

**ANCIENT
SOUND CHANGES
AND OLD IRISH
PHONOLOGY**

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**ANCIENT
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Krzysztof Jaskuła

Wydawnictwo KUL
Lublin 2006

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PROJEKT OKŁADKI I STRON TYTUŁOWYCH
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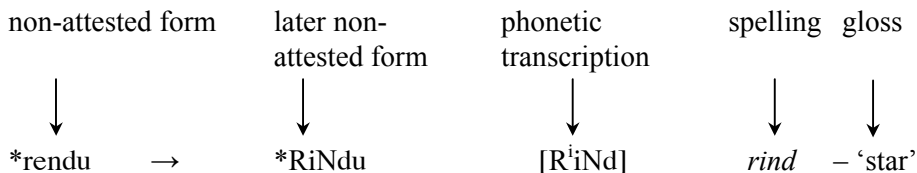
Abbreviations, phonetic symbols and data presentation

- nom. – nominative
- gen. – genitive
- dat. – dative
- acc. – accusative
- sg. – singular
- pl. – plural
- fut. – future
- fem. – feminine
- masc. – masculine
- deut. – deuterotonic form in compound verbs (stressed on the second syllable), e.g. [do 'bⁱerⁱ] *do:beir* – ‘(he) gives’, such forms occur independently
- prot. – prototonic form in compound verbs (stressed on the first syllable) e.g. [‘tavərⁱ] *:tabair* – ‘(he) gives’, such forms occur only after particles, (e.g. negative or interrogative)
- conj. – conjunct form in simple verbs e.g. [bⁱerⁱ] *:beir* – ‘(he) bears’, 3sg. of the verb *beirid*, such forms occur only after particles (e.g. negative or interrogative)

- [ɣ] – voiced velar fricative
- [χ] – voiceless velar fricative
- [ð] – voiced dental fricative
- [θ] – voiceless dental fricative
- [N] – tense dental nasal
- [L], [R] – tense liquids
- [v̥] – labial nasal fricative
- [ⁱ] – palatalization
- ['] – stress

Prehistoric word-forms

Old Irish word-forms



Orthography and pronunciation of Old Irish consonants

SYMBOLS	PRONUNCIATION		
	WORD-INITIALLY	WORD-MEDIALY	WORD-FINALLY
<i>p, t, c</i>	[p, t, k]	[b, d, g] or [p, t, k]	[b, d, g] or [p, t, k]
<i>b, d, g</i>	[b, d, g]	[v, ð, ɣ] or [b, d, g]	[v, ð, ɣ] or [b, d, g]
<i>m</i>	[m]	[ṽ] or [m]	[ṽ] or [m]

In order to indicate word-initial lenition, the symbols *p, t, c* are spelt as *ph, th, ch* and represent [f, θ, χ], e.g. [tʰeɣ] *teg* – ‘house’ vs. [ə θʰeɣ] *a theg* – ‘his house’. Lenition is not orthographically specified in the case of *b, d, g* although in a leniting context these letters represent [v, ð, ɣ], e.g. [baL] *ball* – ‘limb’ vs. [ə 'vaL] *a ball* – ‘his limb’.

So as to mark eclipsis, the radical *b, d, g* are spelt as *mb, nd, ng* and represent [m, N, ŋ], e.g. [bo:] *bó* – ‘cow’ vs. [ə 'mo:] *a mbó* – ‘their cow’. No indication of nasalization occurs in the voiceless stop symbols, although they are realized as [b, d, g] in a nasalization environment, e.g. [kol] *col* – ‘sin’ vs. [ə 'gol] *a col* – ‘their sin’.

Other relevant details of pronunciation as well as possible exceptions to these rules will be mentioned whenever necessary.

Preface

The more Pooh looked inside the more Piglet wasn't there.

A. A. Milne *The House at Pooh Corner*

This work seeks to describe the workings of the phonological system of Irish in and before the period of Old Irish. Such a study is a hazardous enterprise given that the knowledge of the Old Irish system is based on written materials and the word-forms from before that period are by and large reconstructed. It should be borne in mind, then, that the employment of non-attested forms only facilitates the formulation of hypotheses and possible solutions and lends a wider perspective to the tangible data. In other words, reconstructed forms must not be viewed as equally reliable. Nonetheless, provided that minor phonetic details are ignored and purely phonological patterns are focused upon, the ancient and mediaeval systems can be the subject of a coherent account.

In the analysis offered below, we adopt the main principles of the theoretical framework of Government Phonology (GP), a theory of representations whose main tenet is the concept of government. This model is based on the idea that universal principles and language-specific parameters are part of every linguistic system. In this work, we will focus on the changes in the melodic structures of segments which enter into governing relations with other segments both within words and within close syntactic groups. It will be argued that the lack of government between certain segments can result in the melodic changes of these expressions and the subsequent rise of so-called mutations. Moreover, we will see that many seemingly phonological phenomena in Old Irish, e.g. the alternations of short vowels, are in fact petrified reflections of prehistoric processes whose presence in the system cannot be phonologically justified once we assume that a phonological process occurs in a synchronically available context.

Chapter One presents the vital assumptions of Government Phonology in its basic and modified versions, with particular emphasis placed on the issues which are relevant to the ensuing analysis.

