ‘may he trample’) (§V.2.1)

PGPh. **ōi* > OPh. *oi*

PGPh. **-ōi* ‘(dat. sg. *o*-stem ending)’ > OPh. *-oi* (e.g. *tadoy*) (cf. PhL 65)

PGPh. **āu* > OPh. *⁺au*

no good Phrygian example

PGPh. **ēu* > OPh. *au*

PGPh. **-ēus* ‘(nom. sg. agent noun)’ > PPh. **-āu-* + *-os* > OPh. *-avos* ‘id.’ (cf. PhL 65)

PGPh. **ōu*

no good Phrygian example

The placement of the accent apparently played some role in vocalic developments.¹²⁸

¹²⁸ For a treatment of the Phrygian accent, see §II.3.4.

PGPh. **e*_[-accent] > PPh. **i* / _CC > OPh. *i* (§II.3.4)

PGPh. **neptíja*- ‘niece, granddaughter’ > OPh. *niptiya*-

In proclitics, final *-i* was beginning to become syncopated by Old Phrygian.

PPh. **-i* > OPh. *-i*, *-∅*; NPh. *∅* / *in proclitics*

pre-Proto-Phrygian **ki* ‘this (neuter, clitic)’ > Proto-Phrygian **si* >
Old Phrygian *s(i)* (cf. *s=materan*, *s=manes*, but *si=keneman*)
(§IV.3.4)

Some instances of vowel raising are known to have taken place.

PGPh. **é* > OPh. *ē* / _\$RV (§II.3.4, *contra* LL 1821)

Proto-Phrygian **kubéleja* > OPh. *kubeleya*, *kubileya* ‘DN’

Proto-Phrygian **béreto-* > NPh. *βερετορ*, *βιρετο*[ι/ρ] ‘to bring (3sg
middle present/imperfect)’

PGPh. **e* > OPh. *ē* / _n# (Brixhe 1983: 119-120)

pre-OPh. **-en* ‘(acc. sg. *e*-stem ending)’ > OPh. *-in* (e.g. *manin*
‘Manes (PN) (ASg)’ (*contra* PhL 83)

PGPh. **o* > OPh. *ō* / _n# (Brixhe 1983: 119-120)

PGPh. **-on* ‘(acc. sg. *o*-stem ending)’ > OPh. *-un*, NPh. *-ov*, *-ouv*
(cf. PhL 63-64)

This final development may have resulted in a phonemic merger of mid and high vowels before a nasal in a closed syllable, or it may have been another example of an allophonic raising.¹²⁹

PGPh. **e* > [ɛ] or /i/ / _N\$C

PGPh. **penk^we* > NPh. *πινκε* ‘five’ (LL 1820)

PGPh. **o* > [ɔ] or /u/ / _N\$C

no certain example, possibly NPh. *πουντας* ‘Pontic’, *derived from a loan of* Gr. *Πόντος* ‘Pontus’ (LL 1822)

II.3.2.2.1 Vowel raising in non-final position

New Phrygian mid-vowels appear to have remained unchanged in non-final position before a nasal. If we discount all instances of *κνουμαν-* ‘grave’ (most likely with an inherited /u/ < **ū* (Lubotsky 1998)) and of *γεγρ(ε)μενο-* ‘written’ (where *ει/ι* spells the reflex of PPh. **ē* < **ī*),¹³⁰ high vowels before nasals in inlaut appear in a comparatively small number of forms: *μῑμογα* °18^W, *μῑμογας* °18^W, *σῑμουν* °25^{SW}, [ζ]ῑμελωσ °25^{SW}, *πουντας* °48^{NW}, *εινεα* °69^{SE}, *διουνσιν* °88^C, *λο[-]διμον* °116^W, *πινκε* °116^W, *δεδασσιννι* °NC, *κορουμανη* 2x °130^{NW}, *γουμεις* 2x °130^{NW}, *ειλικρινη* °130^{NW}, *εγουννου* °130^{NW}.¹³¹

Some of these high vowels are certainly etymological (*ου* < *ō*, *u*, *ū*; *ι* < *i*; *ει* < *eī*, *ī*).

¹²⁹ See further in the following section.

¹³⁰ *Contra* Haas 1966: 66, who assumes an etymological /i/ or /ei/.

¹³¹ For *σῑμουν* and *ζῑμελωσ* in °25^{SW}, see §II.3.4.

Some of these examples are consistent with the pre-nasal raising of mid-vowels in a closed syllable proposed for Old Phrygian: *πουντας* (derived from a loan of Greek Πόντος ‘Pontus’) and *διουνσιν* (possibly the Phrygian rendition of Greek Διόνυσος ‘Dionysus’) both show raising, *πινκε* ‘five’ is a regular reflex of PIE **penk^{we}* (as proposed by Ligorio and Lubotsky (LL 1820)), and the 3pl act. impv. ending *-ουννου* [-un:u] can be etymologized as deriving from **-onnō* < **-ontō* (cf. PhL 68).

The following examples seem to contradict pre-nasal raising of vowels in closed syllables: *ενσταρνα* °48^{NW}, *τεμρογειος* °48^{NW}, *]τεντουμενος* °48^{NW}, *αλενπατης* °69^{SE}, *γεντιβεπαι* °120^W, *ριποτειτωμν[*, *ουελασκοννου* °42^W, °120^W

Three of these examples are from inscription °48^{NW}, which was found near Eskişehir, which is somewhat remote compared to other locations where New Phrygian inscriptions were found. It is conceivable that the presence of spellings with <ε> is a dialectal convention. The two sequences of *εν-* (in *ενσταρνα* and *]τεντουμενος*) could ultimately reflect the preposition *εν* or compounds with it from after the raising rule was no longer productive. *τεμρογειος* is a river-name (Lubotsky 1997: 7) and is likely to be a borrowing.

γεντιβεπαι is difficult to read and segment, though the presence of a sequence *-ντ-* suggests a word boundary after *γεν*. *ριποτειτωμν[* begins the inscription; the presence of *ω*, which normally appears in a final syllable, makes a word boundary before <μ> likely, and it is likely *μ* could not appear word-finally in any case. *αλενπατης* has two unexpected features, specifically the lack of vowel-raising and a non-assimilation of <ν> to <μ> before a labial, which makes it extremely likely there is a word boundary between *αλεν* and *πατης*.

In ουελασκοννου, if Hämmig's (2022: 96 *et passim*) reading of ουελασκοννου as a single verbal form with a 3pl imperative ending (-οννου < *-ontō) is correct, which seems an appealing possibility, the /o/ could well have been paradigmatically restored. The other instance of κοννου °42^w, found in the sequence usually read as *με κοννου, is better read as belonging to ο[υ]ελαςκοννου (Hämmig 2022: 94ff.). The paradigmatically restored vowel would still presumably be raised before a nasal (as suggested by the spelling εγουννου), but would have continued to be understood as phonemic /o/. Hämmig's account is preferable to the older suggestion that κοννου means 'joint, together' (Lubotsky 1998: footnote 14).

II.3.2.2.2 Development of syllabic resonants

The PGPh. vocalic resonant **ŋ* was resolved into a sequence of *a* and a nasal consonant.

PGPh. **ŋ* > OPh. *an*

PGPh. **-ŋ* '(acc. sg. consonant stem ending)' > OPh. *-an*, NPh. *-av*
(cf. PhL 67)

The development of the two remaining syllabic resonants is somewhat uncertain.

PGPh. **r* > OPh. *ro*

PPh. **mṛti-* 'death' > MPh. *μοῦτι-* (cf. PhL 69)

PGPh. **r* > OPh. *or* / *_#*

PGPh. **pr* > OPh. *por* (cf. PhL 69)

There are only two pieces of evidence for this development, and they both appear in an environment where *ʕ is preceded by a labial consonant.

This is relevant, since van Beek has proposed that the Epic dialect of Ancient Greek showed a conditioned reflex of Proto-Greek *ʕ, developing into -po- when followed by a labial and into -pα- elsewhere (van Beek 2021: 501-503). If the Phrygian syllabic rhotic developed in the same linguistic area, its reflex may well have been conditioned by the presence of a labial as well.

On the other hand, in the Aeolic dialect of Ancient Greek, Proto-Greek *ʕ developed unconditionally into -po- (van Beek 2021: 501-503). It is thus also possible that the Phrygian segment developed in the same linguistic area as Aeolic and shows an unconditioned reflex.

This is not to say that the development of Proto-Phrygian *ʕ must be a part of some wider areal phenomenon; the reflex may well be an independent development. The possibility is mentioned because of the geographic proximity of Phrygian to the two dialects at certain points in time.

Hopefully, an unambiguous example of a reflex of Proto-Phrygian *ʕ in a non-labial environment will be found and will serve to conclusively settle the question of what the unconditioned reflex of the segment was.

Unfortunately, no examples of a reflex of earlier *ʕ are known in Phrygian.

II.3.2.3 Development of the stops

The system of the Proto-Graeco-Phrygian stops underwent three major developments on its way to attested Phrygian: 1) the shift of the

“traditional” plain voiced stops into plain voiceless stops and the development of “traditional” voiced aspirated stops into plain voiced stops; 2) conditioned palatalization of inherited plain velars (from PIE palatovelars and PIE plain velars); and 3) delabialization of labiovelar stops.

II.3.2.3.1 Voiceless stops

PGPh. voiceless stops remained voiceless in Phrygian.

PGPh. **p* > OPh. *p*, NPh. *π*

PGPh. **patr-* ‘father (obl.)’ > OPh. *patr-* (in *patriyo-* < **patr-(i)jo-*), NPh. *πατρος* (gen.sg.) (cf. PhL 72)

PGPh. **t* > OPh. *t*, NPh. *τ*

PGPh. *to-* ‘(dem. pronoun, neut.)’ > OPh *to-* (in *tovo* ‘gen. sg.’), NPh. *το* (cf. PhL 72)

PGPh. **k* > OPh. *k*, NPh. *κ*¹³²

PGPh. **dik-* ‘to point (weak stem)’ > NPh. *τικ-* (cf. PhL 74)

PGPh. **kako-* ‘bad’ > OPh. *kako-* (in *kakuioi*), NPh. *κακο-* (PhL 265-266)

PGPh. **k^w* > OPh. *k*, NPh. *κ*

PGPh. **k^we* ‘and’ > OPh. *ke*, NPh. *κε* (cf. PhL 73)

¹³² Except under palatalizing conditions; see below in §II.3.2.3.4.

A special development of **p* between vowels has been proposed by Hämmig (2013: 135) and is endorsed by Obrador-Cursach (PhL 72).

possibly PPh. **p* > OPh. *v* / V_V

PIE **nepot-* ‘nephew, grandson’ > PGPh. **nepot-* > OPh. *nevos* (NSg), *neyotan* (ASg)?

The examples in favour of this development are somewhat problematic. If we take a look at a copy of the inscription where the two forms appear, the form *neyotan* clearly shows substantial damage to the letter read as *v*, and the reading of *v* is almost entirely conjectural. The form *nevos* appears clearer, but a reasonable argument can still be made that the word in question is not necessarily a reflex of **nepōts*, though that is certainly an appealing possibility. For this reason, this development is only listed provisionally for the time being.

II.3.2.3.2 Inherited plain voiced stops

Proto-Graeco-Phrygian stops that developed from the traditionally reconstructed plain voiced stops of PIE surfaced as Phrygian voiceless stops.¹³³ This development is commonly named the *Lautverschiebung*. Despite being proposed by Meister in 1909, comparatively early in Phrygian studies (see Woodhouse 2009 for an overview of the research on

¹³³ This is one argument in favour of reconstructing the plain voiced series as pre-glottalized voiced stops, in terms of VOT situated approximately halfway between modally voiced stops and voiceless stops, since they develop into plain voiced stops in Greek, and into voiceless stops in Phrygian.

Phrygian), this development was not generally accepted for a long time. In recent years, specifically after the publication of Lubotsky's paper (2004) which does endorse it, the consensus has shifted towards broader and broader acceptance, and the veracity of the *Lautverschiebung* is now the *communis opinio* in Phrygian studies.

The number of identified examples has steadily increased over the years.

PGPh. **d* > OPh. *t*, NPh. *τ*

PGPh. **ped*- 'foot' > OPh. *pet*-, NPh. *πετ*- (cf. Kloekhorst 2015: 115, PhL 71)

PGPh. **dik*- 'to point (weak stem)' > NPh. *τικ*- (cf. Lubotsky 2004: 235, PhL 71)

PGPh. **diu*- 'Ti- (weak stem)' > OPh. *tiv*-, NPh. *τι*- (cf. Lubotsky 2004: 229ff., PhL 71)

PGPh. **didō*- 'to give (present stem)' >> NPh. *τοτο*- (cf. PhL 72)

PGPh. **doti*- 'gift' > OPh. *toti*- (cf. Ligorio 2016, PhL 72)

PGPh. **g* > OPh. *k*, NPh. *κ*¹³⁴

PGPh. **mega*- 'big' > OPh. *mekā*-, NPh. *μεκα*- (cf. Obrador-Cursach 2016: 184, PhL 71-72)

¹³⁴ Except under palatalizing conditions; see below.

PGPh. **b^hegos* ‘a broken-off thing’ > NPh. βεκος ‘bread’ (cf. PhL 196)

PGPh. **g^w* > OPh. *k*, NPh. *κ*

PGPh. **hlāg^w*- ‘to grasp, seize’ > OPh. *lak*- (cf. PhL 74)

PGPh. **g^w(V)naik*- ‘woman (oblique)’ > OPh. *knayk*-, NPh. *κναικ*- (cf. PhL 74)

A possible example exists for PGPh. **b* (< PIE **b*), depending on whether the interpretation of *apel* meaning ‘fruit’ is adopted.¹³⁵

PGPh. **b* > OPh. *p*, NPh. *⁺π*

PGPh. **abel*- ‘apple’ > OPh. *apel*- ‘fruit?’

While discussing the matter of the *Lautverschiebung*, a far too commonly cited erroneous counter-example must be mentioned.

Lejeune (1979) provided *podas* as the pre-eminent example of a form that supposedly disproved the devoicing of inherited plain voiced stops, interpreting it as being identical to Greek πόδας ‘feet (acc.pl)’ < **podms*. The inscription in which this word appears is decorated with a prominent image of feet, so Lejeune’s interpretation has long been taken as a crucial piece of evidence that PIE **d* developed into Phrygian *d*. The reasoning Lejeune employed was consistent with what was known about Phrygian at the time of publication.

¹³⁵ See §III.3.7.

With our present knowledge, Lejeune's interpretation of *podas* is problematic, however, even entirely ignoring the issue of Phrygian *d*. We know that a vocalic nasal in Phrygian first developed into **an* and that **an* appearing before **s* in word final positions had the reflex *-ai-*. The actual development of a hypothetical **podms*, if we sidestep the *Lautverschiebung*, would have been: PIE **podms* > PPh. **podans* > OPh. ***podais*. Note that this is not a hypothetical development of the ending; there are other attested accusatives plural that show the ending *-ais* (cf. LL 1826). Lejeune's interpretation, then, cannot be correct by virtue of the ending *-as* alone, though at the time of Lejeune's analysis, this would not have been known.

podas as a counter-example to the *Lautverschiebung* is certainly untenable, then, and has been so since Lubotsky's work on the matter (2004). It is hoped that this work, alongside many other recent works on Phrygian, will play a part in finally laying this ghost form to rest.

As far as the depicted image of the feet decorating the inscription is concerned, Kloekhorst (2015) has re-analysed the inscription and come up with a solution more in line with the rest of the Phrygian data and the other evidence in favour of the *Lautverschiebung*: the word for 'feet' does appear, but it is not *podas*; rather, it is *petes* (nom.pl.) 'feet' < PIE **ped-es*. He has quite convincingly analysed the sequence *podas* as belonging to a verbal form *podaska[i]*, and this interpretation is wholly endorsed in this work.¹³⁶

¹³⁶ *podaskai* is best analysed as deriving from a preverb *po(C)* and an iterative verbal stem *daske/o-* (< PIE **d^heh₁-ske/o-*) in the subjunctive mood. See §V.3.1.4 for a full analysis.

II.3.2.3.3 Inherited voiced aspirated stops

The PGPh. voiced aspirated stops developed into plain voiced stops (cf. PhL 70-1).

PGPh. **b^h* > OPh. *b*, NPh. β

PGPh. **b^hrãter-* ‘brother’ > OPh. *brater-*, NPh. βρατερ- (cf. LL 1823)

PGPh. **b^heud^hos* ‘image’ > OPh. *bevdos* ‘statue’ (cf. PhL 71)

PGPh. **b^her-* ‘to bear’ > NPh. βερ- (cf. PhL 71)

PGPh. **d^h* > OPh. *d*, NPh. δ

PGPh. **d^hē-* ‘to put, place’ > OPh. *da-*, NPh. δα- (cf. PhL 71)

PGPh. **d^heho-* ‘god’ > OPh. *devo-*, NPh. δεο- (cf. PhL 73)

PGPh. **g^h* > OPh. ⁺*g*, NPh. γ¹³⁷

PGPh. **g^hrr̃-* ‘to anoint, smear’ > NPh. γρει- ‘to proscribe’ (cf. PhL 71)

PGPh. **g^harit-* ‘charity’ > NPh. γαριτ- ‘to curse, be devoted to’ (cf. LL 1823)

PGPh. **g^{hl}ōrejo-* ‘yellowish’ > MPh. γλουρεο- ‘golden’ (cf. LL 1823)

¹³⁷ Except under palatalizing conditions; see below.

PGPh. *g^{wh} > OPh. g, NPh. γ

PGPh. *d^hreg^{wh}- ‘to make fat, feed, bring up, take care for’ > NPh.

δρεγ-πο- ‘palatable’ (cf. PhL 73, 358)

II.3.2.3.4 Palatalization

The idea that some palatalizing processes took place in Phrygian is not new. Indeed, early on, Phrygian was considered to be a *satəm* language (Woodhouse 2009: 170-171). While this initial proposal was later generally rejected, in the more modern era of Phrygian studies, Brixhe (1982) proposed that the PIE plain velars and palatovelars (in our framework, both would have merged into PGPh. plain velars), but not labiovelars, were palatalized when appearing before front vowels. Brixhe’s proposal is fundamentally identical to the framework adopted in this work, as well as provisionally in Obrador-Cursach’s *The Phrygian Language* (PhL 73). Curiously, however, despite there never appearing a proper refutation of Brixhe’s work from 1982, the idea seems to have never been properly explored and even Brixhe himself seems to have later treated his proposed sound law as more of a tendency rather than as an actual regular development. Even Obrador-Cursach, while generally endorsing the idea of this development, is not fully committed to it (cf. PhL 36-37, or his treatment of *kena* (PhL 270)).

Let us now revisit the evidence that suggests a palatalizing process took place in Phrygian.

Most crucially, the assumption of this development hinges on the distribution of the Old Phrygian grapheme <↑> and the New Phrygian

grapheme <ζ>. Both of these comparatively rare graphemes appear practically exclusively before front vowels.¹³⁸ Also, there can be no doubt that the New Phrygian grapheme <ζ> represents a voiced sibilant [z(:)], as it did in Koiné Greek during the time when New Phrygian inscriptions were written (Allen 1968: 55-56).

The only two New Phrygian lexemes with <ζ> from inscriptions are ζεμελο- and ζειρ-. The etymology of the first has been known to be **d^hǵ^hemelo-* ‘earthling, man’ for a long time (LL 1820). A commonly proposed etymology connects ζειρα with Greek χείρ ‘hand’ < PIE **ǵ^hesr-* (Neumann 1997: 25; Hämmig 2013: 150). This meaning seems to be quite firmly established when taking into account Kloekhorst (2015: 117): if *petes* does mean ‘feet’, a phrase in inscription °12^S can now be naturally read as ζειρα κε οι πετες κε τιττετικμενα ‘hands and feet (may become) condemned’ (cf. PhL 331).

Ligorio and Lubotsky (LL 1824) propose that the initial ζ- in ζεμελο- is due to special development of a dental-velar cluster. Since we now have etymologies for two examples of New Phrygian ζ- and one of them derives from PIE **ǵ^he-*, there is no reason to assume that ζ must have developed from a dental-velar cluster. Rather, it is preferable to assume that a reduction of the cluster into simply PPh. **g* took place.¹³⁹ Both instances of ζ can now be derived from the same sequence of segments.

¹³⁸ The one example going against this distribution is the form *a↑ses* (cf. the clearly related *a↑ion*, *a↑ios*, *a↑iai*) If, as seems likely based on the analysis in §II.1.1.2, <↑> was at least initially used to represent /dz/, the use of <s> immediately following it can perhaps be seen as an attempt at writing a voiceless affricate [ts]. Most likely, then, this is a proper noun of a non-native origin.

¹³⁹ For an analysis of the treatment of original dental-velar clusters, see §II.3.1.1.2.

Since both the reconstructed onset (**ǵ^h*) and the attested onset are voiced, the only conclusion to be drawn is that the sound ultimately represented by NPh. <ζ> [z] remained voiced throughout the history of Phrygian and did not pass through an intermediate voiceless stage (*contra* Brixhe 1982: 210ff.).

Neumann (1997: 25) already connected New Phrygian ζειρα with ↑*iray* from the Vezirhan inscription. The vocalism is not problematic; we propose in this work that the Old Phrygian phoneme *ē* was commonly written with floating <e> and <i> in Old Phrygian, whereas its reflex was commonly written as <ει> in New Phrygian (§II.2.3.1.2).

This identification of ↑*ira* with ζειρα serves as a good example that the Old Phrygian phoneme represented by <↑> developed into a phoneme represented by New Phrygian <ζ>. That <↑> and <ζ> were used to represent the same phonemic lineage is, in any way, strongly suggested by the fact that there does not seem to be any other possible reflex of <↑>, which must have represented its own phoneme, other than <ζ>, which likewise represented its own phoneme.

Another example of this development can be found listed as a gloss (Hesychius): ζευμαν . τὴν πηγὴν . Φρύγες. ‘a spring. Phrygian’. Brixhe (1982: 244) has already suggested that ζευμαν is cognate with Greek χεῦμα ‘that which is poured’, with both being regular reflexes of an earlier **ǵ^heu-mṇ* (a neuter nominal formation from the PIE root **ǵ^heu-* ‘to pour’). There is no reason to dispute this analysis.

Another possible example listed as a gloss (Photius) is ζετνα . φρύγιος ἡ λέξις . σημαίνει δὲ τὴν πύλην. ‘Phrygian word. Means the door.’ This word has been connected to the PIE root **ǵ^hed-* ‘to close, shut’ (whence, for

instance, Old English *geat* ‘gate’) (Brixhe 1982: 244). The word ζετνα would then regularly develop from **g^hed-no-* ‘a closing’, and its plural inflection would presumably be due to referring to the two wings of a door.¹⁴⁰

If we assume that an original voiced aspirated palatovelar before a front vowel was palatalized (as appears to be indicated by ζεμελο- and ↑*ira-*/ζειρα-), the question is naturally what happened to Proto-Phrygian voiceless velar stops (which would have been the reflexes of PIE voiceless and plain voiced palatovelars and plain velars) in this environment.

There does not appear to be a readily identifiable voiceless counterpart to <ζ> and <↑>. The arrow sign has an unclear origin and might be a Phrygian invention. The Phoenician alphabet had a separate sign for the sound [z], which was adapted by the Greeks as their zeta, but it cannot be the source of the Phrygian arrow sign.

If the final stage of palatalization of a voiced stop was [z(:)] (as can be reasonably inferred from the spellings with ζ), the expected final stage for voiceless stops would have been [s(:)].

¹⁴⁰ In addition to their unreliability, the other glosses with <ζ> are not nearly as informative (cf. Brixhe 1982: 243ff.). The etymology of αζην ‘beard’ (Hesychius) is unclear. In ζελκια ‘vegetables, greens’ (Hesychius), we can likely find the reflex of the PIE root **g^helh₃-* ‘yellow, green’ (also found in zero grade in MPh. γλουρρο- ‘made of gold’ < **g^hlh₃reio-*) (see also Brixhe 1982: 243-4), which would confirm the conditioned reflex of **g^h* before a front vowel. See further in §III.3.3.3.

The primary and, so far, only example of a voiceless velar that underwent palatalisation is in the proximal demonstrative pronoun:^{141, 142}

PIE **ke* ‘here’ >> PGPh. **ke/i-* ‘(dem. pronoun)’ > OPh. *si*, NPh. *σε*- (cf. PhL 73)

While the reflexes of PGPh. **k* and **g* seem to have surfaced as /s/ in Old Phrygian and beyond, what would have been the precise phonetic value of OPh. <↑> and NPh. <ζ>?

Occasionally, initial <ζ> makes position in New Phrygian inscriptions,¹⁴³ which is not the case for the <σ> found in the pronoun *se/i-*. This indicates

¹⁴¹ Ligorio and Lubotsky (LL 1824) have assumed that the attested *s-* of the proximal demonstrative pronoun is the reflex of a cluster **k̥i-*. This analysis is unlikely to be correct for compositional reasons, for which see §IV.3.1. If our analysis of the vocalic developments conditioned by the Phrygian accent are correct (for which see §II.3.4.), there also exists a possible formal counterargument against deriving the initial *s* of the *si/e-* pronoun from **k̥i-*. The form *esai* (dat. sg. fem.) shows the *e*-prefixed stem variant of the demonstrative pronoun. As we may suspect on the basis of the pronouns *ibe-* and *ivi-*, this initial *e* was unaccented, and unaccented *e* before an original consonant cluster is raised to *i*, which is what we find in *ibe-* < **esb^hé-* and *ivi-* < **ehwé-*. Thus, if the initial *s-* for the demonstrative pronoun were derived from **k̥i-*, we would expect its *e*-prefixed stem to surface as ***isi/e-* < ***ek̥ji/é-*, which is contradicted by *esai*. Of course, however, if **k̥i-* developed into **s* early enough, the development would not apply and the argument is not valid.

¹⁴² In light of Ligorio and Lubotsky’s interpretation, Alwin Kloekhorst wondered during a talk on the Phrygian palatalization I gave in Leiden (in July 2020) whether the palatalization of velars could have been limited to the original voiced aspirated series. Against this proposal, consider the arguments in the preceding footnote. Nevertheless, the idea cannot be fully dismissed out of hand. Should one firmly endorse the **k̥i-* interpretation, Kloekhorst’s idea would be theoretically tenable, if requiring some difficult analogical remodelings along the way to produce the attested forms. In any case, it seems more systemically likely that palatalization would not be limited to a single segment of Proto-Phrygian.

¹⁴³ E.g., με ζεμελως κε δεως κε ‘among men and gods’ °3^W, °6^W, °97^{W+}, °113^W, °119^W with minor differences in spelling, metrically -UU-UU-U (Lubotsky 1998: 417). Note especially the addition of sigma in με σζεμελως κε δυος κε °113^W and με σζεμελως κε τε κε °131^C.

a later simplification of the voiced segment as opposed to its voiceless counterpart.

<↑> was initially most likely adopted as a means of writing the segment /dz/.¹⁴⁴ Its reflex by at least the time of the composition of the New Phrygian malediction formula was still metrically long, but it is unlikely that New Phrygian <ζ> would have still been used to write /dz/. Not only was the value of <ζ> in contemporary Greek /z/ and /z:/, there is a spelling variant of ζεμελως that clearly show the initial element in the sound underlying NPh. <ζ> was not an affricate: σζεμελως °113^W, °131^C. For this reason, the best option is to assume that an older /dz/ developed into /z:/, and later, presumably, into /z/.

We may thus formulate the following sound laws:

PGPh. *g^h > PPh. *dz / _V[+front] > OPh. /dz/ <↑> > NPh. /z:/ > ?LNPh. /z/

PGPh. *k, g / _V[+front] > PPh. *(t)s > OPh. /s/ <s> > NPh. /s/ <σ/ ^{145, 146}

Assibilative palatalization producing a system with a voiced affricate, but without a corresponding voiceless affricate, and this state of affairs remaining preserved for some amount of time is not unprecedented: the unconditioned reflexes of the palatovelars in both Armenian and Sanskrit show a sibilant for the voiceless series and an affricate for the voiced series,

¹⁴⁴ See §II.1.1.2.

¹⁴⁵ There is no known example of this development affecting PGPh. *g, but since it merged with PGPh. *k in other environments, we can reasonably assume the same would hold here. See also §II.3.2.3.4.

¹⁴⁶ Do note that the development of the voiceless stop into s is only securely known in word-initial position. It may well be that an affricate or geminate reflex would have been preserved longer when word-internal.

which undoubtedly emerged from an intermediate stage with affricates alone. This lack of symmetry in the system was resolved in these two languages by introducing a new voiceless affricate of a different origin. In Phrygian, the system was eventually realigned through the reduction of the voiced affricate to a sibilant.

The developments proposed for Phrygian explain the use of <↑> and <ζ> well and are typologically sound. Nevertheless, a number of apparent counterexamples exist that serve to explain why Brixhe's (1982) proposal of a conditioned palatalization has not been more enthusiastically accepted.

The first major class of exceptions are found when the reflex of PIE **k̑/g̑/g̑ʰ* is found before the thematic vowel **e*: e.g. **segʰ-e-* > *ege-* 'to hold', instead of ***e↑e-*. This set is easy to explain: the thematic vowel appears as both **e* and **o* in different forms, meaning that a velar appearing in forms with **e* would have been palatalised, whereas a velar appearing in forms with **o* would not have been. This would result in a paradigm with a consonantal alternation in the stem. Such an alternating stem would be levelled in favour of one of its two allomorphs; in Phrygian, the preferred variant was apparently the unpalatalized one (cf. Brixhe 1982: 245).

This pattern of development need not only apply to thematic verbal formations. Most likely, the majority of intraparadigmatic consonant alternations resulting from vocalic alternations would have been levelled out of the system in favour of an unpalatalized allomorph.

For one among many parallels of such a development, we need only look at Greek. In some Greek dialects, the labiovelars were palatalised before a front vowel. This likewise produced paradigmatic consonantal alternations which were levelled out in favour of the non-palatalised stem variant. An

example: PG 1sg **leik^w-ō* ~ 3sg **leik^w-ei* > pre-Attic-Ionic 1sg **λείπω* ~ 3sg **λείτει* >> Attic 1sg *λείπω* ‘to leave (1sg)’ ~ 3sg *λείτει* ‘to leave (3sg)’.

The second major class of exceptions is found in the reduplicated syllable of perfect verbal stems. As a general rule, a Phrygian verbal root formed its perfect stem by adding a reduplicated syllable composed of the first consonant of a verbal root and the vowel *e*: **C₁C₂- >> C₁e-C₁C₂-*. If a verbal root began with a velar consonant, then, we would expect it to become palatalised in this environment. As we may observe, however, the creation of the perfect stem through reduplication was highly productive in Phrygian (§V.3.3) and it is very likely that reduplication would have been renewed to keep the *C₁e-C₁C₂-* pattern transparent to the speakers. This is clearly supported by the existence of the perfect medial participle *σεσταμενο-*, where the initial syllable must have been a secondary creation from after **s* > **h* had run its course; if it were not, it would have surfaced as ***εσταμενο-*. The same explanation applies for the perfect stems *γεγαριτ-* ‘to curse’ (< **ǵ^{hr}Hit-*), *γεγρει-* ‘to write’ (< **ǵ^{hr}riH-*), and any other potential similar examples.

The third class of exceptions to the palatalisation rule is eclectic and based on individual etymological proposals. These need to be considered on a case-by-case basis.

One such potential counterexample is *keneman* ‘niche’, where the initial *kene-* is assumed to be related to Skt. *khanⁱ-* ‘to dig’ and ultimately derived from a PIE **K(h₁)enh₁-* (cf. LIV₂ 344). While the pre-history of the root underlying the Sanskrit term is complex,¹⁴⁷ there is actually no basis in

¹⁴⁷ With an original aoristic root **k^(w)eH-* forming a nasal present, from which a neo-root **k^(w)enH-* was ultimately extracted, with the original zero-grade of the root aorist **k^(w)H-*

favour of assuming that the root was $*k'(h_1)enH-$ rather than $*k^w(h_1)enH-$. Indeed, the lack of palatalization in Sanskrit suggests the latter variant more strongly. As such, there is no good reason to consider *keneman* an actual counterexample even if this etymological relation is wholly accepted; PIE $*k^w(h_1)enh_1-mn$ would develop entirely regularly into OPh. *keneman*.¹⁴⁸

The best available counterexample against palatalization is NPh. $\kappa\epsilon\nu\alpha$ (nom. pl.), usually taken to be an *s*-stem nominal directly inherited from PIE $*g\acute{e}nh_1-os$ ‘generation, offspring’ (> Gr. $\gamma\acute{\epsilon}νο\varsigma, -ου\varsigma$ ‘id.’) (cf. PhL 71). Assuming such a meaning for the Phrygian term is plausible, but by no means guaranteed, in one of the contexts where it is found, specifically in the apodosis of a curse formula: $(\alpha\varsigma \alpha\nu\alpha\nu\kappa\alpha\iota) \pi\alpha\nu\tau\alpha \kappa\epsilon\nu\alpha \iota\nu\nu\upsilon \circ 35^E$ ‘may all *kena* become’.¹⁴⁹ Lubotsky (2004: 234) translates $\alpha\varsigma \alpha\nu\alpha\nu\kappa\alpha\iota$ as ‘to mischief’, though other translations are clearly possible and $\alpha\varsigma \alpha\nu\alpha\nu\kappa\alpha\iota$ need not belong to the apodosis at all, which complicates this analysis further; we could read the protasis as $\iota\omicron\varsigma \dots \alpha\delta\delta\alpha\kappa\epsilon\mu \mu\alpha\nu\kappa\alpha\iota \underline{\alpha\varsigma \alpha\nu\alpha\nu\kappa\alpha\iota}$ ‘whosoever should do harm to the stele by force’ (since Greek $\alpha\gamma\acute{\alpha}\gamma\kappa\eta$, whence Phr. $\alpha\nu\alpha\nu\kappa\alpha$ was loaned, also means ‘force’).¹⁵⁰ As another possibility, one could also take *kena* to be an adjective and translate the apodosis as $\pi\alpha\nu\tau\alpha \kappa\epsilon\nu\alpha \iota\nu\nu\upsilon$ ‘may everything become *kena*’, in which case an etymological connection of *kena* with $*g\acute{e}nh_1-$ would not be warranted at all. This was the assumption made by Haas (1966: 119) and Orel (1997:

> kh providing the initial aspiration (LIV₂ 344). Note that LIV₂ reconstructs the root as having $*h_2$ to account for the aspiration in their framework. If this is correct, Phrygian *keneman* cannot, in any case, be related to it. For the reason of upholding this relation, the final laryngeal is reconstructed as $*h_1$ here.

¹⁴⁸ See also §III.3.6.1.

¹⁴⁹ The appearance of *kenos* as the only word on a pottery sherd is more enigmatic and does not lend itself well to analysis.

¹⁵⁰ Cf. $\iota\omicron\varsigma \dots \alpha\delta\delta\alpha\kappa\epsilon\tau \underline{\zeta\epsilon\iota\rho\alpha\iota}$, ... 106 ‘whosoever ... should do harm by hand’.

255) (cf. also Brixhe 1993: 341-342), who saw *kena* as a case form of an adjective meaning ‘empty’, loaned from Greek κενός ‘empty’.

Thus, while the possibility that *kena* is derived from **ḡenhi-* cannot be disproven, one must weigh the explanatory benefit of upholding an etymological connection of one word found in a somewhat ambiguous context against the explanatory benefit of assuming that a Phrygian palatalization took place, which regularly explains all the etymologizable appearances of <↑> and <ζ> and has no further counterexamples. Quite clearly, the assumption of Phrygian palatalization is preferable by far.

II.3.2.3.5 Iotation

It is unknown how clusters of a stop and PIE **j* developed in Phrygian. In Greek, such clusters underwent special and complex developments (Brixhe 1982, Rix 1992: 92, Viredaz 1993), and it is possible that some types of **Cj* clusters underwent specific developments resulting in palatalised sounds (or affricates) in Proto-Graeco-Phrygian already. Alternatively, the developments found in Greek may well be entirely Proto-Greek and later.

Unfortunately, even if a Phrygian reflex of **Tj* or **Kj* could be securely identified, clusters of this type are so prone to a palatalising development we would still likely be unable to tell whether the Greek and the Phrygian reflexes shared some early common reflex.

Until an example can be identified, in any case, no judgement is possible on this topic.¹⁵¹

¹⁵¹ The initial sibilant of the demonstrative pronoun *si/e-* has been proposed to derive from a **kj-* cluster, i.e. **kji/e-* (LL 1826), but the assumption of a plain palatalization of **k* before a front vowel is the more elegant solution. See further in §IV.3.1.

II.3.2.3.6 Development of the resonants

The Proto-Graeco-Phrygian resonants **r*, **l*, **m*, and **n* remained unchanged in isolation.

PGPh. **r* > OPh. *r*, NPh. *ρ*

PGPh. **māter*- ‘mother (oblique)’ > OPh. *mater*-, NPh. *ματερ*- (cf. PhL 66)

PGPh. **l* > OPh. *l*, NPh. *λ*

PGPh. **-elo*- ‘(nominal suffix)’ > NPh. *-ελο*- (e.g. *ζεμελο*-) (cf. PhL 69)

PGPh. **m* > OPh. *m*, NPh. *μ*

PGPh. **mega*- ‘great, big’ > OPh. *mekā*-, NPh. *μεκα*- (cf. PhL 297-298)

PGPh. **n* > OPh. *n*, NPh. *ν*

PGPh. **neptih₂*- ‘niece, granddaughter’ > OPh. *niptiya*- (cf. PhL 311)

PGPh. **μ* > OPh. *ν*, NPh. *ου*

PGPh. **-eμo*- ‘(adjective-forming suffix)’ > OPh. *-evo*- (e.g. *ktevo*- < **g^hd-eμo*-) (§III.3.1.5)

PGPh. **j* > OPh. *j*, NPh. *ι*

PGPh. **-ejo-* ‘(nominal suffix)’ > OPh. *-eyo-* (e.g. *k↑ianaveyo-*),
NPh. *-ειο-* (e.g. *τεμρογειο-*) (§III.3.1.4)

Where a sequence of two vowels emerged for any reason, e.g. due to regular phonetic developments or through morphological processes, if either of the two vowels was rounded, an epenthetic *v* developed as a hiatus filler.

PPh. **∅* > OPh. *v* / *V*_[+round] *V*, *V* *V*_[+round]

PGPh. **-oho* ‘(gen. sg. *o*-stem ending)’ > PPh. **-o.o* > OPh. *-ovo*,
NPh. *-ov* (cf. PhL 68, LL 1822)

PGPh. **d^heho-* ‘god, divinity’ > PPh. **de.o-* > OPh. *devo-*, NPh. *δεο-* (cf. PhL 68, LL 1822)

PPh. *∅* > OPh. *∅* / *V*_[-round] *V*_[-round]

PPh. **edāes* ‘he put (aor.)’ > OPh. *edaes*, NPh. *εδαες*

II.3.2.3.7 Development of the fricatives

The Proto-Graeco-Phrygian fricative **h* was lost in all positions.¹⁵²

PGPh. **h* > PPh. *∅* > OPh. *∅*, NPh. *∅*

PGPh. **heg^h-* ‘to hold’ > OPh. *eg-*, NPh. *εγ-* (cf. PhL 69)

¹⁵² Its presence did affect the development of **hR*-clusters, however, for which see the following section.

The Proto-Graeco-Phrygian fricative **s* appears to have been preserved everywhere, except in certain types of clusters.¹⁵³

PGPh. **s* > OPh. *s*, NPh. *σ*

PGPh. **-s-* ‘(aorist-forming suffix)’ > OPh. *-s-*, NPh. *-σ-* (cf. LL 1823, §V.3.2.1)

PGPh. **stā-* ‘to stand’ > OPh. *sta-*, NPh. *στα-* (cf. PhL 70)

The Late Proto-Phrygian phoneme **s* would have had three basic sources:
1) inherited PGPh. **s*, 2) palatalized PPh. **k*, and 3) the reflex of earlier **ts*.

LPPh. **s* < PGPh. **s*; EPPh. **k* / _V[+front]; EPPh. **ts*

PGPh. **-s-* > PGPh. **-s-* ‘(aorist-forming suffix)’ > OPh. *-s-*,
NPh. *-σ-* (cf. LL 1823)

EPPh. **ki/e-* ‘(demonstrative pronoun)’ > OPh. *si-* (strong stem),
NPh. *σε-* (oblique stem) (cf. PhL 344; §IV.3)

EPPh. **-it-s-* ‘(*s*-aorist stem of denominal verbs from nouns with the suffix **-it-*)’ > OPh. *-is-*, NPh. *-ισ-* (§III.3.10.1.1)

¹⁵³ These are the inherited **-sC^h-* clusters (§II.3.2.3.8) and word-final **-Cs* clusters (§II.3.2.3.10). Another possible environment where **s* might have been lost could have been in restored **sR*-clusters, but since none of these are known, this is currently purely speculative.

The PGPh. voiceless palatal fricative *ç, originating from earlier *s_i, *h_ii-, and *h_{ii}-, underwent voicing and developed into j.¹⁵⁴ An example is only known for word-initial position.

PGPh. *ç > PPh. *j > OPh. y, NPh. ι

PGPh. *ç- ‘(relative pronoun)’ > OPh. yo-, NPh. io- (Bozzzone 2013: 6)

II.3.2.3.8 Treatment of clusters

Proto-Graeco-Phrygian non-final clusters composed of two stops, those composed of a resonant and a stop, and those composed of a non-dental stop and *s were apparently not simplified. Stops appearing in clusters underwent the *Lautverschiebung* and the resulting clusters were uniform in terms of voicing, assimilating to the final element.

Very few verbal roots, and even fewer lexemes, are attested in both Old and New Phrygian. As such, there are only a handful of cases where an Old Phrygian cluster can be explicitly shown to correspond to a New Phrygian cluster.¹⁵⁵ There is no evidence to suggest that any Old Phrygian cluster would have undergone a special development.

The PGPh. cluster *ts was presumably simplified at a very early stage of Proto-Phrygian.¹⁵⁶ The simplification of this cluster likely remained a productive surface filter throughout attested Phrygian history.

¹⁵⁴ Note that no example of a reflex of word-initial PGPh. *ç- is known in Phrygian.

¹⁵⁵ One tantalizing example that also demonstrates the principle of voicing assimilation is the treatment of the PIE root *g^hed- in zero-grade: OPh. *ektetoy*, NPh. *εκτε-*.

¹⁵⁶ In word-final position, an earlier *-ts had simplified into *-s in Proto-Graeco-Phrygian already.

PGPh. **-ts-* > OPh. *s*, NPh. *σ*

EPPh. **-it-s-* ‘(*s*-aorist stem of denominal verbs from nouns with the suffix **-it-*) > OPh. *-is-*, NPh. *-ισ-* (§III.3.10.1.1), cf. Gr. *-ισ-* aorists to *-ιζω* verbs

At least in word-final position, but possibly intervocalically as well, the PPh. cluster **-ns*, originating from PGPh. **-ns* and **-nts*, underwent a special development.

pre-PGPh. **-ns*, **-nts* > PGPh. **-ns* > EPPh. **-ns* > OPh. *-js*, NPh. *-ις* (cf. PhL 67-68)

PGPh. **-ns* ‘(acc. pl. consonant stem ending)’ > EPPh. **-ans* > LPPh. **-ais* > OPh. *-ais*, NPh. *-αις* (cf. PhL 67-68)

pre-PGPh. **-unt-s* ‘nom. sg.’ > PGPh. **-uns* > PPh. **-vans* > OPh. *-vais* (cf. PhL 83-84)

This development is highly specific and is also attested in Lesbian Greek (cf. Aeolic *παῖς* and Attic-Ionic *παῖς* ‘all’, both from PGr. **pans*) (Rix 1992: 67). Since the Proto-Phrygians would have migrated from the Balkans to Phrygia proper through areas that would have, at the time, been close to those populated by non-Ionic Greek speakers, it is very likely that the development of the **ns* cluster is an areal phenomenon.

The PGPh. cluster **nt* underwent assimilation and developed into a geminated nasal. In word-final position, **-t* was dropped. For more details, see section §II.3.2.3.9.

PGPh. **nt* > OPh. <*n*>, NPh. *vv*

PGPh. **-nti* ‘(3pl act. primary ending)’ > NPh. *-vvt* (cf. Avram 2015: 209, PhL 158)

PGPh. **-ntō* ‘(3pl act. impv. ending)’ > NPh. *-vvov* (cf. PhL 68)

PIE **nt* > PGPh. **n* > OPh. *n*, NPh. *v* / *_#*

PIE **-ent* ‘(3pl act. secondary ending)’ > PGPh. **-en* > NPh. *-εv* (LL 1821)

The PGPh. semi-vowel cluster **hw*, originating from earlier **sɥ*, dropped the **h*. There is no evidence that the resulting segment would have differed from the reflexes of PGPh. **ɥ* > *ɥ* in any way. An example is only known for word-initial position.

PGPh. **hw* > PPh. **w* > OPh. *v*, NPh. *ov*

PGPh. **hwe* ‘self’ > OPh. *ve-*, NPh. *oε-* (cf. PhL 68-70)

The simplification of **hw* must have been later than the reduction of unaccented **e* in closed syllables:

PGPh. **e*_[-accent] > PPh. **i* / *_C\$* MUST PRECEDE PGPh. **hw* > PPh. **w*

PPh. **e=hwé-* > PPh. **ihwé-* > OPh. *ivi-* (§II.3.4)

In word-internal position, the clusters **hr* and **hm* were simplified into **r* and **m*, respectively, and caused compensatory lengthening of the preceding vowel. It is likely that the same would have happened to PGPh. **hl* and **hn* as well.

PGPh. **Vhr-* > OPh. *Ṽr-*, NPh. *Vp-*

PGPh. **g^hesr-* > PPh. **dzēṛā-* > OPh. *↑ira-*, NPh. *ζεῖρα-* (§III.3.5)

PGPh. **-Vhm-* > PPh. **-Ṽm-* > NPh. *-Vμ-* (cf. Lejeune 1969b: 296; cf. PhL 70)

PGPh. **ehmo-* ‘(demonstrative pronoun, oblique stem)’ > OPh. *-imo-*, NPh. *-εμο-/ιμο-*¹⁵⁷

A voiced cluster composed of a sibilant and the reflex of the old voiced aspirated stop was simplified into the reflex of the stop only, without compensatory lengthening.

PGPh. **sD^h-* > PPh. **sC[+voice]* > OPh. *C[+voice]*, NPh. *C[+voice]*

PGPh. **-esd^hō* ‘(3sg impv. mid. ending)’ > OPh. *-edo*, NPh. *-εδου*
(cf. Lubotsky 1993: 130, LL 1823, PhL 70)

This development must be posterior to the reduction of unaccented **e* in closed syllables.

PGPh. **e_[-accent]* > PPh. **i / _C\$* MUST PRECEDE THE CLUSTER REDUCTION OF PGPh.
**sC^h* > PPh. **C[+voice]*

EPPh. **e=sb^hé-* ‘(reflexive pronoun)’ > OPh. *ibe-* (§II.3.4)

The Proto-Phrygian cluster **ks* in word-internal position underwent a special development into a sound represented by the grapheme <Ψ>, its

¹⁵⁷ See also §II.3.4.

most likely value being [ʃ] (§II.1.1.4). As already noted above (§II.3.1.2.1), a word-final **-ks* lost its final segment.¹⁵⁸

PPh. **ks* > OPh. <Ψ> [ʃ]

PPh. **deg-sī-ti* ‘may he burn?’ > OPh. *deΨeti* [deʃēti] ‘id.’

PPh. **ks* > OPh. *k* / _#

PPh. **uānaks* ‘king (nom. sg.)’ > OPh. *vanak* ‘id.’

II.3.2.3.9 Sequences of nasal and dental

The Proto-Graeco-Phrygian cluster **nt* shows a regular development. In New Phrygian, the PGPh. 3pl active imperative ending surfaces with a spelt geminated consonant consistently: PGPh. **-ntō* > -vvov (cf. PhL 68, LL 1822). In inscription °130^{NW}, the 3pl active primary athematic ending **-nti* likewise surfaces as -vvi.

In the Middle Phrygian inscription °W-11, Obrador-Cursach (2020: 42ff.) has argued that the sequence πεννιτι is a verbal form derived from the reflex of the PIE root **pent-* > πενν-.¹⁵⁹

Thus, we may explicitly say that PGPh. **nt* developed into a geminate nasal at least in Middle and New Phrygian and had a reflex different from inherited **n*, which was consistently spelt a <v>:

PIE **nt* > MPh., NPh. <vv> /n:/

¹⁵⁸ To explain the development of the preverb ις < *iʃ, if from **eks*, we may note that the **ks* cluster would not have been word-final due to being part of a preverb. The same would hold for the preposition ις. See also §II.2.3.2.1 and §VI.1.4.

¹⁵⁹ For an analysis of this form, see further in §V.3.5.

As already noted before, Old Phrygian did not graphically distinguish consonantal gemination: since PGPh. **nt* > NPh. <vv> and PGPh. **n* > NPh. <v>, a possible approach is to assume that the development of PGPh. **nt* > Phr. /n:/ took place in Old Phrygian already.

Unfortunately, since no certain explicit reflexes of an earlier **-nt* are known in Old Phrygian, we may only confirm this assumption through proxies.

The primary example suggesting the chronological development of PPh. **-nt* > /n:/ is the treatment of the lexeme *panta-/παντα-* ‘all’ (cf. LL 1822, PhL 326-327).

Clearly, inherited **nt*-clusters developed into vv /n:/ by New Phrygian. If we wish to explain New Phrygian *παντα-*, then, we can only assume that this specific cluster *vt* postdates the **nt* > *n*: sound law. *παντα-* does, of course, have a comparandum in Greek *παντ-* ‘all’ (PhL 44); as such, New Phrygian *παντο-* must have been loaned from Greek *παντο-* once the **nt* > *n*: sound law had stopped being operational.

The existence of an Old Phrygian *panto-* °B-05 clearly shows that the **nt* cluster was likewise no longer being phonologically adapted to /n:/ when the term was first attested. Thus, we can firmly determine that a **nt* > /n:/ sound law had been operational before the term *pant-* was loaned from Greek, at the latest at the time when inscription °B-05 was written. The non-assimilation of the nasal-dental sequence in this inscription also appears to be confirmed by *sin t’* and *sin ti* which would have been sequences of clitics and thus more likely to undergo cluster assimilation.

Names in *-evais* provide a possible argument that the development of PPh. **nt* > /n:/ preceded the Old Phrygian era in general. Etymologically, these names are derived with the use of the suffix **-unt-* > PPh. **-vant-* (cf. LL 1822, PhL 83-84). The nominative singular would have regularly

developed as PGPh. **-e-unt-s* (with simplification of **ts > *s*) > PPh. **-e-van-s > -evais*. The oblique cases would have regularly developed as follows (the genitive is used as a model for the non-nominative cases): PPh. GSg **-e-vant-os > *-evann-os > OPh. <-evanos> /-evan:os/*. Since Old Phrygian does not graphically distinguish gemination, the segment /n:/ would have been spelt simply as <n>.

Unfortunately, the argument is not conclusive. With NSg **-e-van-s ~ GSg *-e-vant-os*, the stem **-e-van-* of the nominative singular could have easily spread to the oblique cases: **-e-van-s ~ *-e-van-os*. In this case, the Old Phrygian spelling with <n> would simply reflect the single nasal of the oblique cases: OPh. <-evanos> /-evanos/. Unless a form of this suffix with an explicitly written geminate is found, the status of the nasal in names in *-evais* will remain uncertain.

Nevertheless, in more practical terms, the development **-nt > /n:/* must have taken place at the very latest at some point during the Old Phrygian era, and quite likely at a time before Phrygian was attested as a written language. This is at least slightly supported by the fact that Old Phrygian inscriptions include almost no examples of a written sequence <nt>.¹⁶⁰

¹⁶⁰ A written <nt> appears in: *bat(o)ante* °B-04 and *eventnoktoy* °B-06. The meaning of these two words is unknown and it is quite possible that a word boundary exists between <n> and <t>. In *bat(o)ante*, *bat(o)an* may be the name of the god Bas in the accusative case (attested in New Phrygian as βαταν), which would mean a word boundary precedes *te* (Lubotsky 1989b: 149). In *eventnoktoy*, the simplest solution is to parse the sequence as being composed of three words: *even t(V) noktoy* (cf. PhL 222-223).

II.3.2.3.10 Word final clusters

The only word-final clusters permitted by Old Phrygian are composed of a semi-vowel and a sibilant. Every other word-final cluster was simplified in some manner.

Word-final clusters of almost every type simplified in favour of the first consonant in the cluster (cf. LL 1821):

PPh. $*-C_1C_2...C\# > \text{OPh. } -C_1$

PPh. $*\text{vanaks}$ ‘king’ > OPh. *vanak* (PhL 70)

The only exception to this rule were word-final sequences composed of a semi-vowel and a continuant, i.e. $*s$ or a resonant.

PPh. $*-VYC[+\text{continuant}]\# > \text{OPh. } -VYC[+\text{continuant}]$

EPPh. $*-\text{ans}$ ‘(acc. pl. consonant stem ending)’ > LPPh. $*-\text{ais}$ >

OPh. *-ais*, NPh. *-αις* (cf. LL 1820, PhL 67-68)

II.3.2.3.11 Gemination

As we have already noted, Old Phrygian did not graphically distinguish gemination (§II.1.2.2). Nevertheless, there are instances of gemination in New Phrygian which must reflect pre-Old Phrygian developments. At least two phonemes must have allowed phonemic gemination in Old Phrygian, even if it was graphically unmarked.

The first Old Phrygian phoneme that could have been geminated was /n/. This development has already been described in section §II.2.3.2.2 and particularly in §II.3.2.3.9.

PGPh. **nt* > PPh. **nn* > OPh. <*n*>, NPh. <*vv*>

The second segment that would have permitted gemination in Old Phrygian already was /s/. When /s/ was geminated, it was retracted into /ʃ/, a sound spelt with <Ψ>.¹⁶¹ The geminate sibilant most likely emerged as the result of mora-reassignment in a sequence of a long vowel followed by a prevocalic *s*, i.e. $\bar{V}sV$.^{162, 163}

PPh. * $\bar{V}sV$ - > OPh. $V\bar{f}fV$ < $V\Psi V$ > > NPh. $V\sigma\sigma V$

The retraction of the sibilant is confirmed by the spelling of the Old Phrygian form *daΨet*, a sigmatic optative verbal form.¹⁶⁴

II.3.3 Developments from Old Phrygian to New Phrygian

II.3.3.1 Vowel developments

The vowel system was significantly simplified between attested Old and New Phrygian.

¹⁶¹ For which see section §II.1.1.4.

¹⁶² See §V.3.4.1 for the steps taken to arrive to this conclusion.

¹⁶³ This development has now also been independently proposed by Oreshko (2022: 158).

¹⁶⁴ See again §II.1.1.4.

The short vowels remained unchanged (cf. LL 1819), except around nasals.

OPh. *ǎ* > NPh. *α*

OPh. *mekǎ*- ‘great, big’ > NPh. *μεκα*-

OPh. *e* > NPh. *ε*

OPh. *petes* ‘feet (nom. pl.)’ > NPh. *πετες*

OPh. *i* > NPh. *ι*

OPh. *tivan* ‘Ti- (acc. sg.)’ > NPh. *τιαν*¹⁶⁵

OPh. *o* > NPh. *ο*

OPh. *yos* ‘(rel. pronoun, nom. sg.)’ > NPh. *ιος*

OPh. *u* > NPh. *ου*

PGPh. **upsod^hη* ‘up, above’ > OPh. *⁺upsodan* > NPh. *υσοδαν*,
ουσοδαν

The short diphthongs seem to have remained mostly unchanged (cf. LL 1819).

OPh. *ai* > NPh. *αι*

OPh. *ayni* ‘if’ > NPh. *αινι*

OPh. *oi* > NPh. *οι*

OPh. *-toy* ‘(3sg mid. primary ending)’ > NPh. *-τοι*

¹⁶⁵ The loss of /u/ after the Old Phrygian era is analogical. See §III.3.4.

OPh. *au* > NPh. *au*

OPh. *avto-* ‘(reflexive pronoun)’ > NPh. *αυτο-*

OPh. *eu* > NPh. *ευ*

no good example

There is no attestation of OPh. *ou*, so its reflex is unknown.

It is possible that OPh. *ai* lost its glide in word-final position (PhL 77). There is one inscription suggesting this development: in °12^S the phrase ζειρα κε οι πετεξ τιττετικμενα [...] αδειννου ‘his hands and feet condemned [...] may-become’ includes the words ζειρα and τιττετικμενα, the former assuredly of the feminine gender,¹⁶⁶ both in the nominative plural, suggesting that the expected Old Phrygian ending ⁺*-ai* developed into simply *-α*. This development is reminiscent of the common development *-āi* > *-α* in word-final position (*ibid.*).¹⁶⁷

OPh. ⁺*ai* > NPh. *α* / *_#*

OPh. *-ai* ‘(nom. pl. *a*-stem ending)’ > NPh. *-α* ‘id.’

Old Phrygian *ei* was initially preserved as such (cf. Lubotsky 1998: 414-415). In final position, /ei/ could be spelt with <ει>, <ε>, <ι>, or <η>; these spellings may reflect phonetic developments that took place during the New Phrygian era (*ibid.*, §II.2.3.1.2).

¹⁶⁶ As suggested by the DSg forms ζειραι °105^C and †*iray* °B-05. See further in §III.3.5.

¹⁶⁷ See also further below in this section.

OPh. *ey* > NPh. *ει*

OPh. *-ey* ‘(dat. sg. cons. stem)’ > NPh. */-ei/* <*ει*, *ε*, *ι*, *η*>

The spelling of a word-final diphthong *-ei* with <*ει*> is found predominantly in the Eastern part of the New Phrygian area, where other types of spellings scarcely appear (§II.3.3.3).

The system of the long vowels underwent significant changes that ultimately resulted in a system without distinctive vowel length (cf. LL 1819).¹⁶⁸

OPh. *ā* > NPh. *α*

OPh. *mātār* ‘mother’ > NPh. *ματαρ*

OPh. *ō* > NPh. *ου*

OPh. *-edō* ‘(3sg impv. mid. ending)’ > NPh. *-εδου*

OPh. *ū* > NPh. *ου*

PPh. **knūman-* ‘grave’ > NPh. *κνουμαν-*

The treatment of an OPh. word final *-āi* diphthong is inconsistent. By far the most common attested environment where the reflex of word-final *-āi* can be found is in the dative singular of *a*-stems. A common proposal (Brixhe 1982: 118, Lubotsky 1998: 416; LL 1819) is the following:

¹⁶⁸ The loss of vowel length is suggested by the fact that previously long vowels do not form heavy syllables in New Phrygian metrics. See further in §II.2.2.1.

pre-NPh. $\bar{a}i > {}^+ \bar{a} > \alpha / _ \#$

OPh. *sai* ‘dem. pron. (dat. sg.)’ > NPh. $\sigma\alpha$ ‘id.’

In general terms, this proposal seems to be correct for most examples. However, as the authors cited above note themselves, there is evidence that this development is somewhat irregular, with the reflex of $-\bar{a}i$ in the dative singular sometimes being $\langle\alpha i\rangle$: OPh. *sai* ‘dem. pron. (dat. sg.)’ > NPh. $\sigma\alpha i$ ‘id.’. The inscriptions in which this unexpected spelling αi appears, do, in most cases, also show the treatment $\bar{a}i > \alpha$ (the exception is inscription $^{\circ}35^E$, where all three instances of a reflex of $\bar{a}i$ are spelt with αi).

This irregular treatment of $-\bar{a}i$ can be found in the following identifiable instances: $\mu\alpha\nu\kappa\alpha i$ $^{\circ}2^W$, $\tau\alpha i$ $^{\circ}18^W$, $\xi\alpha\rho\nu\alpha i$ $^{\circ}18^W$, $\sigma\alpha i$ $^{\circ}35^E$, $\mu\alpha\nu\kappa\alpha i$ $^{\circ}35^E$, $\alpha\nu\alpha\nu\kappa\alpha i$ $^{\circ}35^E$, $\mu\alpha\nu\kappa\alpha i$ $^{\circ}60^E$, $\sigma\kappa\epsilon\lambda\epsilon\delta\rho\iota\alpha i$ $^{\circ}67^{SE}$, $\sigma\alpha i$ $^{\circ}69^{SE}$, $\mu\alpha\nu\kappa\alpha i$ $^{\circ}69^{SE}$, $\xi\epsilon i\rho\alpha i$ $^{\circ}106^E$, $\tau\alpha i$ $^{\circ}116^W$, $\sigma\epsilon\alpha\nu\tau\alpha i$ $^{\circ}116^W$.

The treatment of a final $-\bar{o}i$ diphthong is more consistent than that of $-\bar{a}i$. The synchronic dative singular ending of *o*-stems is usually written with $\langle\sigma\upsilon\rangle$ ¹⁶⁹, which is a reflex of Old Phrygian $\bar{o}i$.

The most parsimonious explanation is that pre-New Phrygian ${}^+ \bar{o}i$ developed to ${}^+ \bar{o}$ before phonemic vowel length was lost and that this ${}^+ \bar{o}$ subsequently developed into *u*, as expected.¹⁷⁰

pre-NPh. $\bar{o}i > {}^+ \bar{o} > \text{NPh. } /u/ \langle\sigma\upsilon\rangle / _ \#$

MPh. $\sigma\omicron\rho\omicron i$ ‘coffin (DSg)’ > NPh. $\sigma\omicron\rho\omicron\upsilon$ $^{\circ}124^C$

¹⁶⁹ *Contra* Brixhe (1982: 119), who assumes simplification to *o* and subsequent neutralization of *o* ~ *ov* in final position.

¹⁷⁰ Alternatively, $*\bar{o}i > u$ and $*\bar{o} > u$ could be simultaneous.

There is no good evidence that OPh. *-ōi* ever developed into *-oi* in a parallel manner to the peripheral *-āi* > *-ai*. The only such possible example is ξευνοι °31^s, a loaned personal name (otherwise attested as ξευνη in the nominative singular) with an entirely unexpected *o*-stem ending. It would be premature to draw any conclusions from this particular example.

What we may note, however, is that in Middle Phrygian inscription °W-11, the reflex of *-āi* was already written as <α>, whereas the reflex of *-ōi* was still written <οι>: this is clearly seen in the phrase σα σοροι ‘to this coffin’. The feminine noun σορος is loaned from Greek σορός (fem.). While it is possible that the Greek dative case form σορῷ was loaned already declined into Phrygian as σοροι for the purposes of this inscription and is as such uninformative for determining whether OPh. *-ōi* had already developed into ⁺*-ō*, if the spelling does represent a native declensional ending, it would suggest that the simplification of the two long diphthongs in word-final position did not take place simultaneously.

The long diphthong *-ōi* also had a special reflex when followed by word-final *-s* (as in the dative plural *o*-stem ending *-ōis*) (LL 1822):

PIE **-ōis* ‘(inst. pl. *o*-stem ending)’ > PPh. **-ōis* ‘(dat. pl. *o*-stem ending)’
> OPh. */-ōis/* <*ois*> > NPh. <ως> /-ɔ/

PPh. **dzemelōis* ‘earthling (DPl)’ > NPh. ζεμελως ‘man (DPl)’

In contemporary Greek, the grapheme <ω> was used to represent a long vowel /ō/, whereas <ο> was used for a short vowel /o/. In New Phrygian inscriptions, the spelling ζεμελος appears three times instead of the expected ζεμελως. The timbre of the vowel represented by <ω> must have then been *o*-like, with no apparent *i*-offglide. The consistent use of ω

suggests that the vowel represented by it was still somewhat distinct from the vowel represented by <ο>.

In a very limited number of instances, ω is also used before a word-final nasal in place of expected <ο> or <ου> < OPh. -ο / _n#. Since vowels before a final nasal were initially raised and later even centralised due to the spread of nasalization, the vowel represented by <ω> may have been somewhat higher than its counterpart written with <ο>. This would be parallel to the Phrygian distribution between <η> and <ε>, where, in contemporary Greek, the former was used to write a long mid-high front vowel [ē] and the latter a short mid front vowel [ε]. It is for this reason that the grapheme <ω> is taken as representing a raised vowel phoneme /ɔ̄/, which was phonetically presumably [ō̄].^{171, 172}

Before a nasal in final position, mid-vowels were raised to mid-high vowels (§II.2.3.1.3). This allophonic raising had been operational since the Old Phrygian era (§II.1.2.4).

PPh. *ο > OPh. ɔ > NPh. ɔ <ο, ου> / _n#

PPh. *ε > OPh. ɛ > NPh. ɛ <ε, ι> / _n#

There is evidence that mid(-high) vowels in such a position became nasalised (§II.2.3.1.3).

¹⁷¹ Since New Phrygian was unlikely to have contrastively distinguished vowel length, the phoneme /ɔ̄/ is not specified for length.

¹⁷² We may also note that as the diphthong *ōi* monophthongized, the offglide *-i* could have transferred its [+high] property to the preceding vowel and raised it.

PPh. **e* > NPh. [ẽ] / _*n*#, PPh. **o* > NPh. [õ] / _*n*#

pre-NPh. ⁺*daket m*- > **daket̃* *m*- > **dakem̃* *m*- > **dakẽ(m̃)* *m*- > NPh.

[dakẽ m] (spelt as αδδακεν με, αδδακεμ μανκαι, αδδακε μανκαι)

These nasal vowels may have been centralised for some speakers, possibly to the point of merging entirely (§II.2.3.1.3): consider the spellings κακιν, κακεν, and κακευν for usual κακο(υ)ν.

possibly NPh. [ẽ], [õ] > [ə]

This development is supported by the spellings of the Hesychian glosses. The glosses provided are usually given in the accusative case.¹⁷³ Nevertheless, the forms in which the glosses appear commonly end with -εν or -ην; e.g. αζεν ‘beard’, ζεμελεν ‘slave’, κυκλην ‘constellation *Ursa Minor*’, etc. This is extremely puzzling, since *e*-stem nouns are comparatively rare in Phrygian and in at least some cases the glosses cite a form that one would expect to belong to the *o*-stems; consider the gloss ζεμελεν and attested ζεμελο-, or the gloss κυκλην, which is either borrowed from or etymologically related to Greek κύκλο-. This suggests that the glosses were corrupted in some manner and the specific change we may observe can be given a systematic explanation if we assume centralization of final nasal vowels. A word-final /-on/ would have been heard as [-ə] and transcribed by speakers of Greek as <-εν> or <-ην>, the closest Greek approximation of a non-native sound.

¹⁷³ E.g. ζευμαν (nom./acc. sg. neut.). τὴν πηγὴν (acc. sg. fem.). ‘spring’ or γλourεα. χρύσεα. (both nom./acc. pl.) ‘golden objects’.

Between two nasal consonants, vowels may have been allophonically nasalised (§II.2.3.1.3):

PPh. *V > $\tilde{V}$ / N_N

Consider the spellings κνουμμανει °44^S, °53^{SE} and κνουνμανει °101^{SE} [knũmanei] for usual κνουμανει ‘grave (DSg)’, κνουμινος °5^W [knũmĩnos] for expected ⁺κνουμανος ‘id. (GSg)’, μακκα °94^S [māk:a] for usual μανκα ‘stele (DSg)’, and αινι μυρα °25^{SW} [ainĩ mura] with an otherwise unexplainable initial geminate.

II.3.3.2 The development of consonants

Old Phrygian word-final stops became unreleased in pausa and before a consonant (§II.2.3.2.1).

OPh. -C[+stop] > pre-NPh. *- $\bar{C}$ / _##, _#C

Unreleased stops assimilated to a following segment (§II.2.3.2.1). It is unclear whether the conditioning applies for all consonants or only some; evidence for this development exists for stops and nasals.

pre-NPh. *- $\bar{C}$ [+stop]#C₂ > C₂C₂

pre-NPh. **ad beret* > **a $\bar{d}$ beret* > NPh. αββερετ ‘would bring to’

pre-NPh. **tit gegaritmenos* > **ti $\bar{t}$ gegaritmenos* > NPh. τυγγεγαριτμενος ‘~ cursed’

pre-NPh. **addaket* *mankāi* > **addakē*⁷ *mankāi* > NPh. αδδακεμ
μανκαί ‘would do to the stele’

but: pre-NPh. **ad eitō* > NPh. αδειτου ‘may he become’

The phoneme underlying the assimilated stop was restored, either graphically or phonetically, to its pre-vocalic value in non-univerbated forms at times, presumably for reasons of morphological transparency. This is seen in the majority of spellings of the 3sg act. secondary ending -τ (e.g. (αδ)δακετ, (αβ)βερετ).

No other consonantal changes can be firmly established to have taken place between Old and New Phrygian.

II.3.3.3 Phrygian dialectology and Eastern New Phrygian

If one examines the spellings of New Phrygian inscriptions, some patterns begin to emerge regarding the spelling choices of the scribes that are likely indicative of phonetic characteristics of the language in specific areas.

Most clearly, a distribution may be observed for the spelling of the dative singular consonant stem ending /-ei/ (cf. §II.3.3.1). In the easternmost areas of the Phrygian speaking area (encompassing quadrants E and SE as defined in §I.2.1), of a total of 25 endings of the dative singular consonant stem ending, 19 are spelt with -ει (κνουμανει in °32^E, °33^E, °34^E, °45^{SE}, °47^E, °53^{SE}, °54^E, °55^E, °61^{SE}, °64^E, °75^E, °76^E, °77^E, °79^E, °101^{SE}, °105^E,

°106^E, °108^E, °110^E) and only 6 with <ε>, <ι>, or <η> (κνουμανε °57^E, °78^E, °100^E; κνουμανι °36^E; μροτιη °58^E; κνουμανη °114^{SE}).

In contrast, in the rest of the Phrygian speaking area (all quadrants besides E and SE), of a total of 50 attestations of the dative singular consonant stem ending, 21 are spelt with <ει> (κνουμανει in °3^W, °10^S, °14^{NW}, °18^W, °19^N, °20^C, °43^W, °44^S, °62^C, °87^W, °88^C, °92^W, °99^{NW}, °115^W, °118^W, °117^S, °122^C, °123^C, °131^C, °133^N; κολταμανει °18^W), and 29 are spelt with <ε>, <ι>, or <η> (κνουμανε °6^W, °25^S, °28^{SW}, °29^{SW}, °37^{SW}, °40^W, °63^C, °90^W, °93^{SW}, °95^{SW}, °97^{W+}, °102^S, °112^W, °119^W, °120^W, °126^W, °128^C; βρατερε °31^S; δουμε °48^{NW}; ματερε °129^W; κνουμανι °7^W, °12^S, °25^{SW}, °73^W, °86^W, °103^C, °127^{SW}; Ξευνη °15^{NW}; κορουμανη °130^{NW}).

The ratios between the spellings <ει> against <ε>, <ι>, and <η> are ~3:1 in the easternmost zone against ~2:3 elsewhere. If we look at the spellings in the western area alone (quadrants W, NW, SW), the spelling <ει> is comparatively even rarer, the ratio being 10:22 = ~1:2. Such a skewed distribution is unlikely to be the result of random chance. Rather, it suggests that monophthongization of the final diphthong /ei/ began in the western periphery of the Phrygian speaking area, where it is most commonly observed in the spelling, and only slowly radiated towards the east, where the majority of spellings indicate it had not yet taken place.

The spelling of the reflex of the OPh. diphthong *-āi* as <αι> may also be examined areally: it appears 8 times in the eastern zone (σαι °35^E, μανκαι °35^E, ανανκαι °35^E, μανκαι °60^E, σκελεδριαι °67^{SE}, σαι °69^{SE}, μανκαι °69^{SE}, ζειραι °106^E), and 5 times in the western part of the New Phrygian speaking area (μανκαι °2^W, ται °18^W, ξαρναι °18^W, ται °116^W, οεανται °116^W). Notable is its absence in the centrally located quadrants S and C, as well as the immediately adjacent quadrant SW. This may suggest that

the treatment of *-āi* as <αι> is a peripheral phenomenon (cf. §II.3.3.1). This would make the most sense if we assumed that the regular development *-āi* > *-ā* > <α> (quite possibly under the influence of Greek, which had lost its own long diphthongs in the same manner before the beginning of the common era) was an innovation of the most central areas where Phrygian was spoken that then radiated outward, with the periphery preserving *-āi* until much later.

If we consider the proposed relative chronology of New Phrygian inscriptions from §II.2.3.2.2 and understand the language stages listed in table #11 as five distinct language varieties, we may attempt to determine whether any such language variety (or stage) is overly represented in a particular area. Should that be the case, it would suggest that the area in question is either more or less conservative with regard to its treatment of the geminates. For this purpose, only those inscriptions that can be securely established as belonging to a specific language stage will be considered.

Of 14 inscriptions that can be securely assigned a language stage from the eastern part of the Phrygian speaking area (quadrants E and SE), 1 belongs to stage 1 (°69^{SE}), 7 belong to stage 2 (°45^{SE}, °53^{SE}, °57^E, °75^E, °76^E, °77^E, °80^E), 2 belong to stage 3 (°51^{SE}, °67^{SE}), 4 belong to stage 4 (°51^{SE}, °61^{SE}, °67^{SE}, °106^E), and none belong to stage 5.

We may compare these numbers with 25 inscriptions that can be securely assigned a language stage from the western part of the Phrygian speaking area (quadrants NW, W, and SW): 2 belong to stage 1 (°86^W, °119^W), 11 belong to stage 2 (°2^W, °3^W, °6^W, °25^{SW}, °39^{SW}, °40^W, °90^W, °91^W, °114^{SW}, °126^W, °130^{NW}), 4 belong to stage 3 (°7^W, °86^W, °112^W, °115^W), 7 belong to stage 4 (°5^W, °14^{NW}, °28^{SW}, °93^{SW}, °97^{W+}, °99^{NW}, °127^{SW}), and 1 belongs to stage 5 (°87^W).

The ratios of the number of inscriptions in the eastern or western area belonging to a particular language stage to the total number of inscriptions found in that area are roughly comparable. This suggests that both the eastern and the western part of the Phrygian speaking area were equally innovative in terms of their treatment of the geminates and that the trend towards the simplification of geminates affected the entire language community.

We may also examine the 19 spellings suggesting the existence of a nasalized vowel (cf. §II.2.3.1.3): $\kappa\alpha\kappa\epsilon\nu$ °40^W, °97^W, °119^W; $\kappa\alpha\kappa\iota\nu$ °14^W; $\kappa\alpha\kappa\epsilon\nu\nu$ °45^S; $\sigma\epsilon\mu\iota\nu$ °76^C, °100^C, °107^C; $\sigma\epsilon\mu\omicron\mu$ °5^W; $\sigma\epsilon\mu\omicron$ °19^W; $\kappa\nu\omicron\mu\iota\nu\omicron$ °5^W; $\kappa\nu\omicron\mu\mu\alpha\nu\epsilon\iota$ °44^S, °53^{SE}; $\kappa\nu\omicron\nu\mu\alpha\nu\epsilon\iota$ °101^{SE}; $\alpha\delta\alpha\kappa\epsilon\nu$ $\mu\epsilon$ °5^W; $\alpha\delta\delta\alpha\kappa\epsilon\mu$ $\mu\alpha\nu\kappa\alpha\iota$ °35^C; $\alpha\delta[\delta\alpha]\kappa\epsilon$ $\mu\alpha\nu\kappa\alpha\iota$ °60^C; $\alpha\iota\nu\iota$ $\mu\mu\nu\alpha$ °25^{SW}; $\mu\alpha\kappa\kappa\alpha$ °94^S.

It is conspicuous that none of them are found in the E quadrant of the Phrygian speaking area, despite the fact that over a quarter (31 in total) of New Phrygian inscriptions were found there. This would seem to suggest that the nasalization of vowels in certain environments was a change that began in the west and which apparently failed to extend into the north-eastern periphery of the Phrygian speaking area.

The distribution of the middle verbal forms in the protasis of the curse formula likewise appears to be areally skewed. Of 10 such middle forms found in the corpus ($\alpha\beta\beta\iota\rho\epsilon\tau\omicron<\iota>$ °25^{SW}, $\alpha\delta\delta\alpha\kappa\epsilon\tau\omicron$ °40^W, $\alpha\delta\delta\alpha\kappa\epsilon\tau\omicron$ °63^C, $\alpha\beta\beta\epsilon\rho\epsilon\tau\omicron$ °73^W, $\alpha\beta\beta\epsilon\rho\epsilon\tau\omicron$ °75^E, $\alpha\beta\beta\epsilon\rho\epsilon\tau\omicron\iota$ °91^W, $\alpha\beta\beta\epsilon\rho\epsilon\tau\omicron\iota$ °113^W, $\alpha\delta\delta\alpha\kappa\epsilon\tau\omicron$ °121^W, $\alpha\beta\beta\epsilon\rho\epsilon\tau\omicron\iota$ °129^W, $\alpha\beta\beta\epsilon\rho\epsilon\tau\omicron\iota$ °131^C), only one (in °75^E) appears in the eastern part of the Phrygian speaking area, and all the rest

appear to the west.¹⁷⁴ The total number of middle forms is small, however, so it may be that the distribution is simply the result of chance.

One additional phenomenon ought to be noted for future reference. Of the three spellings of the first vowel of δακετ ‘would do’ with <o> (δοκετ °44^S, δοκετ °54^E, αδοκετ °106^E) (§II.2.3.1.1), all three are found in the eastern half of the Phrygian speaking area (PhL 158). To this list we may also add γεγρεμενον and ουτον, both in °106^E, for more common γεγρεμεναν and ουταν, again showing an unexpected <o>. While the low number of instances of this specific spelling strategy does leave open the possibility that this is simply due to chance, it seems more likely that the /a/ vowel was backed in this area, presumably being close to [ɑ], which would explain its occasional spelling with <o>.

What all of these analyses suggest is that there existed an eastern dialect of Phrygian that was linguistically conservative: it failed to fully participate in the $-\bar{a}i > -\alpha$ shift, the monophthongization of $-ei$ is only marginally observed, and there is no evidence for nasalization of vowels. Speaking in favour of the existence of an eastern dialect is also the spelling of expected <α> with <o>, an innovation that appears not to have spread to the west.

The most important innovations appear to have radiated from the western parts of the Phrygian speaking area. This may be due to their numbers and their proximity to areas where various other languages would have been spoken; the east, on the other hand, would have been more isolated and sparsely populated.

¹⁷⁴ While inscriptions °63^C and °131^C are classified as belonging to quadrant C, they were both found at the very western edge of that quadrant, in Bolvadin (PhL 550, 618) and Kadıkuyu (PhL 532-533, 618), respectively.

II.3.4 The Phrygian accent

Neither the Old nor the New Phrygian scripts provide any way of marking an accent. Thus, there is no direct evidence for where the Phrygian accent would have been placed in a lexical word. Nevertheless, on the basis of what we know of Greek and PIE accentuation, combined with a limited number of unexpected vocalic developments, we may begin to investigate this question. It should be remarked that the study of the Phrygian accentual system is still very much in its infancy. For this reason, it would currently be far too premature to speculate on where individual Phrygian words were accented. Rather, only those handful of forms which provide some evidence for the location of the accent will have it explicitly marked in this section.

It is unknown if there were any limitations on which syllables could carry the accent (such as the Law of Limitation found in Ancient Greek) or whether any grammatical categories underwent specific accentual developments (such as, again, Ancient Greek with its obligatory recessive accentuation of verbs).

The best way to begin to approach the question of the Phrygian accent is to take note of all unexpected vocalic alternations or developments which currently have no known conditioning factor. What we find are unexpected instances of *i* appearing where we would etymologically expect to find the vowel *e*.

The forms relevant for this analysis are:¹⁷⁵

- *ibe-* °B-01, °B-05 ‘~ this’ < **e-sb^he-*;
- *ivi-* °B-05 ‘his?’ < **e-sue-*;
- *niptiya-* °B-05 ‘niece, granddaughter’ < **nep-t-ih₂-*;
- ζιμελως °25^{SW} instead of the usual ζεμελως ‘man (DPI)’;
- σιμουν °25^{SW} instead of the usual σεμουν ‘this (DSg)’ (cf. also OPh. dat. sg. *iv-imun* °B-05);
- αββιρετο<ι> °25^{SW} instead of the usual αββερετοι ‘to bring to’;
- *kubileya* °W-04 instead of *kubeleya* ‘DN’;
- *akinanogava-* °M-04 instead of *akenanogavo-* ‘(religious title)’.

We may immediately remove σιμουν (as well as *ivimun*) from this list on the basis of a sound change we have previously proposed, i.e. **esR-* > *ēR*, for which see §II.3.2.2. If the segment *m/μ* does originate from a PIE element **-sm-* found in the pronouns, as we propose in §IV.3.2, then we would expect the sequence **-esm-* to develop regularly into *-ēm-*, which would be spelt as OPh. <*-em*>/<*-im*> and NPh. <*-ειμ*>/<*-ιμ*>, which explain the spellings *ivimun* and σιμουν. It is, then, the almost universally found form σεμουν that is the unexpected one. We may explain its existence by suggesting that the vocalism is the result of levelling from genitive singular ⁺*-evo*.¹⁷⁶

¹⁷⁵ [αδδα]κκιτορ 1x instead of the usual αδδακετορ, if the two may be compared at all, is probably best taken out of consideration, since it appears as part of a badly worn and fragmentary inscription °72^E. While the inscription is not to be dismissed entirely, it is probably best analysed independently and not as being necessarily representative of other marginal processes that can be observed elsewhere in the corpus. See also §II.2.3.2.4.

¹⁷⁶ If one rejects this approach, another solution is to assume that the sound law **esR-* > *ēR* did not apply to all resonants and that compensatory lengthening did not take place when **m* was involved. In that case, the *-imun/-ιμουν* is to be explained along the same lines as those instances of *e* > *i* as those that appear in an open syllable before a resonant.

It is best to separate the remainder of this list based on the phonetic and phonotactic environment in which the vacillating vowel appears.

In the first of the two sections of the list, we find the *e~i* interchange in an open syllable before a resonant. This is relevant in the following examples: ζιμελως (1x) for usual ζεμελως, αββιρετο<ι> (1x) for usual αββερετοι, *kubileya* (1x) for *kubeleya* (1x), *akinanogava-* (1x) for *akenanogavo-* (2x).

As with many other types of spelling variations in Phrygian,¹⁷⁷ the different spellings most likely reflect an allophonic realization of what would have otherwise remained the same underlying phoneme.

What all the variant spellings with *i* have in common is: 1) they appear in an open syllable; 2) the following consonant is a resonant; 3) they appear in the antepenultimate syllable or earlier.

The idea that this vocalic development is due to the position of the accent is not new. Ligorio and Lubotsky (LL 1821) have proposed that the vowel *i* is a reduced variant of *e* in a pre-tonic position; Lubotsky (p.c.) now believes that this reduction may have also taken place in a post-tonic position or perhaps in unaccented syllables generally. The idea is certainly appealing, since a very similar development can be observed in Luwian: **e* > *i* / _\$' (Melchert 1994: 262); the development could then be understood as reflecting a broader areal feature.¹⁷⁸

¹⁷⁷ Cf. spelling vacillations of vowels before a final nasal discussed in §II.2.3.1.3 and Šorgo (2019).

¹⁷⁸ An Iron Age West Anatolian linguistic area can be suggested on the basis of other commonalities shared between Phrygian, Lycian, Lydian, and Luwian, for which see Šorgo (2019).

Nevertheless, Ligorio & Lubotsky's idea is not in line with the expected location of the accent based on the morphological make-up of the forms in question and the comparative evidence.

In full-grade thematic verbal formations like βερε-, which derives uncontroversially from PIE **b^her-e-*, the comparative evidence suggests that the accent fell on the verbal root, i.e. **bér-e-* (CIEL 254, LIV₂ 18). While true that sentence-final finite verbal forms were as a rule unaccented in PIE (Fortson 2004: 99), this did not hold for subordinate clauses, where the finite verbal form was regularly accented (*ibid.*). αββιρετο<ι> appears in a conditional, i.e. subordinate, clause, so we cannot claim that it was unaccented, unless we posited that most or all Phrygian verbal forms lost their accent by analogy with unaccented main-clause verbs, which is an unlikely proposition, and even if that did occur, it is almost impossible that the verbs would have remained unaccented up to the New Phrygian era, where we actually observe this change. If the *e* > *i* change observed in αββιρετο<ι> is due to the unaccented nature of the vowel, it would suggest that the accent in Phrygian shifted from its original position in stressed forms onto the first, penultimate, or the final syllable. No good morphological or analogical argument can be made for such a shift, so it would need to be mechanically conditioned.

On the other hand, if the original accent of the verb in stressed position was preserved, it would fall on the syllable whose vowel has the *e*~*i* vacillation in spelling, meaning that the vowel quality would be the result of accent.

In ζιμελο-/ζεμελο-, we are dealing with a derivation utilizing the thematic nominal suffix **-elo-*. The closest comparanda to Phrygian ζεμελο- are

Latin *humilis* ‘low’ < **hem-el-* < **d^hg^hem-el-* and Greek χαμαλός ‘low’,¹⁷⁹ but both are adjectives and neither of the two is a perfect formal match: the formation is evidently not thematic in Latin, and the Greek form has its lexical root in the zero-grade while also showing evidence for a suffixal *-*h*₂-, which would not have been present in Proto-Graeco-Phrygian. The Latin term is uninformative in terms of the accent, whereas the Greek term at least points towards an *-*elo*-type adjective derived from some reflex of the stem **d^hg^hVm-* being accented on the final syllable. If the same held for Phrygian and if ζεμελο- did originate as a nominalized adjective (‘earth’ > ‘earthly’ > ‘one who is earthly’ *vel sim.*), we would expect the original location of the accent to have been on the final syllable, which is one possibility.

If the accent in ζεμελο- fell on the penultimate syllable, this would certainly need to be due to a mechanical process of accent placement.

Finally, if the accent of ζεμελο- fell on the first syllable, it would once again mean that the vowel quality would be the result of the accent. This seems the most attractive possibility: since the presence of the *e*-grade in the root syllable and the fact that the Phrygian word is a noun both suggest that we are dealing with a noun-to-noun (‘earth’ > ‘earthling’ *vel sim.*) derivation, the accent could reasonably be placed on the root syllable.

In *kubileya/kubeleya* we are once again dealing with an *-*eCo*-type nominal, in this case a derivation with -*ejo-* from a non-native theonym, and the accent could in principle fall on any syllable, with different implications as far as the explication of the *e*~*i* spelling vacillation is

¹⁷⁹ The Greek term can seemingly be transposed as **d^hg^hmh₂-eló-*, but it is more likely to be a blending of a PG **χθεμελο-* ‘earthling’ and **χαμα-* ‘Earth’ (with Cretan *χαμα-*, as cited by Hesychius, likely being a reflex). For details, see §III.3.1.8.

concerned. The Greek form of the name Κυβήλη/Κυβέλη likely derives from a form of the name without the characteristically Phrygian feminine suffix *-e/iya-*, i.e. from **kubelā- vel. sim.*^{180, 181} The Greek accentuation suggests that the accent was on the second syllable, though this cannot be extended as a certainty to Phrygian *kubeleya*, which is a derived form. For Phrygian, in principle, any of the syllables could have borne the accent.¹⁸²

The religious title *akenanogavo-/akinanogava-* ‘holder of the *akenan*’ is an endocentric compound composed of the elements *akena(n)-* ‘(a religious term)’ and *ogavos* << **soǵ^hēus* ‘holder’. *avo*-type nominals were originally derived from athematic nominal forms with a suffix **-é/éu-*, so the accent of *ogavos* would have likely appeared on the second syllable. The Phrygian noun *akena(n)-* is attested twice in Old Phrygian: in *akenan* P-04a (acc. sg.), and in the sequence *akenas*[W-07 (unclear case form). The accent could in principle have appeared on any of its three syllables. Since we are dealing with a compound, it is uncertain which of the two constituent elements would have taken accentual primacy.¹⁸³

¹⁸⁰ The accentuation of Κυβήλη/Κυβέλη, unless secondary, precludes the name from being a regular development of a preform *kubelējā* > **kubelēā* > ***Κυβηλη*.

¹⁸¹ Compare also the Greek variant Κυβήβη and Lydian *Kuvava* (EDG 794).

¹⁸² One particularity to note is that one of the variants of the Greek name of this deity is Κυβήλη, with a long vowel in the second syllable. If the Greek and Phrygian names were borrowed from the same original source that had a long mid-high vowel in the second syllable, it is entirely possible that the Greeks would have adopted the vowel as either their <ε> (to preserve the quality) or <η> (to preserve the length), whereas the Phrygians would have adopted it with their native /ē/ (most similar in both quality and length), which was spelt with <e> or <i>. In that case, the *kubileya/kubeleya* would be entirely uninformative in terms of the placement of the accent, since the spelling vacillation would be the result of an entirely different reason.

¹⁸³ This is assuming, of course, that compounds were inherently limited to having a single primary accented syllable.

Combining these analyses, we may elaborate on the following four possibilities:

1) If the *e~i* vacillation only took place in a syllable immediately preceding the accent, the forms $\alpha\beta\beta\iota\rho\epsilon\tau\omicron<\iota>$ and $\zeta\epsilon\mu\epsilon\lambda\omega\varsigma$ would need to have been accented on the penultimate syllable. Since this was not the original location of the accent, this accentuation would need to be the result of a mechanical rule that fixes the accent on the penultimate syllable; no other explanation is possible. This cannot explain *kubileya-* or *akinanogava-*, however. Even if the accent were preserved on the first member of the compound, *akena(n)-* would not have the proper accent location for a weakening of *e*. We may thus discard the possibility of a narrowly defined rule $e > i / _RV\acute{}$.

2) If the *e~i* vacillation before a resonant took place in unaccented syllables generally, this could serve to explain $\alpha\beta\beta\iota\rho\epsilon\tau\omicron-$, $\zeta\epsilon\mu\epsilon\lambda\omega\varsigma$, *kubileya-* and *akinanogava-*. The issue with this account is that unaccented syllables are obviously more common than accented ones, so we should expect to find more examples on account of the conditioning environment being so broadly defined: most open syllables before a resonant would be liable to be affected, yet only these four instances are actually attested.

3) A more restricted formulation that vocalic reduction takes place before the accent, but in a non-adjacent syllable, could explain $\alpha\beta\beta\iota\rho\epsilon\tau\omicron<\iota>$, $\zeta\epsilon\mu\epsilon\lambda\omega\varsigma$, *kubileya-* and *akinanogava-*, if the former two were accented on the final syllable, and it sidesteps the issue of the conditioning environment being too common. The rule itself would be somewhat peculiar and oddly specific, however: $e > i / _RV\acute{\$}$, but not when $e > i / _SRV\acute{}$.

4) The most elegant solution is that the *e~i* vacillation takes place in open accented syllables preceding a resonant: $/\acute{e}/ > [\acute{e}] / _SRV$. In this case, we would be dealing with allophonic lengthening of the vowel. The

development is natural and the three conditioning factors, stress, being in an open syllable, and appearing before a resonant, are each individually conducive to such a change. The *e~i* spelling vacillation would be the result of attempting to spell this lengthened vowel, either as <*e*>/<*ε*> due to its quality being that of /*e*/, but ignoring the length, or as <*e/i*>/<*ει*/, which is the strategy employed to spell /*ē*/, the most similar long vowel, though one with a slightly raised character. In this case, the accent of αββιρετο<*ι*> would be found in its expected location, in ζιμελως it would fall on the root syllable, in *kubileya*- it would match its location in Greek, whereas in *akinanogava*- it would evidently be the first member of the compound that was stressed, unless we assume the first member of the compound could carry a secondary stress.

The second category where we find unexpected *i*-vocalism in place of *e* are the lexical items *niptiya*-, *ibe*-, and *ivi*-.

The pronominal forms *ibe*- and *ivi*-, more thoroughly discussed in §IV.10, both show an unexpected initial element *i*- that has so far defied a clear interpretation (Hämmig 2013: 139-140 has identified *ibe*- as related to Gr. σφεῖς, Lat. *sibi*, OCS *sebe*, but stopped short of explaining the vocalism). Phrygian pronouns in general are known to appear in what are referred to in §IV.13 as “bound pronouns”, i.e. a conglomeration of agglutinated pronominal elements (i.e. *e=si*-, *ve=avto*-) that form a neo-pronoun. The *i*- found in *ibe*- and *ivi*- is thus likely to be a preposed pronominal element. It is clear that it cannot be the strong stem *i*- of the demonstrative pronoun, however; when appearing as a pronominal prefix, its oblique stem **e*-, was used, which we can see in the bound pronoun *e-si*- < **e-ke/i*- (§IV.2), but also in Greek ἐκεῖνος < **e-ki/e-(e)no*-. On the other hand, no other known

Phrygian pronoun is vowel-initial; as such, none can be the origin of *i-*. It is best to assume, then, that the initial *i-* of *ibe-* and *ivi-* does ultimately originate in the anaphoric/demonstrative pronoun *i/e-*, specifically its weak stem PGPh. **e-*. The only likely factor that resulted in the different reflexes of **e* in *ibe-* < **e-sbe-*, *ivi-* < **e-swe-*, and *esi-* < **e-ki-* is the syllable structure of the three forms in Proto-Phrygian: the first two had the **e* appear in what was a closed syllable, whereas it appeared in an open syllable in the third.

Proceeding from the initial assumption that an **e* developed into *i* when followed by two consonants seems to be confirmed by the heretofore enigmatic *i*-vocalism in *niptiya-*, which is quite clearly derived from an older **nep-t-ih₂-*, i.e. an *ih₂*-feminine to the *t*-stem **nep-ōt-s* ‘nephew, grandson’ (Hämmig 2013: 134-138).

There are a number of counterexamples to the broad formulation of the rule as *e > i / _CC*. These are:

- 1) augmented forms such as *estaes* ‘he erected’ and *ektetoy* ‘he caused to be acquired’;
- 2) the 3sg middle imperative thematic ending *-e-do* < **-e-sd^ho*;
- 3) prepositional phrases (e.g. *perbeda*, *enstarna-*, ...);
- 4) reduplicated perfect stems built to roots with two initial consonants (e.g. *gegreimeno-* ‘written’);
- 5) various other examples of an *e-* followed by two consonants outside initial position, e.g. *vebra*, *evetekset-*, *evememesmeneya-*.

If the broad formulation of the rule is correct, three of these are easily explained through trivial analogical developments:

- 1) the augment, with its marked morphological function, would likely be restored on the basis of verbal forms that began with a single consonant, e.g. *edaes* ‘he placed’;
- 2) the 3sg middle imperative thematic ending **-e-sd^hō* > ***i-dō* would be the only known thematic verbal form next to the unattested 2pl middle indicative/imperative thematic endings **-e-sd^he* > ***i-de* where the thematic vowel would not surface as *e* or *o* and would thus likely be levelled to conform to the rest of the thematic conjugational pattern;
- 4) the formation of the perfect stems followed a productive pattern of reduplication with *-e-* vocalism for a considerable period of time, likely resulting in a renewal of reduplication with the expected vocalism.

Prepositional phrases (3) serve as poor evidence against the hypothesis, since they are, by definition, composed of two separate lexical elements. Even if the *e* > *i* change did take place in prepositions in certain environments, the *e* would have been easily restored through re-composition, though it would not be unexpected if we found some preserved relic forms.

Category (5) is more problematic: the examples are numerous and cannot be simply dismissed. On their basis, we must propose that there was a conditioning factor in play, and it is likely that the relevant condition was the location of the accent.

For *nīptiya-*, we may note that the Sanskrit comparandum *nāptī-* ‘daughter, granddaughter’ is accented on the final syllable.¹⁸⁴ If the same was true for

¹⁸⁴ Compare also Greek ἀνεψιά ‘female cousin’. The Greek term is derived from the masculine ἀνεψιός, which is itself extended with a suffix, however, so the location of the

the immediate predecessor of *nīptiya-*, we may surmise that the *e* > *i* change only took place in unaccented syllables: $e_{[-\text{accent}]} > i / _CC$.

This formulation can also serve to explain *ibe-* and *ivi-*. We have already noted (§IV.3.1) that Phrygian pronouns with a prefixed *e-* can be directly compared to Greek (ἐ)κεῖνος. The initial ἐ- is not accented in Greek, nor is it accented in the likely comparable Sanskrit *asáu* ‘that’, which likewise shows the reflex of a prefixed **e-* (EDG 397). The comparanda then suggest that the demonstrative prefix **e-* was unaccented, which falls in line with our formulation of the *e*-reduction rule.

In those instances where the *e* does not develop into *i* despite appearing before two consonants (*vebra*, *ρεκτηο-*, *evetekset-*, ...), the *e* was either accented or was paradigmatically restored from environments where it appeared in an open syllable. We may also note that, if the augment was accented in Phrygian, as is suggested by the comparative evidence (CIEL 252), it would never have been reduced to *i-*, so our proposed explanation above that it would have been levelled is not necessary.

Phonetically, a conditioned reduction of *e* is not difficult to justify: the vowel would be shortened on account of the inherently longer duration of closed syllables as a means of normalizing syllable duration for open and closed syllables. The vowel **i* in Proto-Phrygian was durationally shorter than the vowel **e*, as is evidenced by its loss in proclitics during the Old Phrygian era.¹⁸⁵

accent is likely to be secondary (EDG 102). Incidentally, the Phrygian onset *n-* confirms that the Greek initial ἄ- does not originate in **h₂*.

¹⁸⁵ For which consider most obviously the loss of *-i* in *s=materan*, *s=manes*, but its preservation in *si=keneman*. See further in §IV.3.4.

In summary, then, we can propose these two accent-based rules for Phrygian:

$$e_{[-\text{accent}]} > i / _ \text{CC}$$

$$e_{[+\text{accent}]} > [\bar{e}] / _ \$RV$$

Both rules suggest that Phrygian switched from a pitch-based accent, which we may reconstruct for Proto-Graeco-Phrygian due to its preservation in Greek, to a stress-based one. A reduction that aims to normalize syllable duration suggests the presence of a syllable-timed system for unstressed syllables, whereas the observed lengthening points to stressed vowels being pronounced as longer, which is more characteristic of stress-based systems. The evidence is meagre at this point, however, so no firm conclusions can be made.