

Segmental identity and the issue of complex segments

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Abstract: This paper examines the phonological entities called labiovelar stops in Classical Latin. The status of these entities involves the question whether they are segments (i.e., labiovelar stops) or clusters (i.e., sequences of a stop and a glide). The arguments for either position are discussed in detail and the literature is critically reviewed. The types of evidence that are taken into account are facts of frequency, phonetics, phonotactics, alternations and a specific assimilation process, and certain diachronic points are also considered. The conclusion is that the balance tilts slightly, but not definitively, towards the cluster interpretation.

Keywords: Latin, phonological segment, labiovelar, phonological database, consonant cluster

1. Preliminary

Establishing the segmental inventory of a language in a principled and consistent way has been an explicit *sine qua non* of phonological analysis and linguistic description for about a hundred years now. In a more implicit way it was, of course, a very important part of linguistic analysis already in the nineteenth century. More recently, however, it has assumed a new and increased significance for two reasons. One is the creation of large language databases which are useful only if elementary issues – such as the inventories of the languages included and the criteria for selecting phonological segments – do not need to be addressed anew whenever the researcher asks a particular question. This issue was raised already in the 1980's (see Lass 1986; Bell 1986; Pagliuca & Perkins 1986) in response to the UPSID project and its first comprehensive published form (Maddieson 1984). The other reason is technological advance. With increasing automation the need for unequivocal and well-founded inventories is becoming ever more pressing, since the goal is to reduce the role of flexible and intuitive human interpretation.

Related to these is the question of what one compares with what in cross-linguistic and comparative research. As is well known, a variety of factors may lead to a situation in which a sequence of two segments in

one language corresponds to a single segment in another language. For instance, nasal loss with compensatory lengthening (and later qualitative changes) of the preceding vowel led to the systematic correspondence exhibited by E. *goose, tooth* vs. G. *Gans, Zahn*. In some cases, however, physically identical parts of the signal (at least physically identical in the relevant sense and to a relevant degree) may function differently in comparable languages, as a single segment in one but as a sequence of segments in the other. This was recognised, in general, already at the early stages of structuralist phonology (cf. Trubetzkoy 1939 [1969], 55ff), but it is no longer a simple analytical question. Today, the question asked is not only “are there diphthongs or palatalised consonants in this particular language?”, but increasingly, “how many languages are there in the world (or at least in the database) that have diphthongs or palatalised consonants?”. Thus structural issues are promoted to design principles for databases (cf. Round 2013).

In this paper we revisit, in a comprehensive manner, a classic question about which much has been written, but even more has been taken for granted without discussion, *viz.* the question of labiovelar stops in Latin. The so-called labiovelars of Proto-Indo-European were partly preserved as **some sort of** labiovelars in Latin, Anatolian and Germanic. In the other languages they developed into various other sounds. The interesting fact about these segments is that their phonological status is variable both historically and cross-linguistically. There are compelling reasons (taken from phonotactics and from patterns of alternation, not to be discussed here in detail) for assuming that labiovelar stops were monosegmental in PIE. But there are equally compelling reasons to assume that e.g., in English, a descendant of PIE, the only remaining “labiovelar” [kw] is not a segment but a sequence of two segments much like [pr] or [kl]. As for the reconstructed phonological system of Proto-Germanic, opinions differ. A look at the literature reveals that no consensus has been reached, though the monosegmental interpretation, parallel to that of PIE, appears to be somewhat more widespread (see Lehmann 1994, 22–23; Ringe 2006, 88ff; Seebold 1967; Stausland Johnsen 2009 among others).

In this paper we critically review the arguments for the monosegmental vs. the cluster interpretation of “labiovelar stops” in Classical Latin, an issue on which the literature has long been divided. Devine & Stephens (1977, 13–104) is by far the most detailed discussion of the Latin labiovelars to date. For a classic summary of some of the arguments, to which later “phonemic” analyses hark back, see Sturtevant (1939). For a less thorough but astute survey see Zirin (1970, 29–40). Important observations are

found in Allen (1978), another classic. The issue was picked up again in Touratier (2005b) and Watbled (2005). Of course, if any of the above papers had provided a definitive solution, the present paper would not have been written. What will be attempted here is a critical survey of the arguments for either position. To anticipate the conclusion, the question cannot be settled definitively, which leads to two important problems, one practical, the other theoretical. The practical question is how one incorporates such information into phonological inventory databases. (Incorporating it into descriptions *qua* descriptions is no problem since explanations can always be added.) The theoretical question is whether it is possible for a phonological entity to play an ambiguous role (segment or cluster) in a language's phonological system. These two questions, to which our discussion leads, are not pursued in the present paper.

The structure of the paper is the following. First, the basic distributional facts and facts of lexical incidence are laid out in order to set the context for a more detailed discussion of labiovelars. Then we turn to the arguments for the monosegmental vs. cluster interpretation of the labiovelars in Classical Latin. These are listed by type, i.e., frequency, phonetic issues, phonotactic issues, alternations and finally two minor points (a particular assimilation process and certain diachronic considerations). Before the conclusion, some points regarding the voiced labiovelar entity are summarised.

Throughout this paper the entities in question will be written ⟨qu⟩ and ⟨gu⟩ in order not to prejudge any conclusion regarding their phonological status. Note that while the former spelling in the generally accepted form of writing Latin unequivocally corresponds to the voiceless labiovelar entity in question, the latter can correspond to its voiced counterpart but also to the sequences [gu] and [gu:], as in *arguere* 'show' and *argutus* (past participle of same), respectively.

2. Basic facts of distribution and incidence

The voiceless labiovelar entity is found in word-initial and word-internal position, in all cases followed by a vowel. It can be preceded by [s] both initially (*squalor* 'dirt') and internally (*usque* 'until'). Internally it can also be preceded by [ŋ] [r] or [j] (*quinque* 'five', *torquere* 'turn', *aequus* 'flat', resp., though of these clusters only ⟨nqu⟩ occurs in more than one word). In word-final or preconsonantal position ⟨qu⟩ is never found and it is also not found in prefixes or suffixes.

The voiced labiovelar entity has an extremely restricted distribution phonologically and a correspondingly restricted lexical incidence. It is only found in the following 11 words (and their derivatives), in all of them in the environment [ɲ]—V:

- (1) anguis ‘snake’
 inguen ‘loin’
 languor ‘languidity’
 lingua ‘language/tongue’
 ninguit ‘it snows’ (or ningit)
 pinguis ‘fat’ Adj
 sanguis ‘blood’
 stinguere ‘extinguish’
 tinguere ‘dip’ (or tingere)
 unguis ‘nail (on hand and foot)’
 unguere ‘smear’ (or ungere)

As is indicated in the list, in some words it is in free variation with [g], e.g., *ninguit* ~ *ningit*. What these facts, *viz.* this very limited distribution and the very low lexical incidence mean for the phonological status of ⟨gu⟩ is discussed in 3.6.

3. The arguments regarding the phonological status of the labiovelars

3.1. The issue of frequency

Devine and Stephens (1977) claim that the textual frequency of ⟨qu⟩ is much higher than that of either [k] or [w].¹ This means, they argue, that it is better analysed as a single segment. But they also admit that the markedly high textual frequency of ⟨qu⟩ simply follows from the fact that it occurs in many of the interrogative and relative pronouns, e.g., *quis* ‘who’, *quid* ‘what’, *qui/quae/quod* ‘which, who’, *quo* ‘where’, etc., as well as the

¹ “[I]f *qu* and *gu* are biphonemic, then *k* would be the only consonant which would be more frequent in clusters than in single occurrences: $f(kw) + f(kC) > f((V)k(V))$. . . and *kw* would be the only cluster which would be more frequent than all other occurrences of the second consonant of that cluster: $f(kw) > f(w)$ ” (Devine & Stephens 1977, 49).

clitic conjunction *-que* ‘and’ (*op.cit.*, 94). Actually our own calculations² bear out Devine and Stephens’s generalisations only in part. In particular, the frequency of [w] is almost twice as high as that of [kw] (38 865 vs. 20 225 over the 191 025-word selective corpus), and it would be so even if one subtracted the number of tautosyllabic [aw] sequences (called diphthongs, see Cser 1999) from the number of [w] tokens (35 189 vs. 20 225). Thus their claim that “*kw* would be the only cluster which would be more frequent than all other occurrences of the second consonant of that cluster: $f(kw) > f(w)$ ” (*ibid.*, 49) does not seem to be correct. On the other hand, it is true that if [kw] is a cluster, [k] occurs in clusters more frequently than without an adjacent consonant. In our corpus [k] occurs in clusters (not including geminates but including [kw]) 39 062 times, in gemination 924 times, in neither clusters nor gemination 29 694 times. Furthermore, [kw] is more frequent than all the other [k]-clusters combined (20 225 vs. 18 837). By contrast, the stop [p], whose distribution is in other respects broadly similar to that of [k], occurs in clusters (not including geminates) 13 314 times, in gemination 703 times, in neither clusters nor gemination 16 364 times. The proportions will be similar if we analyse [kw] as a segment rather than a cluster, because in that case [k] occurs in clusters 18 837 times (vs. 29 694 times not in clusters). Whether other consonants are generally like [p] remains to be verified, but there is a likelihood that Devine and Stephens’s claim is right on that count. In sum, however, the frequency arguments are not conclusive.

3.2. Phonetic issues

There is some indication that the vocalic element in ⟨qu⟩ was different, less “noisy”, than the [w] in other positions. Allen (1978, 17) points to direct evidence for this from the early 2nd century AD grammarian Velius Longus, and Modern Italian seems to have preserved precisely such a pattern. While ancient grammarians’ and orthographers’ remarks on phonetic details are often unreliable and hard to interpret, the passage cited by Allen (1978, 17) can, indeed, be plausibly understood as saying that the [w] element in

² The textual frequency of consonants was calculated from a selective corpus of texts representing a variety of authors and genres from the 1st century BC and the 1st century AD. The texts, which altogether comprise 191 025 words and 1 101 173 characters, are the following: *Res gestae divi Augusti* (also known as the *Monumentum Ancyranum*), Julius Caesar’s *Commentarii de bello civili*, Cicero’s *Brutus*, *De legibus*, *Pro Archia poeta* and *Pro Quinctio*, Ovid’s *Amores*, Persius’s *Saturae*, Sallust’s *Bellum Catilinae*, Statius’s *Silvae* and Vergil’s *Georgica*.

⟨qu⟩ was less consonant-like than other [w]’s.³ The conclusion Allen draws is that ⟨qu⟩ was a segment rather than a cluster. But even if there existed a phonetic difference between the two realisations of the labial element, and even if their distribution was [k]— vs. elsewhere (which is not clear), it may mean no more for a phonological analysis than a simple case of allophony of some sort.

Allen (1978, 16–17) also makes the point that the spelling of words like *tamquam* ‘just as’, with ⟨m⟩ before the ⟨q⟩ instead of an assimilated ⟨n⟩=[ŋ], indicates that lip rounding was simultaneous with the closure and regards this as another piece of evidence in favour of the monosegmental interpretation. But in fact the ancient grammarians make it clear that the nasal before ⟨qu⟩ and ⟨gu⟩ was velar (see the relevant *testimonia* in Devine & Stephens 1977, 37). The spellings with ⟨m⟩ were etymological spellings used in compounds, not at all to the exclusion of ⟨n⟩ (*tanquam*, *nunquam* ‘never’, etc.).

Thus the meagre phonetic indications that we have certainly do not support the monosegmental interpretation – though they also do not contradict it. They simply do not add up to a critical amount of really relevant information and are thus inconclusive.

3.3. Static phonotactic issues

3.3.1. Geminate

While all stops occur as geminates in simplex forms, ⟨qu⟩ does not. Furthermore, it does not even occur in a [kkw]/[kk^w] sequence (which could, in theory, be analysed as the phonetic representation of geminate [k^w] but

³ “. . . v litteram digamma esse. . . non tantum in his debemus animadvertere in quibus sonat cum aliqua adspiratione ut in valente et vitulo et primitivo et genetivo sed etiam in his ⟨in⟩ quibus ⟨cum q⟩ confusa haec littera est ⟨ut⟩ in eo quod est quis” ‘we need to be mindful that the letter v is digamma [i.e., [w] – A. Cs.] not only in those [words] in which it is accompanied by a certain noisiness, as in *valente* and *vitulo* and *primitivo* and *genetivo*, but also in those in which that letter merges ⟨with q⟩, as in *quis*’ (Velii Longi *De Orthographia*, Keil 1855–1878 VII 58, translation ours). The parts in ⟨ ⟩ are missing from the most important manuscript as well as the first printing of this work. The contrast the grammarian gives is between *adspiratio*, here probably best translated as ‘noise’, and *littera confusa*, the technical term for vocal forms that cannot be precisely rendered with letters, here probably meaning roughly a sound (scil. [w]) that is fused with the preceding stop ⟨q⟩, i.e. [k]. But note that the examples he gives for the “noisy” ⟨v⟩ are initial and intervocalic, and he contrasts these with ⟨qu⟩ only; he is silent about postconsonantal [w] in general.

also as a [k] + [k] + [w] sequence). This squares neatly with the fact that geminates do not occur next to another consonant (in this case [kk] before [w]). It also squares neatly with the fact that [kkw] can emerge (though rarely does) at prefix–stem boundaries, as in *acquirere* ‘get’ and *acquiescere* ‘acquiesce’ from *ad*+⟨qu-⟩. It is only at such boundaries that geminates can be adjacent to consonants. Note, however, that if this particular sequence was analysed as a [k + k^w] cluster, the lack of [kk^w] could be explained with reference to the fact that in two-stop clusters the second stop can only be [t] (i.e., only [pt] and [kt] are found, apart from geminates), and thus, the gap in question would be compatible with a monosegmental interpretation, too.

3.3.2. Positional restrictions and stop + glide sequences

Sequences of an obstruent and a glide are virtually non-existent in Classical Latin. In word-medial and word-final position no such clusters are found unless one regards ⟨qu⟩, which occurs medially in many words, and the few occurrences of ⟨gu⟩, all medial, as clusters. Apart from ⟨qu⟩ (and ⟨gu⟩), medial [w] can be preceded only by [l r j] (e.g., *silva* ‘forest’, *parvus* ‘small’, *laevus* ‘left’, respectively). In word-initial position, [kw] [sw] and [skw] (as in *quis* ‘who’, *suavis* ‘sweet’ and *squalor* ‘dirt’, respectively) would be the only obstruent+glide clusters.⁴ Furthermore, when occasional desyllabification in poetry produces a stop + glide cluster internally,⁵ scansion shows that such a cluster is heterosyllabic, which indicates that a stop+glide cluster generally cannot be tautosyllabic.

This seems to tilt the balance towards the monosegmental interpretation. But the fact is that the phonotactic patterning of ⟨qu⟩ under a monosegmental interpretation is at least as irregular as under a cluster interpretation (and perhaps more irregular). In addition to the absence of gemination (see above), ⟨qu⟩ and ⟨gu⟩ cannot be followed by any consonant in any position, which would be most untypical for a stop (monophonemic in Proto-Indo-European, the labiovelars could be followed by sonorants

⁴ The argument in Watbled (2005, 43ff) is based on these considerations. One of the advantages he sees in a monophonemic analysis for both labiovelars is that it makes it easier to establish the putative complementary distribution of [u] and [w]. But as the works devoted to this latter goal generally show, this feat can only be achieved through laboured and counterintuitive analyses anyhow (e.g., Touratier 2005b, 70; on this, see also Zirin 1970, 80–87).

⁵ Vergil’s *abiete* ‘fir’ ablative scanned as three syllables, i.e., [abjete] instead of [abiete] in all of its four occurrences: *Aen.* 2.13, 5.662, 8.597, 11.665.

without neutralisation).⁶ Under a cluster interpretation this fact receives a very simple explanation. Since in Classical Latin the medial member of a three-member consonant cluster can never have higher sonority than either of the flanking consonants,⁷ a cluster [kw] could possibly only be followed by [j], nothing else. Since, however, [j] never follows a consonant in Classical Latin, [w]-medial clusters are not found.

Note, however, that the restriction of ⟨qu⟩ to the environment ___V again does not absolutely preclude a monosegmental analysis. Recent phonetically oriented (functional) approaches explain such phenomena with reference to the perceptual strength of cues that help identify segments, e.g., Boersma (1998); Steriade (1999); Côté (2000); Kiss (2007). A following consonant effectively masks such cues and so certain types of consonants, such as labiovelars, will be dispreferred in preconsonantal position.

The fact that ⟨qu⟩ and ⟨gu⟩ never occur word-finally can also be seen from two different perspectives and can be explained on the basis of both. Under a cluster interpretation it is because of sonority sequencing, to which Latin rather strictly adheres, that rising sonority clusters are never found in that position.⁸ But it is also a fact that in Latin there is a marked preference for final coronal consonants. Of the non-coronal consonants some occur marginally and some not at all,⁹ so the lack of word-final labiovelars is also consistent with the monosegmental assumption and falls under a very simple segmental distributional generalisation. Furthermore, the weakness of stop place cues in final position can also be invoked just as in the case of preconsonantal position above.

As for the poetic license of the *abiete* → *abjete*-type, it is indeed true that it produces heterosyllabic clusters. It remains a question, however, to what extent this is informative with respect to the status of ⟨qu⟩ (and ⟨gu⟩). While natural classes are expected to display more or less uniform behaviour, the distribution of the two glides in Latin is different in at least three ways, independently of the labiovelar issue. In particular, while postconsonantal [j] does not exist at all, C[w] is found not only in the *sw*-initial words like *suāvis* ‘sweet’, but also in the clusters [lw] [rw] [jw] (e.g., *solvere* ‘to solve’, *parvus* ‘small’, *saevus* [sajwus] ‘raging’) irrespective of

⁶ E.g., **k^wjeh₁*- > *La quies* ‘rest, repose’, cf. Rix et al. (2001, 393), de Vaan (2008, 508–509).

⁷ With the exception of [kst] [pst], of which the latter is found almost exclusively at prefix–stem boundaries. Consonant clusters are discussed in detail in Cser (1999; 2012) and the [s] in these clusters is argued to be extrasyllabic.

⁸ Again except for [ps] [ks], which include extrasyllabic [s].

⁹ See Cser (2012, 45).

how one analyses ⟨qu⟩ and ⟨gu⟩. Furthermore, [w] is never geminated, while intervocalic [j] always is. Combination with the corresponding vowels also reveals two different patterns: **#[ji]¹⁰ vs. #[wu] (*vulgus* ‘crowd’, *vultus* ‘face’).

3.3.3. The question of [sw]

Another static structural argument impinges on [sw], the only other cluster including an obstruent + [w]. If ⟨qu⟩ and ⟨gu⟩ are taken to be segments rather than clusters, the environments of [w] shrink so radically that one is practically compelled to regard [sw] as a single segment (i.e., [s^w]) rather than a cluster. This is because under such an analysis, [w] is never found in complex onsets (except initial [sw]) and, independently of this, [s] is never found before voiced consonants (again except for initial [sw]). That this logically follows was realised by Devine and Stephens: “syllabification and system congruity [...] point to /s^w/” (1977, 80), but they add a disclaimer on the very next page: “It might be thought that monophonemic assessment of Lat. *kw* almost compels the same for *sw*. But this is arguable. . .” – importantly though, they give no arguments apart from the hardly relevant point that the Tarascan language “very likely” has monophonemic [k^w] and cluster [sw], and the somewhat more relevant point that Proto-Indo-European is usually analysed as having the same combination. Given that they do not recognise coda glides and analyse [aw(C)]-type sequences as diphthongs, they are all the worse off, since then absolutely the only position in which [w] is found is as a solitary onset consonant, unless one still analyses initial [sw] as a cluster.¹¹ Thus the parallel of [sw] appears to be a solid argument for the cluster status of the labiovelars.¹²

¹⁰ Throughout the paper, a single asterisk denotes a reconstructed form, a double asterisk denotes an ill-formed sequence.

¹¹ Actually, the structural parallelism between ⟨qu⟩ and [sw] was hinted at already in Brandenstein (1951), cited in Zirin (1970, 38). But there is an evident reluctance on the part of all the authors mentioned to take seriously the consistency of the analysis at this point and say that **if** ⟨qu⟩ is a single segment **then** so is the labialised fricative [s^w].

¹² As a reviewer suggests, initial [sw] could also be thought of as including extrasyllabic [s], and then the problem explained above would appear in a different light. However, the arguments for the extrasyllabicity of [s] in the vicinity of stops (see Cser 2012, 50–51) do not hold for the [s] in initial [sw], e.g., this cluster does not contradict the Sonority Sequencing Principle, and it does not occur – and thus does not show heterosyllabic parsing – word-internally.

3.3.4. Verb stem structure

A point Devine and Stephens make (1977, 48, where it is attributed to Robert Godel) is that verb stems do not end in three consonants, but they do end in ⟨Cqu⟩ at least in *linquere* ‘leave’ and *torquere* ‘turn’ (and to these one may add the [ŋgw]-final *tinguere* ‘dip’ and *ninguit* ‘it snows’).

This point is valid only diachronically, not structurally. How is one to make a principled distinction between *torquere* ‘turn’ and *monstrare* ‘show’, another verb with a heavy consonant cluster before the inflectional endings? It will not do to argue that *monstrare* has a more complex morphological structure than *linquere* or *torquere* (and derives from the primary root attested in *monere* ‘admonish’) because this is more of a statement about the history than the structure of these forms. Historically, of course, the claim that verb stems do not end in three consonants makes perfect sense in view of two generally accepted details of reconstruction: (i) PIE $*k^w$ as a single consonant, and (ii) the well known PIE root structure constraints on intramorphemic consonant clusters, *viz.* the maximal root being sCCVCC with CC portions that strictly adhere to sonority sequencing, e.g., $*streng^h$ - ‘pull together’.

3.3.5. Voicing contrast in clusters

Consonant clusters including at least one obstruent are found relatively frequently in Latin. Since stops (but not fricatives or sonorants) are contrastive for voice, it is an interesting question how this contrast is present in consonant clusters. The data clearly show that the possibility for voice to be contrastive depends on the size of the cluster. Notably, voicing contrast for stops is found only in CC clusters, e.g., [VndV] ≠ [VntV], as in *quando* ‘when’ vs. *quantus* ‘how much’, or [VlbV] ≠ [VlpV], as in *albus* ‘white’ vs. *culpa* ‘sin’; no voicing contrast is found in CCC clusters, e.g., [VntrV], as in *antrum* ‘cave’ but $**[VndrV]$, [VmplV], as in *simplex* ‘simple’ but $**[VmbIV]$. If one analyses the clusters found in e.g., *linguam* ‘I leave’ Subj vs. *linguam* ‘tongue’ Acc as CCC rather than CC, these will be the only instances of CCC clusters with contrastive stop voicing ([VŋkwV] ≠ [VŋgwV]). If, however, one analyses these as CC clusters, they pattern as expected ([Vŋk^wV] ≠ [Vŋg^wV]). This is certainly a fact that points towards the greater plausibility of the monosegmental interpretation of labiovelars.

3.4. Alternations

The entity denoted by ⟨qu⟩ alternates with [k] just like [g] does, e.g., *coquere* ~ *coctus* ‘cook’ Inf ~ PassPart much like *agere* ~ *actus* ‘do’ Inf ~ PassPart. As Devine and Stephens (1977, 50) point out the parallel alternation in identical environment suggests that ⟨qu⟩ is a single consonant just like [g], since both alternate with [k]. As for ⟨gu⟩, in some words it is in free variation with [g] (*ninguit* ~ *ningit* ‘it snows’); in some verbs it seems to parallel the *coctus*-type alternation (*unguere* or *ungere* ~ *unctus* ‘smear’ Inf ~ PassPart). This seems to imply the same for the voiced as for the voiceless entity, i.e., monosegmental status. The issue of alternations, however, is a complicated one and the fuller picture is less than unambiguous with respect to the phonological status of the entities involved.

First, it is important to note that the apparent ⟨qu⟩ ~ [k] alternations are practically restricted, at least in inflectional morphology, to two environments, one being second declension nouns (*ecus* ~ *equī* ‘horse’ NomSg ~ NomPlur),¹³ the other the environment exemplified above, where ⟨qu⟩ occurs in the imperfective stem of a verb, while [k] in the third stem and its derivatives (such as the PassPart). The voicing alternations like [g] ~ [k] are found in a somewhat broader range of forms, such as *rex* ~ *regis* ‘king’ NomSg ~ GenSg, *ingere* ‘to shape’ ~ *inxi* ‘I shaped’ or *secare* ‘to cut’ ~ *segmentum* ‘slice’. In the second declension the closest parallel to the *ecus* ~ *equi* type alternations, so far as we can judge, is the apparently short-lived pattern of *dius* ~ *divi* ‘godly’ NomSg ~ NomPlur, where a segment is clearly lost.¹⁴ By contrast, the alternations in verb stems are rather varied and generally show little phonological regularity apart from *a*-stems such as *amare*:¹⁵

- (2) *amare* ~ *amatus* ‘love’ (no alternation)
facere ~ *factus* ‘do’ (no alternation)

¹³ The analogical levelling of the type *ecus* ~ *equi* > *equus* ~ *equi* became general only after the 1st century AD, and modern editorial practice on this particular point is based on a tradition that postdates even Augustan times by a wide margin (see Buck 1899).

¹⁴ The form *dius* replaced earlier *divos*, and was itself analogically replaced by *divus* already in the early 1st century AD (Buck 1899).

¹⁵ These pairs are all Inf *-(e)re* and PassPart *-(tus)*. Apart from the first example, which is an *a*-stem, all the others are consonant stems (third conjugation), as are all the stems involving supposedly alternating ⟨qu⟩ except for *torqueo* (second conjugation). In an informal sense, the list is meant to represent an increasing distance between the alternants.

dīcere ~ dictus ‘say’ (vowel length)
 agere ~ āctus ‘do’ (voicing and vowel length)¹⁶
 vincere ~ victus ‘win’ (presence vs. absence of nasal)
 fingere ~ fictus ‘shape’ (voicing and nasal)
 spernere ~ sprētus ‘disdain’ (vowel length, nasal and metathesis of [r])
 sternere ~ strātus ‘lay down’ (vowel length and quality, nasal, metathesis of [r])
 solvere ~ solūtus ‘solve’ ([w] ~ [u:] alternation)
 fluere ~ fluxus ‘flow’ ([k] plus irregular [s] instead of [t])
 ferre ~ latus ‘carry’ (suppletion)

Those imperfective stems that end in ⟨qu⟩ show two patterns. In the third stem either [k] or [ku:] appears:

- (3) relinquare ~ relictus ‘leave’
 coquere ~ coctus ‘cook’
 loqui ~ locūtus ‘speak’¹⁷
 sequi ~ secūtus ‘follow’

Given the great variety of formal differences between the two verb stems (Impf vs. third stem), which can perhaps best be captured as a continuum with no alternation at one extreme and suppletion at the other, how does one decide how these patterns (*coquere* vs. *loqui*) support the argument for either interpretation of ⟨qu⟩?

The tendency is for *-ūtus* to correspond to [Cw] or [Cu] in the imperfective stem:

- (4) solvere ~ solūtus ‘solve’
 volvere ~ volūtus ‘roll’
 acuere ~ acūtus ‘sharpen’
 arguere ~ argūtus ‘show’
 tribuere ~ tribūtus ‘confer’

On this basis it is reasonable to say that *loqui* and *sequi* point to ⟨qu⟩ being a cluster rather than a single segment, since it parallels the [lw] of

¹⁶ Note that the length alternation is just the other way round than for *dīcere*. The *agere* ~ *āctus* type exemplifies the lengthening referred to as Lachmann’s Law (see Collinge 1985, 105–114).

¹⁷ *Loqui* and *sequi* are formally passive in almost all their forms. This is immaterial to the status of ⟨qu⟩.

solvere and *volvere*.¹⁸ But then what does one do with the case of *relinquere* and *coquere*? The point here is that there is no way of telling, in a synchronic grammar of Latin, which of the types in (2) they should be seen as belonging to.¹⁹ Is *coctus* parallel to *āctus*? If yes, then this would be an argument for ⟨qu⟩ being a single segment. But what if we say that *coctus* is parallel to *fictus* or *sprētus*, where a consonant is lost?

If we look at stems/roots that end specifically in [w], we see the following. The passive participle forms of the verbs *favēre* ‘to favour’, *cavēre* ‘to be on one’s guard’, *movēre* ‘to move’ and *vovēre* ‘to vow’²⁰ are *fautus*, *cautus*, *mōtus* and *vōtus*, respectively. This means no alternation in the first two (*fautus*, *cautus*),²¹ and loss of [w] with vowel lengthening in the others (*mōtus*, *vōtus*). This shows that it is possible for [w] to alternate with zero (cf. also *bos* ~ *boves* ~ *boum* ‘ox’ NomSing, NomPlur, GenPlur) just as it is possible for it to alternate with a vowel, as in *solūtus*. The morale of this point is that the *loqui* ~ *locūtus* type points to a cluster interpretation rather than the opposite, whereas the *coquere* ~ *coctus* type does not point conclusively in either direction. Given this, plus the fact that these alternations are highly restricted anyhow, one cannot conclude from these facts that ⟨qu⟩ is a single consonant in Classical Latin rather than a cluster.

As for the alternations outside inflectional morphology (e.g., *inquili-nus* ‘tenant’ ~ *incola* ‘inhabitant’), they do not unequivocally support the monosegmental analysis for basically the same reason. Alternation of [w] with zero before consonants and round vowels is an attested phenomenon in Latin, as has been exemplified above.

¹⁸ Clearly one could not argue that ⟨qu⟩ parallels – in the relevant sense – a CV sequence on account of the *arguere*-type.

¹⁹ This is not to say that comparative linguistics has not established with a fair amount of certainty the original morphological composition and the phonological history of all the forms adduced here. Everyone with at least a little familiarity with Indo-European linguistics knows that the nasal in *relinquere* used to be an imperfective infix and the [k] in *relictus* results from the neutralisation of PIE *[k^w] and *[k] in preconsonantal position, the length difference in *dīcere* ~ *dictus* goes back to ablaut, and so on. But the point is that these pieces of information do not impinge on how Classical Latin verb forms are synchronically related or whether ⟨qu⟩ is a cluster or not (in Proto-Indo-European it certainly was a single segment).

²⁰ These verbs belong to the second conjugation, not the third, which means that in the imperfective forms an *ē* tends to appear before the personal endings.

²¹ Note that these spellings stand for [fawtus] and [kawtus].

3.5. Minor points

3.5.1. *Ad*-assimilation

As is indicated in Prinz (1949–1950, 91), the [d] of the prefix *ad-* tends to assimilate to stem-initial stops if these are followed by vowels, but this tendency extends very weakly to forms in which the stem-initial stop is followed by a consonant (thus *ad+petere*, *ad+capere* → *appetere* ‘try to reach’, *accipere* ‘receive’, but more typically *adprehendere* ‘grasp’, *adclamare* ‘shout’; this generalisation is most evidently true of stem-initial [k]). Significantly, assimilation is hardly ever attested in ⟨qu⟩-initial stems, thus e.g., *adquirere* ‘acquire’ is much more frequent than *acquirere*, which means that *ad*-assimilation treats ⟨qu⟩ as a cluster rather than a stop.

3.5.2. Diachronic considerations

Both the prehistory and the later history of Latin arguably point to a single segment. In PIE *[k^w] can be reconstructed as a stop, which is, interestingly, in contrast with the cluster [kw]. This is clear from the phonotactic patterns that are reconstructed and also from the alternations involving these entities (primarily ablaut, see Rix et al. 2001 for the lemmata e.g., on pages 374–376 vs. 377ff). In the Romance languages, the continuation of Classical Latin ⟨qu⟩ is frequently a single stop again, either [k] as in French (CL *qui* > Fr *qui* [ki] ‘who’) or [p] as in Rumanian (CL *aqua* > Rum *apă* [apə] ‘water’).

Note, however, that while these considerations certainly have diachronic interest, they are of no import in terms of a phonological analysis. Restructuring is possible with or without concomitant phonetic change. The history of English shows a parallel development of PIE *[k^w] > Gmc [hw] and *[g^w] > Gmc [kw], as in *which* and *queen*, respectively, where stops developed into what are analysed as clusters on phonological grounds independently of their provenance. Furthermore, the later history of Classical Latin ⟨qu⟩ is far from uniform: in Italian, for instance, it developed intervocalically into [kkw], as in *acqua* [akkwa] ‘water’, which can be seen as a diachronic reflection of its cluster nature (though, admittedly, in Vulgar rather than Classical Latin).

3.6. Further remarks on the voiced labiovelar

As was shown in 2 above, the voiced labiovelar entity ⟨gu⟩ is found only in eleven lexical items and their derivatives, in all of them internally, following a velar nasal. This does not make it easy to argue for either position. If

⟨gu⟩ is a single segment, it is odd that it should be restricted to this particular position and not be found elsewhere (though, of course, the same could be said of [f], which practically only occurs word-initially in Latin). If, on the other hand, it is regarded as a cluster, the phonotactic restrictions seem to pattern somewhat less surprisingly: [ŋg] is an attested word-internal cluster and postconsonantal [w] can occur in the internal clusters [lw] [rw] [jw] [kw] [ŋkw] [rkw] [jkw] [skw] [ŋgw] (plus initial [sw]). Admittedly this is still far from a very good-looking generalisation, but perhaps less counterintuitive than having a single segment restricted to a very narrowly defined environment.²²

If one turns to other phonological regularities, there are not many of them involving ⟨gu⟩. As was noted in 2 above, in some words it is in free variation with [g] (*ninguit* ~ *ningit* 'it snows'); in some verbs it seems to parallel the *coctus*-type alternation (*unguere* or *ungere* ~ *unctus* 'smear' Inf ~ PassPart). This entity does not take part in any other type of alternation.²³ With this free variation and this alternation the balance seems to be tilting towards the monosegmental interpretation. But bear in mind that the *coctus*-type of alternation was argued to be inconclusive (see 3.4) on account of the generally highly varied formal relations between imperfective and third stems. Also note that the handful of examples of the ⟨gu⟩ ~ [g] free variation do not necessarily point to ⟨gu⟩ being a single segment. Free variation between [w] and zero is not unheard of in Classical Latin (again see 3.4): in the perfective of many verbs [w] is optional between identical vowels (*scivit* or *sciit* 'he knew', etc.), but also note forms like *antiquus* or *anticus* 'old'. Thus we see that the patterns involving ⟨gu⟩ are also inconclusive, though perhaps they point very weakly towards a cluster with a relatively low incidence.

4. Conclusion

Many of the arguments we have surveyed proved to be inconclusive. One argument can be adduced quite clearly in favour of the monosegmental interpretation, two arguments for the cluster interpretation, and another two arguments weakly also for the cluster interpretation (see table 1).

The upshot is that we have a balance that tilts slightly – but not very convincingly – towards the cluster interpretation, and at least half of the

²² Pace Watbled (2005, 45ff).

²³ If one disregards the totally idiosyncratic *ning(u)it* 'it snows' ~ *ni[ks]* 'snow' Nom ~ *nivis* 'snow' Gen.

Table 1:

	C	CC	Inconclusive
Frequency (3.1)			✗
Phonetics (3.2)			✗
Geminates (3.3.1)		(✗)	
Positional restrictions, stop + glide sequences (3.3.2)			✗
[sw] (3.3.3)		✗	
Verb stem structure (3.3.4)			✗
Voicing contrast (3.3.5)	✗		
Alternations (3.4)		(✗)	
<i>Ad</i> -assimilation (3.5.1)		✗	
⟨gu⟩ distribution, variation (3.6)			✗

arguments reviewed are inconclusive. Indeterminacy of this kind is not untypical of the world's languages. It is a fact to bear in mind whenever data are collected from descriptions and are processed for higher-level use, as in databases or in theoretical argumentation. Many analytical decisions go into the description of any language. But the farther one moves away from the primary data the less accessible and the more consequential the empirical bases of these decisions are.

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