Chapter Two deals with word-initial consonant mutations whose role in the phonology of Irish from the very beginning to the present day has been immense. Although these consonant alternations in Old, Middle and Modern Irish are morphophonological in nature, their prehistoric phonological cause will be inspected. Taking the Old Irish initial mutations as a point of departure, we will go back in time and discuss the origins of these alterations as well as the consequences of morphological changes in the shape of close syntactic units in which these mutations took place. It will also be shown that the so-called no-mutation

contexts, whose function in the language development is too frequently underestimated, played an equally important role in the shaping of close syntactic groups in and before Old Irish.

Chapter Three is devoted to a diachronic inspection of governing relations between consonantal segments in all word positions. It will be argued that the break-up of government between certain consonants in word-medial and initial position at some point in prehistory led to the origin of the most conspicuous phenomenon in the Irish language, that is lenition. As regards word-final position, the gradually diminishing licensing power of nuclei will be held responsible for the development of vowel epenthesis and the simplification of certain consonant clusters.

In Chapter Four the inventory of short vowels and the vocalic alternations in Old Irish will be investigated. It will be shown that these alternations cannot be viewed as purely phonological because the context for phonological change is no longer present in that system. A close inspection of the pre-Old Irish vocalic alternations will reveal that the Old Irish vowel changes reflect the regular phonological patterns which were part of an earlier inventory of short vowels. Moreover, we will concentrate on the issue of consonant qualities, whose shape and number have constituted a problem for many earlier analyses of Old Irish.

As a result of the following analysis it will be claimed that the more we look inside Old Irish the more phonology is not there.

Concluding, I wish to thank a number of people without whom this work would never have been completed. First and foremost, I am extremely grateful to Professor Edmund Gussmann who first convinced me that phonology is the most fascinating of all the linguistic fields of interest and research. I would also like to express my utmost gratitude to my supervisor Professor Eugeniusz Cyran whose professional help and constant guidance helped me in times of trouble and despair. Also his influence on the final shape of this book cannot be underestimated in any conceivable fashion. Special thanks are due to Professor Aidan Doyle who taught me Old Irish when I was a student and who gave me useful advice after that period. Moreover, I wish to thank Professor Anna Malicka-Kleparska as well as all my professors and colleagues at the English Department of KUL for encouragement and moral support. Iwan Wmffre deserves special thanks for proofreading the final version of the manuscript and for providing me with invaluable comments. I am also indebted to Tobias Scheer, Jonathan Kaye, and Péter Szigetvári for incessant inspiration and helping me broaden my linguistic horizons. Last but not least, I am obliged to thank the Cultural Relations Committee of the Irish Department of Arts, Sport and Tourism for supporting linguistic projects in Lublin and this publication in particular. Special thanks are due to the Ambassador of Ireland in Warsaw, Her Excellency Thelma M. Doran.

1 Theoretical framework

1.1. Introduction

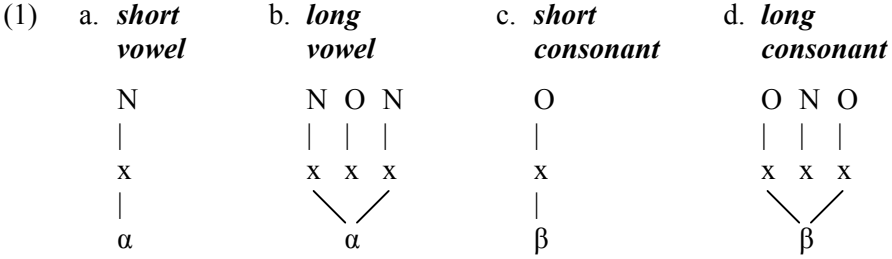
The analysis presented in this book will be based upon the theoretical framework of Government Phonology (Kaye, Lowenstamm and Vergnaud (KLV) 1985, 1990; Kaye 1990; Charette 1991; Gussmann and Kaye 1993; Harris 1994). Within this theory of representations (henceforth referred to as GP), phonological phenomena are regarded as reflecting a limited number of universal principles and language-specific parameters. The model of GP, whose *spiritus movens* is the notion of government, demonstrates that governing relations are present in phonology. Government is understood as an asymmetric relation existing between two skeletal positions, i.e. units of phonological timing. As regards the melody units, each segment is viewed as composed of one or more phonological elements, each of which can be phonetically interpreted in isolation (Harris and Lindsey 1995). Finally, the theory is extremely strict in selecting the phenomena which should be subject to phonological analysis. In particular, all truly phonological processes must be caused by the contexts in which they take place. If there is no context for change, such a change cannot be perceived as phonologically motivated.

1.2. Model variations

The first and the most fundamental version of the theory (KLV 1990; Kaye 1990; Charette 1991) recognized as many as three syllabic constituents – Onset (O), Nucleus (N) and Rhyme (R) – and imposed a binary limit on the number of skeletal positions within each constituent. More recent analyses (Lowenstamm 1996; Scheer 1996; Rowicka 1999; Szigetvári 2000; Cyran 2003) have formally refined the model by reducing the number of constituents to two – Onset (O) and Nucleus (N) – or even dispensing with this division in favour of postulating universal Consonant-Vowel sequences. Hence, the version of GP which does not recognize three maximally binary constituents can be referred to as the CV-model or simply CV. Since the following analysis will utilize the CV-model of GP, this chapter will only concern itself with the issues relevant to the present study.

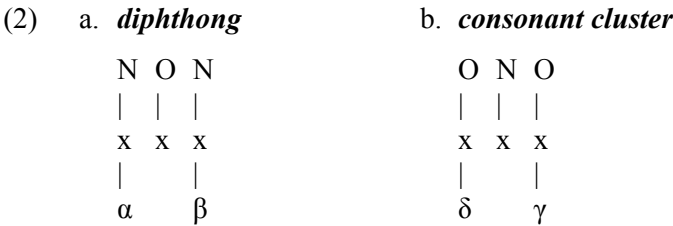
1.3. Formal structures of segments

The model employed here recognizes only sequences of single onsets and nuclei. Thus, all segments are attached to either one or two skeletal positions. In formal terms, we can distinguish the following structures of long and short segments:

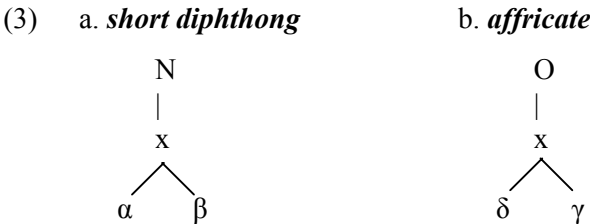


Short vowels (1a) and single consonants (1c) are associated with one skeletal slot, these positions being dominated by (N) or (O), respectively. Long vowels (1b) are linked to two consecutive nuclei, whereas long consonants, i.e. geminates (1d), are attached to two successive onsets.

As far as diphthongs are concerned, these are sequences of two short vowels, each attached to one nuclear point, while consonant clusters are linked to two consecutive onsets. This is shown below:



Finally, let us remark on the structure of short diphthongs and affricates, which are structurally monopositional despite containing two melodies. Formally, the structures of both short diphthongs and affricates are represented as follows:



In (4a) and (4b) we can see two interonset governing relations, rightward and leftward, respectively (see section (1.6.) for the reasons why some segments are governors while other must be governees). The word [brat] *brat* – ‘brother’ in (4a) exemplifies a governing relation between the onset (O_1) – the governor, and the governee (O_2). This relation is licensed by the nucleus (N_2), which dominates the vowel [a]. It is worth noting that the intervening nuclear position (N_1) is an empty slot and plays no part in phonology. The word [elf] *elf* – ‘elf’ in (4b) illustrates a reverse situation, where the governor (O_2) follows the governee (O_1). This relation is also licensed by (N_2) which is empty but plays a role in phonology by virtue of being a licenser for the whole interonset relation. The intervening nuclear position (N_1) is empty and irrelevant to the structure. Szigetvári (2000) calls such nuclei ‘buried’, whereas in Cyran (2003) they are referred to as ‘locked’. In (4c) we can see Proper Government obtaining between the nucleus (N_2), which includes the vowel [u], and the empty slot (N_1). Given that the word [lnu] *lnu* – ‘linen’-gen.sg. alternates with [len] *len* – ‘linen’-nom.sg., it is assumed that the underlyingly empty nuclear slot (N_1) can remain inaudible if it is properly governed by the following realized vowel (Kaye 1990). This condition is met in [lnu] but not in [len] in (4d), where the final nucleus is empty and cannot properly govern. As a result, the empty position (N_1) has to surface phonetically in the form [len].

It should be noted that the licensing of every onset by the following nucleus is taken for granted and is not represented graphically unless this concept is relevant to a given problem. The only situation when the licensing of an onset by the immediately following nucleus does not take place is in interonset governing domains, as shown in (4a) and (4b). In these structures, the nucleus (N_2) governs the whole relation, whereas the nucleus (N_1) plays no active role in the structure to which it belongs in only a formal fashion. Certain inactive nuclei will be shown to have influence on some phonological processes, though.

We should also observe that in the [len]/[lnu] alternation the structures of both the alternants are identical, i.e. ONON. This is ensured by the Projection Principle (KLV 1990:221), which states that there is no resyllabification and that, even if a position is phonetically empty, it is still part of the phonological representation.

1.5. Element Theory

In GP each segment is said to contain one or more phonological elements. These elements, also referred to as ‘primes’, represent the smallest units of representation and can be realized in isolation. For example, the element (A), when interpreted alone, roughly corresponds to the cardinal vowel [a], while (A) combined

with (U) represents the vowel [o]. Any combinations of elements are language-specific, and so are the phonetic interpretations of element structures. The number of elements originally proposed in KLV (1985) has been undergoing the process of reduction and nowadays between six and eight primes are employed in phonological analyses. In the present study the following primes for vowels will be used:

(3)	<i>elements</i>	A	I	U	<i>combinations</i>	A, I	A, U
	<i>vowels</i>	[a]	[i]	[u]		[e]	[o]

The elements from which vowels are composed are also employed in consonants, although there they determine only the place of articulation. Other primes contribute different properties to the consonants. The elements used in this work to represent Old Irish consonants are listed below:

(4)	U – labial	A-I – dental	@ – velar ²	A – alveolar
	? – occlusion	N – nasal	H – stiff vocal cords (voiceless)	

For instance, the Old Irish [p] will be represented by (U, ?, H), which means that this is a labial (U) stop (?), which is also voiceless (H). The voiced counterpart [b] will lack the prime (H) and will have the element structure of (U, ?).

Similarly to government, which is an asymmetric relation holding between skeletal slots, the status the elements enjoy within a given segment may also differ. In particular, some elements are viewed as headed, which means that they are more important for a given segment than the other primes or that they denote tenseness in vowels. For instance, the English lax [ʊ] is normally perceived as headless (U), while the tense [u:] as headed (U). If more than one prime constitutes a segment, the asymmetry of headedness may denote differences in the phonetic quality, e.g. (A, I) = [e], while (A, I) = [ɛ] or [æ], depending on the vocalic inventory of a given system.

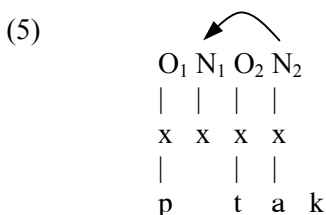
As already mentioned, the employment of both single primes and the combinations of elements varies depending on the phonological system. Therefore, the prime (A) may be realized as [æ] in English but as [a] in Polish. Combinations of primes may bring different results as well, e.g. in standard GP analyses Polish

² This element is employed here in order to specify the velar place of articulation. It is frequent in other GP analyses, however, to perceive velars as empty-headed, i.e. the velar place of articulation has no vocalic element and ‘nothing’ heads a velar segment. So as to avoid ‘nothingness’ as a phonological object, the prime (@) is used below.

[p] equals (U, ʔ, h), while in English it is (U, ʔ, h, H).³ Finally, in many systems combinations of certain elements are disallowed. For example, the elements (I) and (U) do not combine in Polish or English, but they do in German and Finnish, e.g. (I, U) = [ɰ] or [ʏ]. Formally, the ability/inability of elements to combine is usually determined by melodic constraints.

1.6. Substantive complexity and the governing properties of segments

Another important issue to be mentioned here is substantive complexity and its impact on the governing properties of segments. While discussing the examples in (2a, b) we noted that obstruents, e.g. [b] and [f], are governors, whereas sonorants, e.g. [r] and [l], are governees in interonset relations. This assumption results from the view that governors must not be less complex than the governees. Following the majority of GP analyses, we assume that the obstruents normally contain more elements than sonorants, e.g. [b] = (U, ʔ, h, L) vs. [r] = (A) in the word [brat] *brat* – ‘brother’. Sometimes the potential governors and governees are of equal complexity, e.g. [f] = (U, h) vs. [l] = (A, ʔ) in [elf] *elf* – ‘elf’.⁴ Otherwise, governing relations are ruled out in principle. A good case in point seems to be the Polish word [ptak] *ptak* – ‘bird’. Since both [p] and [t] are of equal element complexity, that is [p] = (U, ʔ, h) whereas [t] = (A, ʔ, h), we can assume that no government relation is present between these two segments and the intervening nucleus is licensed by Proper Government. This is shown below.



In (5) there is no interonset relation between (O₁) and (O₂) since the substantive complexity of these segments disallows such an interpretation. The intervening empty nucleus (N₁) is licensed to remain inaudible by the vowel under (N₂).

In (2a, b) we adopted the notion that governors and governees must contract a governing relation if they are adjacent. In many cases, however, substantive complexity is insufficient. Certain consonant clusters are absent from phonological systems because the following nuclei are unable to act as government-licen-

³ The element (h) denoting noise will be absent from the analysis of Old Irish consonants for reasons specified in Chapter Two.

⁴ In Polish (L) represents voicedness.

sers. Thus, for example, a word-final homorganic cluster such as [rt] is licit in Dutch because the word-final empty nucleus is able to government-license such a relation. On the other hand, a heterorganic cluster such as [rk] is disallowed in Dutch because the domain-final empty nucleus is too weak to grant licensing to this sequence. As a result, epenthesis occurs and the cluster surfaces as [rək]. However, if a full vowel follows either [rt] or [rk], both these sequences are allowed because a vowel is a stronger licensor than an empty nucleus.⁵ In the present analysis we will also demonstrate that both substantive complexity of consonants and the governing properties of nuclei play important roles in phonological structure.

1.7. Phonological processes in GP

There are two types of processes recognized by GP: composition and decomposition. In other words, the elements can be either added to or subtracted from a phonological expression in clearly determined contexts. For example, the Primitive Irish vowel [i] was lowered to [e] before a non-high vowel in the following syllable.⁶ This lowering of [i] to [e] can be accounted for as composition, i.e. (I) → (A, I). In the same prehistoric period the vowel [o] was raised to [u] before a high vowel in the following syllable. This change can be perceived as decomposition, i.e. (A, U) → (U).

It should be emphasized that phonological processes must occur in particular contexts. If there is no context which triggers a process, such a phenomenon cannot be viewed as purely phonological. Therefore, the word-final devoicing of obstruents in Polish, e.g. [b] → [p], which is exemplified by a pair of words such as [xleba] *chleba* vs. [xlep] *chleb* – gen.sg./‘bread’, can be explained in terms of phonology because the Polish word-final empty nuclei are too weak to support the element (L) which stands for voicedness in Polish obstruents. As a result of diminished licensing power of the final empty nucleus, we see the decomposition of (U, ʔ, h, L) into (U, ʔ, h) in [xlep] but not in [xleba]. On the other hand, the word-initial lenition of obstruents in Modern Irish, e.g. [bⁱan] *bean* vs. [əⁿ vⁱan] *an bhean* – ‘woman’/‘the woman’, although it involves the decomposition of (U, ʔ) into (U), cannot be viewed as a phonologically-triggered process. This is because consonant lenition should take place between vowels, whereas here we observe the weakening of [b] to [v] between a nasal and a vowel. In fact, this lenition was phonologically motivated in prehistory. In Proto-Celtic, a period which prefaced Old Irish by a few centuries, the phrase *sinda: **ben**a was at

⁵ For a discussion about different properties of full vowels, schwas and empty nuclei see Cyran (2003:107ff.).

⁶ See Chapter Four for details.

some stage reinterpreted as *sinda: **v**ena, which shows that lenition took place in an intervocalic context. Changes of this type will be discussed at length in Chapter Two.

The Irish example shown above can be said to illustrate a morphophonological process.⁷ In this work, following Dressler (1977) and Árnason (1985), among others, we will assume that the term ‘morphophonology’ refers to a situation where past phonological regularities are petrified and when the phonological system develops in a way which makes these regularities synchronically unlikely. For instance, the original phonologically motivated intervocalic lenition of [b] to [v] in *sinda: **b**ena → *sinda: **v**ena, remains up to the present day in the Irish phrase [ən vⁱan], although the intervocalic context has been absent for many centuries.

⁷ The concept of mor(pho)phonology is broadly discussed by e.g. Trubetzkoy (1931), Maiden (1991), and many others.

2 Consonant mutations

2.1. Introduction

The main aim of this chapter is to analyze the system of word-initial consonant mutations in Old Irish. It will be argued that these seemingly phonological phenomena ought to be viewed as an example of the interplay between phonology and morphology. Given that these mutations are by and large a reflection of earlier purely phonological processes, a diachronic inspection of the phonological system will turn out to be necessary. In order to discover the past phonological nature of these mutations and the close relationships between words within syntactic groups, we will go back to prehistoric periods and investigate the contexts in which these alternations took place (chiefly the intervocalic context). It will be shown that these mutations were originally triggered by a purely phonological context and were subsequently lexicalized when this context disappeared as a result of morphological changes. In many cases, however, the appearance of the new context triggered new modifications whose lexicalization also occurred.

This chapter is organized in the following way. At the beginning, an introduction to Irish mutations will be offered. This will be accompanied by a general description of the Old Irish phonological system. The rest of the chapter will be divided into two parts, each devoted to one mutation. Firstly, we will concentrate on lenition viewed from the perspective of Old Irish. A historical inspection of leniting and non-leniting contexts as well as the subsequent changes of these environments will constitute the bulk of this part. Second, we will turn to nasalization. Also taking Old Irish as a point of departure, we will propose an analysis of this mutation in prehistoric contexts.

2.1.1. Consonant mutations

Mutations of initial consonants are among the most outstanding features of not only Old Irish but also of the other Celtic languages, both past and present. Changes of radical segments are presently found also in Welsh, Breton and Scottish Gaelic. Different surface forms of lexical items resulting from these consonant alterations have crucial grammatical functions. For instance, the Old Irish word [tʰeɣ] *teg* – ‘house’, beginning with a voiceless dental, is realized as one with the voiced stop in the phrase [ə ˈdʰeɣ] *a teg* – ‘their house’, and with a voiceless fricative in [ə ˈθʰeɣ] *a theg* – ‘his house’. The radical variant surfaces

in the utterance with the feminine pronoun, i.e. [ə tʰeɻ] *a teg* – ‘her house’ (McCone 1996:121). All these versions of the segment [t] are phonologically related but the identical contexts shown above, always after a phonetic schwa, suffice to diagnose these mutations as not phonological.

The fact that as early as in Old Irish the initial mutations were morpho-syntactic in nature does not mean that there had never been any phonological motivations for these alternations or that at some stage the alternations themselves were not phonological. In prehistoric times, when Celtic languages were in the process of being formed, consonantal segments underwent regular changes triggered by precisely determined phonological contexts. In closely connected syntactic groups the endings of mostly function words exerted influence on the initial segments of the following lexical items. For example, the three possessive pronouns shown above, whose Old Irish shape was *a* (phonetically [ə]), developed from the pre-historic (Proto-Indo-European) *esjo – 3sg. masculine, i.e. the pronoun was terminated by a vowel, *esja:s – 3sg. feminine, where the pronoun ended with a consonant, and *esjo:m – 3pl., in which the pronoun-final segment was a nasal. These diverse items had different impact on the initial consonants of following words. After *esjo (masculine) the lenition of consonants took place, as a result of which in Old Irish the masculine pronoun was followed by the voiceless spirant in [ə tʰeɻ]. After *esja:s (feminine) nothing happened to the following consonant and the radical voiceless stop was intact in [ə tʰeɻ]. Finally, after *esjo:m (plural) nasalization occurred and the Old Irish pronoun was followed by the voiced stop in [ə dʰeɻ]. The contexts mentioned above can be roughly summarized as follows (V stands for ‘vowel’, N for ‘nasal’, while C for ‘consonant’):

- (1) a. ...V#CV... – lenition
 b. ...s#CV... – no change
 c. ...N#CV... – nasalization

A word of comment is in place here. In context (1b) the consonant terminating the word preceding the word boundary need not be [s]. It can be any consonant but a nasal. It so happens, however, that this spirant was by far the most frequently occurring segment in this position, which is why this context is normally treated as one with [s]. Moreover, any nasal could terminate the word preceding a word boundary in (1c). Nonetheless, at the time of nasalization, the only nasal in this position seems to have been [n]. Later on mutating contexts disappeared which resulted from the fact that final syllables were gradually lost. Consider the following developments (McCone 1996:121) which illustrate the schematized contexts in (1) above:

(2)	<i>Stage I</i>	<i>Stage II</i>	<i>Stage III</i>	<i>Old Irish</i>
a.	*esjo tegos	*eja θeγah	*eja θeγa	[ə 'θ ⁱ eγ] <i>a theg</i> – ‘his house’
b.	*esja:s tegos	*eja:h teγah	*eja: teγa	[ə 't ⁱ eγ] <i>a teg</i> – ‘her house’
c.	*esjo:m tegos	*ejan teγah	*eja deγa	[ə 'd ⁱ eγ] <i>a teg</i> – ‘their house’

This chain of events shows the phonological causes of both lenition (2a) and nasalization (2c) as well as the reason why no process occurred in (2b). In particular, the original [t] in *tegos was intervocalically lenited to the corresponding fricative [θ] at Stage II in (2a) above. This intervocalic context for the obstruent remained also in Old Irish. In (2b) the original initial [t] underwent no change because at Stage II it was preceded by a consonant. Later on, although the final consonant was lost at Stage III and [t] found itself in intervocalic position, no lenition of [t] to [θ] took place because this mutation was no longer active, i.e. it had become lexicalized. In (2c) the original [t] was preceded by a nasal at Stages I and II. At Stage III this nasal was dropped, but it left a trace behind, namely the nasalization (voicing) of [t] to [d]. It may be assumed that the nasal was not simply deleted but that the pronoun and the noun formed a phonological word, i.e. *ejan teγah → *ejanteγah, which later resulted in the voicing of the original voiceless stop, i.e. *ejanteγah → *ejadeγa. The newly formed voiced stop [d] did not undergo weakening to the fricative at Stage III, although it found itself in the intervocalic environment, because lenition was no longer a phonologically triggered process.

The developments in (2) above demonstrate how the original contexts caused three different outcomes of the prehistoric word *tegos in Old Irish. The key to understanding the nature of mutations is that they stopped being phonological a long time before Old Irish. Had that not been the case, the Old Irish orthographic sequence *a t(h)eg* would have been interpreted only as [ə 'θⁱeγ] because the synchronic context for the occurrence of the original [t] in this expression was intervocalic. Therefore, by becoming exponents of number and gender, among other things, the initial mutations had been lexicalized and their nature was no longer phonological in Old Irish. What remained, however, was the phonetic shapes of segments, which have survived by and large unchanged even until the present day, and the correspondence between their radical and mutated versions.

2.1.2. *The phonological system of Old Irish*

It can be generally assumed that the phonological system of Old Irish, dating approximately from 700 to 900 A.D., contained the following inventory of vowels and diphthongs (McCone 1996:26):

(3)

	<i>short</i>	<i>long</i>
<i>vowels</i>	i, e, a, o, u	ī, ē, aī, oī, uī
<i>diphthongs ?</i>	ai, oi, ui, iu, eu, au, ia, ua	iū, eū, aū

Although the quality and quantity of the pure vowels is not subject to any major debate, the shape and number of diphthongs have been a bone of contention for the past few decades. The main problem with classifying these objects concerns the spelling conventions. In particular, it is not always certain whether vocalic digraphs denoted diphthongs or pure vowels followed by consonants of different qualities, e.g. palatalized. The questions of qualities as well as those concerning the shape of some short diphthongs will be dealt with in Chapter Four. What is more, it is not definite whether the so-called long diphthongs were long vowels followed by short ones or just expressions consisting of two dissimilar melodies of equal length. Although the system of Old Irish diphthongs is not discussed in this work, we may occasionally need to refer to some segments from this table.

Apart from vowels and diphthongs, the system of Old Irish comprised the following collection of consonantal segments (McCone 1996:26):

(4)

	<i>labial</i>	<i>coronal</i>	<i>velar</i>	
<i>stops</i>	p, b	t, d	k, g	
<i>fricatives</i>	f, v	θ, ð, s	χ, γ	
<i>nasals</i>	m, ñ	Ń, n	ŋ	
<i>liquids</i>		R, r, L, l		
<i>aspirated</i>				h

All these Old Irish consonants, depending on the environment in which they find themselves, i.e. whether they synchronically or historically precede front or back vowels, can be either palatalized (slender) or non-palatalized (broad). For example the labial [b] is slender in the word [bⁱeg] *becc* – ‘small’, but broad in [bo:] *bó* – ‘cow’. This distinction between slender and broad consonants may be called phonological since it is triggered by the presence of a particular type of vowel (front or back) following a given consonant. Moreover, unlike in Modern Irish, the occurrence of a front vowel after a non-palatalized consonant is generally assumed to be unlikely in Old Irish, although the non-palatalization of e.g. [r] in [ri:] *rí* – ‘king’ in Modern Irish may suggest that the Old Irish version, i.e. [Ri:], was an exception as well. The reverse situation is also viewed as non-occurring. More details can be found in Chapter Four.

In Old Irish, however, one can observe another type of palatalization, which may be labelled grammatical. This palatalization came to play important grammatical distinctive roles when historical vocalic endings were dropped in Primitive Irish (a period about 200-400 years before Old Irish). Thus the Old Irish word for ‘sound’ ends with a palatalized nasal in the genitive singular [sunⁱ] *suin* and with a non-palatalized variant in the dative singular [sun] *sun*. Not only single consonants but also consonant groups were distinguished by palatalization, e.g. [NⁱeRt] *ner*t vs. [NⁱeRtⁱ] *neir*t – ‘strength’/gen.sg.

Moreover, the palatalized property was allegedly capable of spreading to consonants which were not in the immediate neighbourhood of a front vowel, e.g. in the word [mⁱiⁱγⁱiðⁱ] *mligid* – ‘(he) milks’ both initial consonants are slender although only the rightmost one, that is [l], immediately precedes the vowel [i]. Even more interestingly, palatalization could go beyond the lexical word to affect the preceding item. For example, the palatalization of the word-initial spirant in [sⁱerk] *serc* – ‘love’ is natural and uncontroversial unlike in the utterance [iNⁱ tⁱerk] *int serc* – ‘the love’, where the consonantal segments [N] and [t], neither of which seem to belong to the noun, are palatalized by the front vowel [e] (Lewis and Pedersen 1974:218).

It should also be mentioned that there is no concord among scholars as to the exact quality of non-palatalized consonantal segments. The subdivision of broad consonants postulated by certain scholars will be dealt with in Chapter Four.¹ Now let us return to the description of the consonant inventory of Old Irish.

Pokorny (1914:6ff.) and Thurneysen (1946:22ff.) use the terms ‘voiced’ and ‘voiceless’ to denote the difference between related pairs of consonants such as [d – t], but it is not uncommon, especially taking into account contemporary phonetic evidence, to use the terms ‘lenis’ and ‘fortis’ for these segments respectively. This means that sounds such as [p, t, k] and their corresponding fricatives [f, θ, χ] are aspirated, while their counterparts [b, d, g, v, ð, γ] are not. It may also be assumed that the aspirated consonants were fully voiceless, while the non-aspirated ones were not fully voiced, like in English for example.

The orthographic sonorants *n*, *l*, *r* can be realized in two ways. In particular, they can appear as tense or lax. The former are very frequently written double in mediaeval manuscripts, which may indicate that at some stage they were geminates, and are represented by capital letters in the phonetic transcription. The phonetic details as well as a possible phonological distinction between the two types of sonorants are provided in the ensuing sections. The labial nasal [m] is realized as the labial nasal fricative [ṽ] in leniting, i.e. weakening environments.

¹ More details concerning palatalization in and before Old Irish can be found in e.g. Kuryłowicz (1971), Greene (1973) and McCone (1996).

The velar nasal, although it is included in (4) above, is not always treated as an independent segment since it never occurs in a context-free environment. It is always represented by *ng* in the spelling and its status as a single segment is to a certain extent unclear.

Finally, the sound [h] occurs only in restricted contexts, namely as a lenited variant of [s], e.g. [ə 'halm] *a salm* – ‘his psalm’, or as a segment prefixed to word-initial vowels in some contexts, e.g. [ə 'ho:r] *a ór* – ‘her gold’. The latter phenomenon, also referred to as *h*-prefixation, is described in detail later in this chapter.

The above consonantal system, which is rich in fricatives, results from intervocalic weakening processes which affected stops inherited from the Proto-Indo-European (PIE) inventory by the Celtic family long before the year 400 or 500 A.D., that is, a very long time before the Old Irish period. The fact that lenition ever took place can be noticed when we look at the correspondence between Old Irish, the oldest attested representative of the Celtic tongues, and other IE languages such as Latin. Consider the following examples:

(5)	<i>Old Irish</i>		<i>PIE</i>		<i>Latin</i>	
	[ma:θər ⁱ] <i>máthair</i>	θ <	t ^h	>	<i>māter</i>	– ‘mother’
	[eχu] <i>echu</i> (acc.pl.)	χ <	k ^h	>	<i>equus</i>	– ‘horse’
	[gav ⁱ id ⁱ] <i>gaibid</i> (3sg.)	v <	b ^h	>	<i>habēō</i> (1sg.)	– ‘take/have’

The examples above indicate that the PIE aspirated stops became unaspirated in Italic languages, while they were turned into fricatives within the Celtic branch. This is not always the case for Celtic forms, however. In fact both these language families chiefly inherited the unaspirated stops (Gamkrelidze and Ivanov 1995:65ff., 743), which can be exemplified by numerals such as the Old Irish [tⁱrⁱi:] *trí* vs. the Latin *tres* – ‘three’ as well as [kⁱeθərⁱ] *cethair* vs. *quattuor* – ‘four’. These forms show the development of the IE aspirated stops [t^h] and [k^h] respectively, into [t] and [k] in both the families. What differentiates the two families is that in Celtic the IE aspirated stops became fricatives in intervocalic position but remained stops word-initially.

Nevertheless, word-initial position did not guarantee the Celtic stops any protection against lenition. In syntactically motivated contexts, that is, mainly after function words ending in vocalic segments, the initial stops also underwent changes to fricatives. Hence, comparably to the word-internal change of [b] into [v] which we observed in the case of [gavⁱidⁱ], we witness the spirantization of [b] in the pair of [baL] vs. [ə 'vaL] *ball/a ball* – ‘limb’/‘his limb’. This indicates that the original word-internal weakening contexts, that is ...VCV..., were equal

to ...V#CV..., as also shown in (1a), where C stands for any true consonant lenited intervocalically. This latter consonant alteration is usually called initial lenition. Various aspects of this phenomenon will be discussed in this chapter as well as in Chapter Three.

The other mutation described and analyzed below is called nasalization. This change affected initial consonantal segments originally following function words ending in nasals, as shown in (1c). What needs to be mentioned here is that the process of nasalization occurred later than that of weakening. Unlike lenition, which has been shown to occur both word-initially and medially, this regular change is normally treated as a typical sandhi phenomenon taking place exclusively at the left margin of words. It will be shown below, however, that the origin of this mutation can be detected word-internally. Descriptions of both these phenomena will be accompanied by Government Phonology accounts with particular emphasis placed on the application of the theory of elements sketched in the introductory chapter.

2.1.3. Old Irish initial lenition

As stated earlier, Old Irish was spoken in the second half of the first millennium, whereas the phonological process of intervocalic lenition occurred a long time earlier. Therefore, although segments are still lenited in certain contexts in Old Irish, this fact does not mean that this weakening is phonological any longer. A good case in point is that Old Irish consonants can appear in their weakened versions even though what synchronically precedes them is not a vowel, e.g. [iN 'χorⁱpⁱ] *in choirp* – ‘of the body’, the lenited form of [korⁱpⁱ] *coirp* – ‘of a body’. Moreover, certain segments are not lenited when synchronically following a vowel, e.g. [ə tⁱeγ] *a teg* – ‘her house’. The same can be said about Middle and Modern Irish, where lenition has a purely grammatical function and can occur even without any phonological contexts, that is, word- or sentence-initially (see e.g. Gussmann 1983). For example, in the Modern Irish sentence [χⁱ:mⁱ bɑ:d] *Chím bád* – ‘I see a boat’, the first segment of the first word, i.e. [χ], is lenited although there is nothing preceding it in the sentence. At the time of phonologically motivated lenition, that is, a long time before Old Irish, such a situation would have been completely impossible.

The initial purpose of the following presentation is to show what happens to particular consonants when they appear as lenited in documented sources and pinpoint certain regularities. In later parts of this chapter we will go back in time, explore the phonological causes of weakening processes in detail and see the developments which ultimately produced the Old Irish forms. We will also investigate the reasons why expected processes did not always take place.

Let us first consider a selection of Old Irish data which show the reflexes of the past phonological process of lenition.

(6) a. *Stops*

p	→ f	[pɔ:g] [ə 'fɔ:g]	<i>póc/a phóc</i>	– ‘kiss’/‘his kiss’
t	→ θ	[tʲeɣ] [mə 'θʲeɣ]	<i>teg/mo theg</i>	– ‘house’/‘my house’
k	→ χ	[kʲeN] [də 'χʲeN]	<i>cenn/do chenn</i>	– ‘head’/‘your head’
b	→ v	[baL] [ə 'vaL]	<i>ball/a ball</i>	– ‘limb’/‘his limb’
d	→ ð	[du:m] [mə 'ðu:m]	<i>dún/mo dún</i>	– ‘fort’/‘my fort’
g	→ ɣ	[goRt] [də 'ɣoRt]	<i>gort/do gort</i>	– ‘field’/‘your field’
m	→ ṽ	[munʲ] [ə 'ṽunʲ]	<i>muin/a muin</i>	– ‘neck’/‘his neck’

b. *Fricatives*

s	→ h	[suθ] [mə 'huθ]	<i>suth/mo suth</i>	– ‘offspring’/‘my offspring’
f	→ ø	[fʲið] [də 'ið]	<i>fid/do fid</i>	– ‘wood’/‘your wood’

c. *Sonorants*

R	→ r	[Ru:m] [ə 'ru:m]	<i>rún/a rún</i>	– ‘secret’/‘his secret’
L	→ l	[Loŋ] [də 'loŋ]	<i>long/do long</i>	– ‘ship’/‘your ship’
N	→ n	[NʲeRt] [mə 'nʲeRt]	<i>nert/mo nert</i>	– ‘strength’/‘my strength’

As can be seen above, all the stops become corresponding fricatives, the coronal fricative [s] turns to [h] and the labial spirant [f] disappears altogether. The bilabial nasal [m] is also treated by the system as a typical stop which undergoes spirantization.

As far as the initial sonorants are concerned, there is much confusion about what their lenition means phonetically. Pokorny (1914:32) names the stronger variants ‘unaspirated’, while the lenited congeners are referred to as ‘aspirated’.² Thurneysen (1946:85) states that the unlenited sonorants, that is [N], [L] and [R], were “articulated with much greater energy”. Quin (1975:4) claims that the frequently doubly-written sonorants represented strongly pronounced vibrants. McCone (1987:267) speculates that weakening “probably somewhat relaxed the articulation” of [N], [L] and [R]. This statement tallies with the most commonly held opinion that the unlenited sonorants were simply tense segments whereas their weakened counterparts were lax. Later on we will see how this distinction can be represented phonologically.

² Pokorny uses these terms for unlenited and lenited variants of true consonants, respectively, as well.

As regards word-initial clusters of consonants, stops and the labial voiceless fricative [f] behave in exactly the same fashion as single stops and [f] when followed by sonorants, so we can observe the following changes in leniting contexts (whenever there is a difference in the spelling of the lenited variant, it is indicated; otherwise both the radical and lenited forms are spelt in the same fashion):

(7)

pr	→ fr	[pro:s ⁱ] [fro:s ⁱ]	<i>próis/phróis</i>	– ‘prose’
pl	→ fl	[p ⁱ l ⁱ e:] [f ⁱ l ⁱ e:]	<i>plé/phlé</i>	– ‘pleading’
br	→ vr	[bra:θ] [vra:θ]	<i>bráth</i>	– ‘doom’
bl	→ vl	[bla:s] [vla:s]	<i>blás</i>	– ‘smoothness’
tr	→ θr	[t ⁱ r ⁱ e:n] [θ ⁱ r ⁱ e:n]	<i>trén/thrén</i>	– ‘strong man’
tl	→ θl	[tla:s] [θla:s]	<i>tlás/thlás</i>	– ‘feebleness’
tn	→ θn	[tnu:θ] [θnu:θ]	<i>tnúth/thnúth</i>	– ‘rage’ (rare cluster)
dr	→ ðr	[dru:m ⁱ] [ðru:m ⁱ]	<i>druimm</i>	– ‘back’
dl	→ ðl	[d ⁱ l ⁱ γ ