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The floating C-Place node in Latin[1]

ANDRÁS CSER

Institute of English and American Studies, Pázmány Péter Catholic University & Research Institute for Linguistics, Hungarian Academy of Sciences

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In this paper it is argued that there existed, in a certain period of the history of Latin, a floating C-Place node in some lexical items in word- and stem-initial position. Notably, this was involved in the phonological representation of the words written – in an archaising fashion – with initial ⟨gn⟩. Based on a thorough analysis of the Brepols Corpus (CLCLT-5) it is demonstrated that the diachronic distribution of the prefixed forms of ⟨gn⟩-initial stems shows restrictions that can only be explained if one assumes a geometric representation involving a floating C-Place node that remained in the place of the original velar stop inherited from Proto-Indo-European. By classical times this floating node was also lost, and thus the possibilities for combining prefixes with original ⟨gn⟩-initial stems expanded.

1. Introduction

In the phonology of Classical Latin, the entity written ⟨gn⟩ is something of a puzzle, especially in word-initial position. Its reconstructible history has a clear beginning and endpoint. It started as Proto-Indo-European *[gn] and finished as (Late) Latin [n], as in the word *gnatus* [na:tus] 'son'. However, the details and the precise chronology of the loss of the initial [g] are not entirely clear. No attempt will be made here to settle the second issue, viz. the chronology of the process (at least in absolute terms); at any rate, it is generally agreed that by classical times (beginning with the mid-1st century BC) the initial stop was lost and its retention in writing was an archaism. What will be addressed here is the process of the phonological demise of the original initial [g], which raises interesting questions in view of the data, and lends itself, it will be argued, to an autosegmental analysis. The argument to be presented crucially hinges on prefixed forms of ⟨gn⟩-initial stems. These show an interesting asymmetry in the particular prefixes that could attach to such stems in that an older and a more recent layer can be quite clearly distinguished, the former with the prefixes *ad-*, *con-* and (negative) *in-*, the

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latter with almost all others (a few prefixes are not attested with such stems at all, but this is probably not a phonological issue). It will be demonstrated that this curious asymmetry can be explained if we assume that at a certain stage in the prehistory of the Latin language ⟨gn⟩-initial stems involved, in initial position, a floating C-Place node dominating a Dorsal node which, in turn, dominated the features [+high, +back]. Thus, the loss of initial [g] was a two-stage depletion process, with all manner features, the Laryngeal node as well as the Root node disappearing first, the C-Place node only later, and the delimitation of the prefixes that could combine with these stems to the three listed above dates from the stage preceding the disappearance of the floating C-Place node.

Analyses involving floating features have long been present in the phonological literature. As is well known, such analyses initially involved tonal phenomena but were then extended to non-tonal (melodic) features to explain harmony phenomena or to describe certain types of non-segmental morphological constituents.[2] In this paper it is neither a harmony phenomenon nor a morphological entity that is analysed in terms of a floating node; it is argued that a handful of lexical stems involved such a structure and this influenced their behaviour with respect to concatenative morphology (prefixation).

In what follows, we will first introduce the phonological representations assumed in this paper. Then the data involving ⟨gn⟩ will be discussed under three headings (in simplex forms, word-initially and after prefixes), and then, after summarising our findings, we will elaborate a hypothesis of what the precise phonological representation of the entity ⟨gn⟩ was and how it may have developed from Proto-Indo-European to post-classical Latin. As mentioned above, the argument crucially hinges on prefixed forms, so the central section of the paper is devoted to these. Finally, those words are discussed that appear to present a problem to the argument developed here.

2. THE PHONOLOGICAL REPRESENTATIONS

The representations we assume for the Classical Latin segmental inventory involve the feature set given in Tables 1 and 2.[3]

[2] For an excellent survey see Zoll 1996. Well-known analyses involving floating non-tonal features include, among others, Chaha labialisation and palatalisation (McCarthy 1983), Terena nasalisation (Durand 1990: 254, there taken from Bendor-Samuel 1960), Japanese Rendaku (Itô & Mester 1986), and some aspects of vocalic alternations in Hungarian suffixes (Kornai 1994) as well as vowel harmony (Siptár & Törkenczy 2000: 157ff.).

[3] The feature set is based on Hall 2007. While the system presented there is not without problems, as Hall duly points out, it embodies a fairly standard set of assumptions about feature inventories and certain aspects of subsegmental structure. We depart from Hall's system in the treatment of [j] as dorsal (see footnote 4). We also depart from it in treating [l] as [+continuant], though this is immaterial for the argumentation presented here.

		l	r	j	w	m	n	b	d	g	p	t	k	f	s	h
Place	Coronal	✓	✓				✓		✓			✓			✓	
	Dorsal			✓	✓					✓			✓			
	[high]			+	+					+			+			
	[back]			–	+					+			+			
	Labial				✓	✓		✓			✓			✓		
Manner	[son]	+	+	+	+	+	+	–	–	–	–	–	–	–	–	–
	Laryngeal	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	[voice]	+	+	+	+	+	+	+	+	+	–	–	–	–	–	+
	[nas]	–	–	–	–	+	+	–	–	–	–	–	–	–	–	–
	[cont]	+	+	+	+	–	–	–	–	–	–	–	–	+	+	+
	[lat]	+	–				–		–			–			–	

Table 1
Distinctive features for Classical Latin consonants

		a	e	i	o	u
Place	Dorsal	✓	✓	✓	✓	✓
	[high]	–	–	+	–	+
	[back]	+	–	–	+	+
	Labial				✓	✓

Table 2
Distinctive features for Classical Latin vowels

As regards manner, all vowels are redundantly [+son], [+voice], [+cont], and underlyingly [−nas]. On the surface, however, there is a contrast between (long) [−nas] and [+nas] vowels (*des* [deːs] 'you should give' vs. *dens* [dẽːs] 'tooth'), with the latter derivable from vowel+nasal consonant sequences. The featural composition of the glides [j] and [w] is the same as that of [i] and [u], respectively. The difference between glides and vowels is encoded in their syllabic position rather than their subsegmental structure.[4]

[4] While not uncontested, this assumption is fairly widespread among phonologists. For an excellent overview, serious counterarguments and an alternative proposal, see Padgett 2008. In contemporary phonology the idea seems to go back to the early 1980s (Clements & Keyser 1983, Steriade 1984, Levin 1985) though, of course, the idea of the structural correspondence between high vowels and glides was central already to ablaut theory in nineteenth-century Indo-European linguistics.

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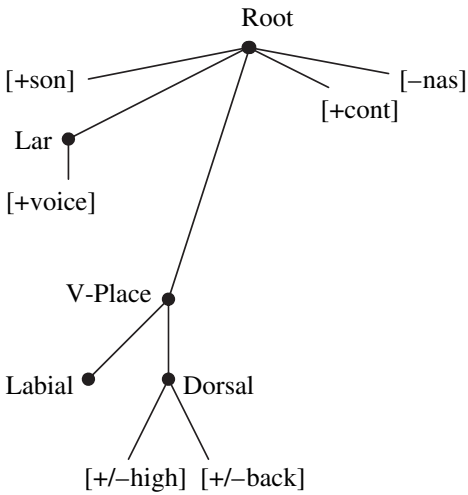
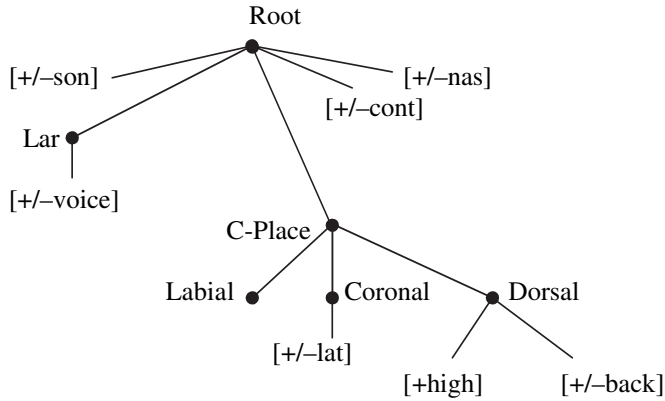
As regards place features, we follow the assumption embodied in recent work on feature geometry that the place features of consonants and those of vowels are organised under two different nodes. Generally speaking, vowels and glides only have a V-place node, whereas consonants only have a C-Place node.[5] Exceptions involve secondary place in consonants, which is found in Latin only in predictable environments (e.g. velarised [ɬ] in pre-consonantal position and before back vowels) and will not be discussed in this paper. The following charts illustrate the basic configurations for vowels and glides (see (1)) and for consonants ((2)), and exemplify a consonant with secondary articulation ((3)).

(1) *The structure of vowels and glides*

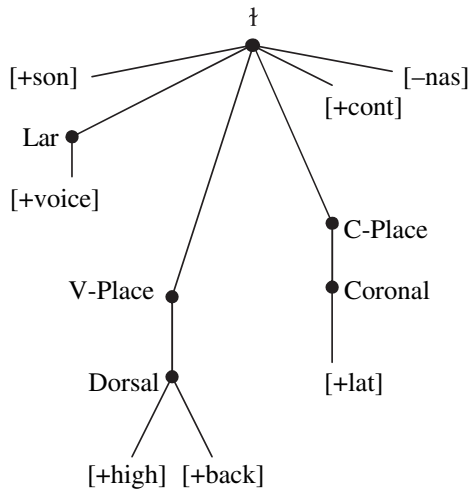


[5] Arguments for such a model of feature geometry come mainly from cross-linguistic patterns of interactions between vocalic and consonantal place features, the distribution and behaviour of secondary place features in consonant systems and various phonological processes affecting place. Clements & Hume 1995 gives a detailed exposition of such a model, though in that geometry only the intermediate nodes differ in consonants and vowels, and the trees converge at the bottom on the same features on the same tiers. This makes the model extremely powerful since the interaction between vocalic and consonantal place features can be described with reference to the features, which are identical, but lack of interaction between vocalic and consonantal place features can be described just as well as long as reference is made to the intermediate nodes, which are not identical. Morén 2003 elaborates a more restricted model based on a very similar assumption, viz. that a V–Place node is subsumed under the C-Place node and dominates the place features of vowels which are identical to the secondary place features of consonants. In Cser 2003 a substantially simpler geometrical model of subsegmental structure was worked out in which vowel and consonant place elements are on different tiers and the former can also function as secondary place elements in consonants.

(2) *The structure of consonants*



(3) *The structure of a consonant with secondary articulation* (*velarised* l)



In this paper consonants with secondary articulations will be generally irrelevant; their structure is shown here for completeness.

3. Medial ⟨gn⟩ in simplex forms

It is generally agreed that instances of the entity written ⟨gn⟩ go back etymologically to a prehistoric cluster *[gn] (in some cases *[kn]), but by the time Latin came to be written, ⟨gn⟩ was the graphic representation of the cluster [ŋn] medially (as well as at prefix–stem boundaries), thus *agnus* [aŋnus] 'lamb', *ignis* [iŋnis] 'fire' etc. The arguments, succinctly summarised

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in e.g. Allen (1978: 23–25), or indeed any of the relevant handbooks, are the following:

- In the prehistory of Latin, there was a tendency for stops to be nasalised before nasals (e.g. [pn] > [mn], as in **swepnos* > *somnus* 'sleep, dream', cf. Old English *swefn* or Greek *hupnos* 'dream', or [tn] > [nn], as in **atnos* > *annus* 'year', cf. Gothic *aþn*).[6]
- Inscriptional evidence includes several forms like ⟨INGNES⟩ for *ignes* 'fire(s)', attesting to the outcome of the nasalisation of [g] before nasals.
- The sound change [e] > [i], which was conditioned by (especially velar) NC sequences (**[teŋg-]* > *tinguere* 'dip', **[peŋkwe]* > *quinque* 'five'), but by no other type of consonant cluster,[7] was also triggered by ⟨gn⟩: **[dekn-]* > *dignus* 'worthy' (scil. via **[deŋn-]*).
- The spelling of *n*-final prefixes provides additional evidence. For example, negative *in-* is optionally spelled ⟨im⟩ before the labial stops and [m] (as in ⟨im + politus⟩ 'unpolished', ⟨im + berbis⟩ 'beardless', ⟨im + mortalis⟩ 'immortal'), ⟨il⟩ before [l] (as in ⟨il + lepidus⟩ 'lacking refinement') and ⟨ir⟩ before [r] (as in ⟨ir + rasus⟩ 'unshaved'). As one would expect, it is written ⟨in⟩ before the velar stops, there being no distinct spelling for [ŋ] (as in ⟨in + celebratus⟩ [iŋkelebraːtus] 'unrecorded'). Before other consonants as well as before vowels, it is consistently written ⟨in⟩ (as in ⟨in + ermis⟩ 'unarmed', ⟨in + decens⟩ 'unseemly'). Before an original ⟨gn⟩-initial stem, however, the spelling of *n*-final prefixes involves the apparent (unparalleled) loss of an ⟨n⟩ as in ⟨ignoscere⟩ 'forgive' from ⟨in⟩ + ⟨gnoscere⟩ 'know', but this is easily explained if this written form represents [iŋnoːskere] 'forgive'. Where the morpheme boundary actually falls is a tricky question but will be clearer after the ensuing discussion of prefixed forms.

4. Initial ⟨gn⟩

Word-initially ⟨gn⟩ is slightly more problematic than medially because (i) it is restricted to a handful of words; (ii) in all these words except the proper name *Gnaeus* it is variably replaced by ⟨n⟩; and (iii) an initial cluster [ŋn]

[6] Original fricatives are not found before nasals for various reasons, and sonorants did not assimilate to nasals in any way. The persistent spelling with ⟨g⟩ instead of some other symbol for the velar nasal (including most inscriptions) is not surprising because (i) [ŋ] was in complementary distribution with [g] as well as with [n]; (ii) in Greek spelling also, the letter gamma was used for [ŋ], i.e. ⟨γγ⟩ = [ŋg], ⟨γκ⟩ = [ŋk] and ⟨γχ⟩ = [ŋkʰ], besides its standard value ⟨γ⟩ = [g].

[7] More precisely, a preconsonantal [ŋ] always triggered the change, preconsonantal [m] triggered it in some cases but not in others (e.g. *simplex* 'simple' vs. *semper* 'always', both from the PIE root **sem-* 'one'), whereas preconsonantal [n] never triggered the change (e.g. *sentire* 'feel'). Other consonant clusters did not trigger the change (cf. *negligere* 'neglect', *lectus* 'bed', *consecrare* 'consecrate'). There was an unrelated [e] > [i] change in non-initial open syllables (**miletes* > *milites* 'soldiers').

would be very odd phonotactically in that there are no onset clusters consisting of two sonorants either internally or initially.[8] An exhaustive list of attested lexemes with initial ⟨gn⟩ is the following:

(4) *Gnaeus* [proper name]
gnarus (overwhelmingly) ~ *narus* 'expert'
gnatus (esp. pre-classical) ~ *natus* (overwhelmingly)[9] 'born, son'
gnavus ~ *navus* (more frequently) 'diligent'
gnoscere (sporadically) ~ *noscere* 'know'
gnobilis (2 pre-classical occurrences) ~ *nobilis* 'noble'

Etymologically, all these words apart from *Gnaeus*[10] go back to two Proto-Indo-European stems, *$*genh_3$- (> *gnarus*, *gnavus*, *gnobilis*, cf. English *can*, *know*) and *$*genh_1$- (> *gnatus*, cf. English *kin*). It is clear that the gross diachronic process we are interested in here began with PIE *[gn-] and finished at some point in Late Latin with [n-], but what happened in between and which stage does Classical Latin belong to?

We are going to argue that the middle stage of the process involved a floating C-Place node in the place of the original *[g] stem-initially. Later the stems beginning with the floating C-Place node were gradually relexicalised either without it (i.e. with a single initial [n]) or, when prefixed, with a [ŋn] cluster (like medially) and the phonological forms of alternating lexemes split into two. This relexicalisation was caused by prefixation in the first place, and is also evidenced best by it, so it is to the prefixation of ⟨gn⟩-initial stems that we now turn.

5. Prefixed ⟨gn⟩-initial stems

As in older Indo-European languages generally, prefixation was an important and widely used derivational process throughout the history of Latin. In terms of productivity, transparency and phonological interference, the prefixed words of Classical Latin can be arranged on a cline with strongly lexicalised and opaque forms at one extreme and relatively transparent formations at the other. This cline is related, though certainly not in an

[8] For an exhaustive listing of consonant clusters and an analysis of syllable structure one may consult Cser 1999 and Lehmann 2005. Onset clusters are restricted to stop + liquid clusters and [fl fr sw]. Nasals are not found at all in onset clusters. The other two original [g]-initial clusters [gl gr] are stable and no change affects either the stop or the liquid.

[9] Zirin (1970: 27–28) cites data that show a distinction between the noun 'son' and the participle 'born' in manuscripts of Plautus in that the former is always written with ⟨gn⟩, the latter variably.

[10] Though note that a remark found in Paulus' epitome of Festus' dictionary referred to as *De verborum significatu* (2nd century AD?) implies that this name was related to the common noun *naevus* (<*gnaevus?) 'birth-mark' (*gneus et corporis insigne et praenomen a generando dicta … apparet* 'it is clear that [the word] gn[a]eus, "mark on the body" as well as a first name, derives from engendering (*generare*)', here cited from the *Oxford Latin Dictionary* s.v.).

isomorphic fashion, to the diachronic emergence of these forms.[11] Prefixation led in many cases to lexicalisation, which in turn resulted in drastic phonological modifications at the prefix–stem boundary as well as within the stem.[12] The pace and the extent of lexicalisation, however, were highly variable (which explains the cline mentioned above). Furthermore, prefixation also involved recomposition in all periods of the documented history of Latin. An early case of recomposition is seen in *perjūrare* 'to forswear', which is the recomposed variant of the older form *peierare* [pejjera:re]. Later recompositions can be reconstructed on the evidence of Romance languages; it is well known that reflexes of forms like *rétinet* 'he keeps' (< *re* + *tenet*) often derive not from the inherited Classical Latin forms but from recomposed variants such as **reténet* (> Fr *retient* etc.).

The phonological processes that occur at prefix–stem boundaries are mostly assimilations (all regressive). Two generalisations emerge quite clearly: (i) in place assimilations, coronals generally assimilate to non-coronals and labials often assimilate to velars (see (5) below); (ii) in full assimilations, consonants only assimilate to consonants of higher sonority (see (6) below).

(5) *Place assimilation at prefix–stem boundary*
in + *politus* → *impolitus* 'unpolished'
dis + *fidere* → *diffidere* 'mistrust'
ad + *gradior* → *aggredior* 'go up to'
sub + *gerere* → *suggerere* 'pile up'

(6) *Total assimilation at prefix–stem boundary*
in + *rigare* → *irrigare* 'make wet'
sub + *ferre* → *sufferre* 'endure'
sub + *rapere* → *surripere* 'steal'

Both generalisations represent tendencies that are well attested cross-linguistically. The first is an instantiation of the general 'weakness' of the coronal place of articulation (see Paradis & Prunet 1991).[13] The second generalisation is evidently related to the observation that heterosyllabic

[11] The best summaries of these issues to date are Prinz (1949–50, 1953), which are based on an extensive study of manuscript and inscriptional evidence as well as grammarians' remarks; one may further consult Leumann (1977: 181–219) on the sound changes that took place in consonant clusters, including those that emerged at prefix–stem boundaries, Buck (1899) on the assimilation of prefix-final consonants, and García González (1996), a short case-study of the prefix *ad-* and its epigraphic variants based on the Roman inscriptional corpus (*CIL* vol. 6).

[12] Within stems, these phonological modifications are virtually confined to short vowels; a discussion of these is beyond the limits of the present work.

[13] Rice (1996, 2007) has treated the issue extensively. In particular, Rice (1996) elaborates a hypothesis that explains the apparent unmarkedness of both the coronal and the velar places of articulation. Interestingly, the behaviour of labials vs. velars in Latin shows the opposite tendency, similar to that in Korean mentioned by Rice (2007: 84), viz. labials assimilating to velars but not vice versa.

clusters preferentially show falling sonority, which was first proposed and amply documented in Hooper 1976 and Murray & Vennemann 1983, and came to be known as Syllable Contact Law.[14]

In Table 3 all the prefixed words based on ⟨gn⟩-initial stems are listed with comments. The data were taken from volume 1 of the Brepols Corpus (CLCLT-5).

A careful examination of the data very strongly suggests a distinction between two types of prefixed forms, one of which is likely to be more archaic and the other more recent. The five features that tend to cluster in the older forms and distinguish them from the newer ones are the following:

- earlier attestation
- higher frequency in the corpus
- more complete paradigms
- written with ⟨gn⟩ rather than ⟨n⟩
- sometimes less transparent meaning

While these criteria do not pattern together in all cases, they quite clearly distinguish between many of the prefixed ⟨gn⟩-words (e.g. *ignoscere* 'forgive' vs. *praenoscere* 'know in advance' or *cognatus* 'relative' vs. *internatus* 'growing between'). In general, prefixation with *ad-*, *con-* and negative *in-* appears to be more archaic in the set of ⟨gn⟩-words than all other cases of prefixation (with a few exceptions to which we will return). The common feature of these three prefixes is that they end in the consonants that are most prone to assimilation.

How can one possibly explain this? What is the phonological structure that accounts for the odd distribution of prefixes on ⟨gn⟩-initial words and how did it develop? As we see it, the diachronic process can be desribed in three stages through which the phonological representation of ⟨gn⟩-initial words changed.

5.1 *Stage 1:* [gn-]

At the earliest stage, identical in the relevant respect to that reconstructed for Proto-Indo-European, these words began with [gn-] (and possibly internal [gn] still existed unchanged).[15] This cluster was somewhat untypical

[14] More recently, the role of sonority in the development of consonant clusters in Late Latin was analysed in Gess 2004, where the validity of essentially the same generalisation is demonstrated in an Optimality Theoretic framework.

[15] There is one word, *niti* 'to lean on', which may go back to a PIE **kn*-initial root (de Vaan 2008: 410). It is, however, not attested with initial ⟨gn⟩ apart from a lexicographic reference of a somewhat troubled history, discussed in Stephens 1980. The change [kn] > [gn]/#_ is claimed to be unlikely in Stephens 1978 on typological grounds, viz. that languages typically do not have initial voiced obstruent + nasal clusters without also having initial voiceless obstruent + nasal clusters, that is, since [gn-] presupposes [kn-], the latter is unlikely to be replaced by the former.

STEM	PREFIX	PREFIXED FORM	GLOSS	COMMENT
(*g*)*narus*	*in-*	*ignarus*	'ignorant'	Much more frequent than (*g*)*narus*, and attested all through the period of written Latin.
	pro-	*prognariter*	'deftly'	Once in Ennius and once in Plautus (3rd–2nd c. BC).
	per-	*pergnarus*	'very deft'	Once in Apuleius (2nd c. AD) and once in Sallust (1st c. BC, debated occurrence).
(*g*)*navus*	*in-*	*ignavus*	'idle'	Much more frequent than (*g*)*navus*, attested all through the period of written Latin, and also more complete morphologically in that only *ignavus* has comparative and superlative forms.
nobilis	*in-*	*ignobilis*	'ignoble'	Very frequent and attested all through the period of written Latin.
	per-	*pernobilis*	'most noble'	First occurrence in Cicero (once; 1st c. BC), then a handful later.
	prae-	*praenobilis*	'most noble'	Apuleius (2nd c. AD), then Prudentius (4th c. AD) and a handful later.
	con-	*cognobilis*	'cognisable'	First in M. P. Cato (3rd–2nd c. BC), then a handful in classical and later times, but semantically clearly from *cognoscere*, not from *nobilis* (though the stems are etymologically related).
(*g*)*noscere*	*in-*	*ignoscere*	'forgive'	All three words significantly more frequent than (*g*)*noscere* and widely attested in most paradigmatic forms (perfective and third stem forms).
	ad-	*agnoscere* (also ⟨adgn-⟩, ⟨adn-⟩)	'acknowledge'	
	con-	*cognoscere*	'recognise'	
	per-	*pernoscere*	'thoroughly know'	Fairly rare word; perfective only attested in Plautus (3rd–2nd c. BC) and Terence (2nd c. BC) with one exception; third stem not attested at all.

	inter-	*internoscere*	'distinguish'	Once in Pacuvius (2nd c. BC), then Lucretius (1st c. BC) and some occurrences later; third stem not attested at all.
	prae-	*praenoscere*	'know in advance'	Cicero (1st c. BC), Ovid (1st c. BC–AD), then most occurrences in Christian Latin; perfective forms 5 altogether; third stem not attested at all.
	dis-	*dinoscere*	'distinguish'	Horace (1st c. BC), Ovid (1st c. BC–AD), then fairly popular later, especially with Christian writers; perfective forms attested only at the end of the 4th c. AD; third stem not attested at all; the spelling ⟨dignoscere⟩ is introduced by Tertullian (c. AD 200).
	re-	*renoscere*	'recognise'	First in a 4th c. AD text of dubious authenticity, then a handful of occurrences in the 5th c.; no perfective or third stem forms attested.
	re- + *con-*	*recognoscere*	'remember'	First attested in Cicero and Virgil (1st c. BC), then very frequently, especially in Christian writers.
	ad- + *con-*	*adcognoscere* (also ⟨acc-⟩)	'acknowledge'	Handful of occurrences in Varro (1st c. BC), Seneca, Petronius, Quintilian (1st c. AD) and Tertullian (1st–2nd c. AD).
(*nō-*)	*in-*	*ignorare*	'not know'	Frequent and attested all through the period of written Latin.
(*g*)*natus*	*con-*	*cognatus*	'relative'	Fairly frequent words, attested from earliest times.
	pro-	*prognatus*	'son'	
	con-	*connatus*	'born together'	Once in Tertullian (1st–2nd c. AD), then a handful in later Christian writers.
	pro-	*pronatus*	'born'	Only in Tertullian (1st–2nd c. AD) and Commodianus (3rd c. AD).
	ad-	*agnatus* (also ⟨adn-⟩, ⟨adgn-⟩)	'born after father's death'	Once in Accius (*agnatio*, 2nd c. BC), then Varro, Cicero (1st c. BC) and later.
	in-	*innatus*	'innate'	A fairly rare word, attested from Plautus (3rd–2nd c. BC) and Terence (2nd c. BC) onwards.

Table 3 (*Cont.*)

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STEM	PREFIX	PREFIXED FORM	GLOSS	COMMENT
	ex-	*enatus*	'growing out'	A rare word, first attested in Pacuvius (2nd c. BC), then in Horace (1st c. BC) and Livy (1st c. BC–AD).
	re-	*renatus*	'born again'	Attested with some frequency from Lucretius (1st c. BC) onwards, popular especially with Christians.
	inter-	*internatus*	'growing between'	A rare word, first attested in Livy (1st c. BC–AD).
	sub-	*subnatus*	'growing underneath'	Hapax in a 1st c. BC text of dubious authorship.
-gna(n)t-	*prae-*	*praegna(n)s*	'pregnant'	Frequent and attested from earliest times onwards; stem in this form only occurs in this particular word.

Table 3
Prefixed ⟨gn⟩-initial stems (exhaustive list)

of Proto-Indo-European, though not unheard of, and it resulted from the loss of a vowel between the two consonants through ablaut (cf. Eng *knee* ∼ Lat *genu*, or Lat *genitus* 'engendered, born' vs. *gnatus* 'son'). It is clear that this phonological form does not explain why prefixation with certain morphemes was preferred to prefixation with others; it is hardly conceivable that the prefix **ad-* or **n̥-* (> *in-*) would have resulted in phonologically well-formed words but a liquid- or vowel-final prefix such as those historically underlying *per-* and *de-*, respectively, would not. Even if one assumed phonological simplification along the lines presented in (7), the conspicuous absence of vowel-final prefixes from the archaic set would still be unexplained.

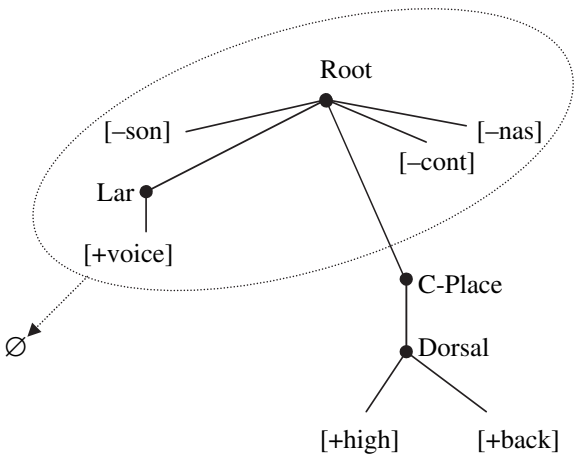
(7) [ŋgn] > [ŋn] (e.g. in the etymon of *cognoscere* 'recognise')
[dgn] > [ggn] > [gn] (> later [ŋn]) (e.g. in the etymon of *agnoscere* 'acknowledge')

It may be surmised that at this stage prefixation was indeed freer with these stems and the restriction seen in (early) documented Latin dates from a later (but still prehistoric) stage.

5.2 *Stage 2: floating C-Place*

At some point in the prehistory of Latin, initial [g] was lost as a full segment and what remained in its place was a floating C-Place node dominating a Dorsal node which, in turn, dominated the features [+high, +back]. This change, which only took place in the environment #_[n], can be formalised as shown in (8).

(8) *Loss of structure in initial* [g]



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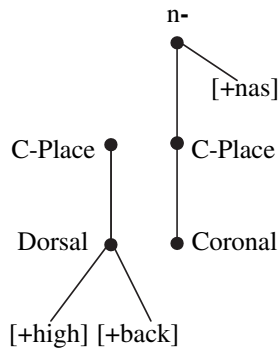
The lexical representation of words like *gnatus* thus involved the configuration in (9).[16]

(9) *Phonological representation of initial ⟨gn⟩*



The realisation of this configuration on the surface must have involved a degree of variation whose details are no longer fully recoverable. Assuming that floating (unlinked) features and nodes could not surface, it is conceivable that the floating C-Place node was deleted; it is also possible that a conservative surface realisation [gn] persisted for some time.

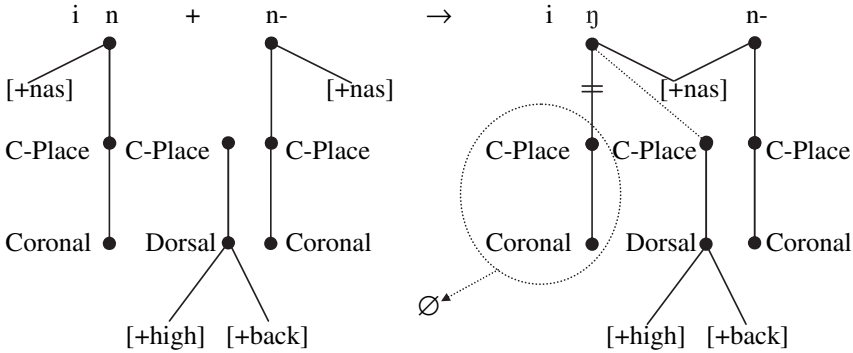
At this point it will be clear why the set of prefixes that attach to ⟨gn⟩-initial stems was restricted to *ad-*, *con-* and *in-* precisely at this stage. The most readily assimilating consonants are [d] and [n], which means that it is primarily coronals that delink their place specification and relink to the place specification of the following consonant. What happens in the case of the ⟨gn⟩-initial words is analogous to that process. Whenever one of the above three prefixes was associated with such a stem, the floating C-Place node with a Dorsal specification triggered assimilation in the same way as any stem-initial velar (or labial) consonant, i.e. it spread leftwards, the only direction allowed in Latin. But when a non-assimilating consonant (such as [r], which does not undergo place-assimilation at all[17]) or a vowel would have been adjacent to the floating C-Place node, the reassociation of the C-Place node could not take place and thus an ill-formed word would have emerged with a

[16] The representations that follow are simplified to highlight the relevant portions of the subsegmental structure.

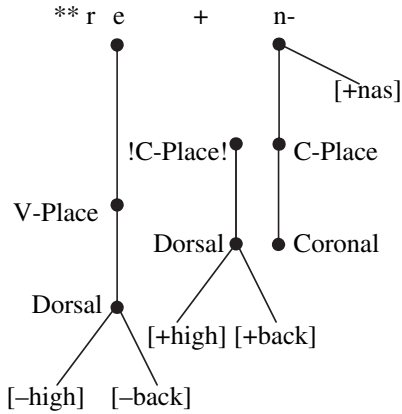
[17] The reason for the lack of place-assimilation targeting [r] is the universal ban on velar trills, since the association of the manner features of [r] with Dorsal [+high, +back] would result in a velar trill (a uvular trill would be Dorsal [−high, +back]). The spreading of Labial to [r] is impossible probably for a similar (though perhaps language-specific) reason. The only consonants found prefix-finally are [d s n b r j]. Of these, [j] has the structure of a vowel (i.e. it has a V-Place node and no C-Place node) and [s] never occurs before a voiced consonant. The issue of [b] and the placeless nasal of *con-* will be taken up later.

stranded floating node in non-initial position.[18] The diagrams in (10) and (11) illustrate this with *ignoscere* vs. the then impossible ***re*(*g*)*noscere*.[19]

(10) *Assimilation in* in + ⟨gn⟩



(11) *Lack of assimilation in* **re + ⟨gn⟩



Note that the internal cluster in a word like *regnum* [reːŋnũː] 'kingdom' is, of course, well-formed since it does not involve a floating C-Place node; this is the difference between that word and ***re* + *gnoscere*.

With *ad-* the place assimilation process is formally the same (see (12) below). The only difference is that the outcome of the relinking of the floating

[18] In (11), the stranded C-Place node is marked with !…!. As was explained in Section 2, vowels do not have a C-Place node and the primary place features of consonants and the place features of vowels are found on different tiers; this explains why vowels cannot associate with the floating C-Place node and produce something like ***runoscere* from *re* + $_{[Dorsal]}$*noscere*.

[19] The coalescence of the two [+nas] features in *ignoscere* 'forgive', just like in *cognoscere* 'recognise' below in (13), results from the Obligatory Contour Principle and will not be discussed here.

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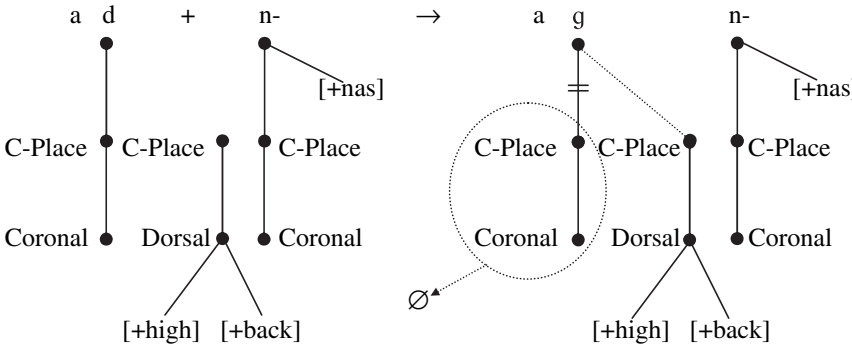
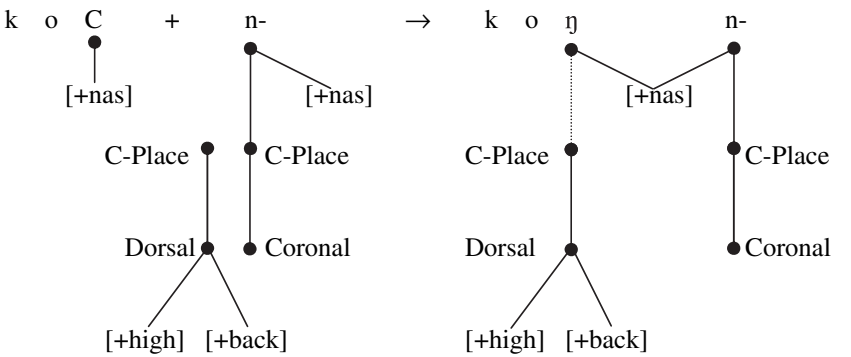
C-Place to the [d] is [g], and the resulting [gn] cluster has yet one more process to undergo, scil. [gn]→[ŋn], which eventually levelled out the variation internally (and which has to be postulated independently because of the *regnum*-type words).

(12) *Assimilation in* ad + ⟨gn⟩-



The behaviour of *con-* is, on the face of it, like that of *in-*. Descriptively they are alike before ⟨gn⟩-initial stems. However, there is a very important difference between the two prefixes: the nasal of *con-* regularly drops before vowel-initial stems (*coegi* 'I coerced', *coire* 'join' as opposed to *inultus* 'unavenged', *inermis* 'unarmed' etc.). This can be explained if we assume that *con-* ended in a placeless nasal, which could only get a place specification from a (following) consonant (since primary place features do not spread from consonants to vowels or vice versa). If there was no consonant in its immediate vicinity, the placeless nasal was not maintained. Before a stop, however, the placeless nasal assumed the C-Place node of the following consonant, as in *componere* 'compose' or *co*[ŋ]*quirere* 'collect', and the same happened before ⟨gn⟩-initial stems (e.g. *cognoscere* 'recognise', see (13)):

(13) *Assimilation in* con + ⟨gn⟩-



A little detour is in order here concerning the prefix *con-*. If one assumes a placeless nasal in this prefix, the question arises how it acquires a coronal

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place of articulation before glides, as in *convertere* 'turn around, translate' and *conjungere* 'join' (stem-initial [w] and [j], respectively). The answer is not straightforward, for two reasons. The empirical issue is whether the nasal was actually coronal in such forms. Before [j] virtually the only spelling one finds is with ⟨n⟩, though inscriptional evidence of ⟨COIV(N)X ⟩ 'spouse' and similar variants exists. Of course, Latin spelling had no way to indicate palatality, so one may imagine that [n] developed a palatal allophone [ɲ] before [j]. Before [w] there is some evidence of a labial pronunciation coming from the grammarian Marius Victorinus (4th century AD). He explicitly claims that the relevant forms are ⟨comvalescit⟩ 'convalesce', ⟨comvocat⟩ 'summon' with ⟨m⟩ rather than ⟨n⟩ (*Ars Grammatica* 4.65). The problem is not only that such forms are extremely rare generally, but also that Marius Victorinus's other claims seem to be so far-fetched (e.g. ⟨ovvertit⟩ 'turn back' and ⟨ovvius⟩ 'facing' instead of ⟨obvertit⟩, ⟨obvius⟩) that one feels one has to take even this apparently plausible piece of information regarding ⟨comvocat⟩ etc. with a pinch of salt. Note, however, that he does not claim the same for *in-*, which seems to be in line with our assumption that *in*-ended in a coronal nasal, whereas *con*-ended in a placeless nasal.

Besides the empirical issue there is a theoretical issue as well: how could a place feature spread from a glide to a consonant if glides have the same structure as vowels (i.e. they have no C-Place node, only a V-Place node, as explained in Section 2) and so their place features are not on the same tier as those of consonants? A possible solution is to assume that the spelling ⟨con⟩ stood for [kõː] rather than [kon] before glides (as well as before [s]), so there was actually no spreading (and no true labial nasal in the putative ⟨comvocat⟩-type words!). This would also explain why Marius Victorinus gives examples of the ⟨in⟩>⟨im⟩ assimilation before the labial consonants [p b f m], but not before [w].[20]

Concerning the hypothesis of the floating C-Place node at stage 2, there is one more possible objection that needs to be addressed. Given that the *b*-final prefixes also assimilate more or less systematically to stem-initial velars (*sub*+*gerere*→*suggerere* 'pile up', *ob*+*gerere*→*oggerere* 'heap'), why do we not find forms like ***sugnoscere* [suŋn-]<[sugn-]<[sub]+$_{[Dorsal]}$[ŋ]- next to *suggerere* and *oggerere*? The answer is that, in all likelihood, the absence of such words is not due to their phonological shape (which would indeed be well-formed) but to semantic reasons and pure lexical contingencies. A possible argument for this position is that none of the three [b]-final prefixes combined with any of the ⟨gn⟩-initial stems even in the latest period of native Latinity, by which time the floating velar was certainly lost; as is

[20] As an anonymous *JL* referee pointed out, another possibility is to assume that coronality is added as a default place with no local source. This would indeed be in line with much of the literature on coronality, default place and unmarkedness (e.g. Paradis & Prunet 1991; Szigetvári 1994, 2006; Rice 1996, 2007; cf. also note 13).

shown in Table 3 above, the only such form attested is the hapax *subnatus* 'growing underneath' found in a text of unclear provenance.

5.3 *Stage 3: relexicalisation without floating C-Place*

For a while the alternations of the *noscere* ~ *i*[ŋ]*noscere*, *natus* ~ *co*[ŋ]*natus* type maintained the representations with the floating C-Place node even if it was not realised phonetically (in word-initial position). But it is clear that the literary period saw the gradual disappearance of the floating C-Place node and the lexical split of words in which it occurred. The unprefixed forms were relexicalised with a single initial [n], whereas the prefixed forms were relexicalised with a fully specified [ŋn] sequence which was no different from the [ŋn] sequence found internally in the *regnum* and *ignis*-type words, and from this point on the relation between these unprefixed and prefixed forms was no longer motivated phonologically. This made it possible for other prefixes to attach to ⟨gn⟩-initial (now phonologically *n*-initial) stems, hence the novel formations like *renatus* 'born again', *praenoscere* 'know in advance' and *pernobilis* 'most noble'. Interestingly, the phonologically no longer motivated, lexicalised relation between unprefixed and prefixed ⟨gn⟩-words also made it possible for authors like Tertullian to introduce the deliberately archaising form (spelling variant?) ⟨dignoscere⟩ for the novel formation *dinoscere* 'distinguish', itself made possible by the relexicalisation of *noscere*.

As for the morphological structure of the forms involved, at stage 2 the morpheme boundary in prefixed forms of the *ignoscere*-type actually divided the prefix-final nasal in that its C-Place node was on the right of the boundary, being part of the stem, but its root node and its manner features were on the left of the boundary, being part of the prefix. At stage 3, however, the morpheme boundary was between the two nasals, with the prefix variants [iŋ koŋ aŋ] reanalysed as lexically selected exceptional allomorphs before certain *n*-initial stems.

6. Problematic words

Problematic items remain, however, and we will now turn to these.

(i) *Gnaeus* (proper name). This name is consistently written in this way and abbreviated *Cn* throughout Antiquity. This could, in theory, indicate that the loss of the floating C-Place node did not take place. But if we consider that this was a proper name, scribal conservatism is likely to have been especially strong and need not point to anything particular about the phonology of this word. It is, of course, also conceivable that a spelling pronunciation [gnajjus] existed until the end of Classical Latin, maybe even later.

(ii) *prognatus* 'son'. There is no doubt that this is one of the early prefixed forms of *gnatus* along with *cognatus* 'relative' and possibly *agnatus*/

agnatio 'born/birth after father's death'. Why then does it have *pro-*, a prefix that otherwise does not attach to ⟨gn⟩-initial stems for reasons discussed above? As we see it, there are three possible explanations. One is that this word was reanalysed as a single word already at stage 1, which is possible but unprovable without circularity. The other explanation could be analogical interference from *cognatus*, which was well-formed at stage 2 as well. This explanation suffers from the weakness that traditional analogical accounts generally face in that it basically acknowledges the isolated nature of the interference: why did *cognatus* give rise to *prognatus* but not *cognoscere* 'recognise' to ***prognoscere*, and so on? The third possibility is that the word *prognatus* is originally not composed of *pro* + *gnatus* but of *prod* + *gnatus*. The appearance of the prevocalic variant of the prefix (cf. *prod* + *ire* 'go forth') in this word would be unusual, but not inconceivable. The regularity governing the distribution of the variants of *pro-* is known not to be watertight: the *d*-less variant appears with a shortened vowel when attached to some vowel-initial stems as in *prŏavus* 'forefather', but the same variant is also found with many *f*-initial words such as *prŏfugus* 'fugitive', where the shortening of the prefix vowel is unexplained. On the other hand, if we assume original *prod* + *gnatus* rather than *pro* + *gnatus*, this word falls into the same category as the *ad*-words, and its phonology is then perfectly regular.

(iii) *praegna*(*n*)*s* 'pregnant'. This word is odd on several counts. On the one hand, it is clearly an early formation attested frequently from the beginnings of Latin literacy and including a stem form *gnat-* or *gnant-*, which is not found anywhere else in the lexicon, though it is obviously related to the stem of *gnatus* (historically **gnato-s*). On the other hand, the prefixation of *prae-* to ⟨gn⟩-initial words is predicted not to happen if the above arguments are to hold. Furthermore, the synchronic phonology of this word in Classical Latin is also unusual: a cluster [jŋn], or indeed any cluster consisting of three sonorants, is unattested even at prefix–stem boundary. The only explanation that we can think of is that this word was lexicalised already at stage 1, and thus it escaped the phonologically motivated restriction that resulted, at stage 2, from the replacement of initial [g] by a floating C-Place node before [n]. This scenario is made plausible by the isolated stem-variant, and it implies a parallel between *praegna*(*n*)*s* and *prehendere* 'grab', where the latter shows an isolated prefix-variant as well as a stem not attested anywhere else in the language, both good indicators of early lexicalisation. The problem of the synchronic phonology of the form still remains, however.

(iv) *innatus* 'innate'. This word is attested from pre-classical times onwards, though not with any great frequency. It is exceptional in including the locative (rather than the negative) *in-*, and its form is also a counterexample to the hypothesis detailed above in that it is not

**ignatus*. We do not have much in the way of explanation apart from the seemingly trivial remark that the form of this word may be due to early vacillation in the lexical form of the stem.

(v) *ignominia* 'disgrace', *cognomen* 'surname', *agnomen* 'nickname'. These words are prefixations of the stem *nomen* 'name', which is not a ⟨gn⟩-stem, and yet, the prefixed form shows *-gn-* instead of the etymologically correct **innominia*, **connomen*, *adnomen*.[21] This has long been explained with reference to the analogical influence of *gnoscere* 'know' and its prefixed variants.[22]

7. Conclusion

We have argued that in the initial cluster *[gn] the velar stop was lost diachronically in two stages: first it was replaced by a floating C-Place node dominating a Dorsal node which, in turn, dominated the features [+high, +back]; this floating C-Place node was subsequently also lost. The argument crucially hinges on the observation that those prefixes that end in assimilating consonants ([d], [n] and the placeless nasal) combined with *[gn]-initial stems earlier than the rest of the prefixes. This can be explained if one assumes that with prefixes ending in non-assimilating consonants and vowels, to which the place node of consonants cannot spread for structural reasons, the resulting form would have included a stranded floating C-Place node and would thus have been ill-formed. After the loss of the stem-initial floating C-Place, prefixation was no longer constrained in this way and new forms were free to appear.

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[21] The last of these is attested once, in the *Historia Augusta* (*Verus* 3.5), cf. also the verb *adnominare* 'take as wife' in St Augustine.

[22] See Walde & Hoffmann (1956 s.v.) and, more recently, de Vaan (2008: 412).

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Author's address: *Institute of English and American Studies, Pázmány Péter Catholic University, Egyetem u. 1., 2081 Piliscsaba, Hungary*
cser.andras@btk.ppke.hu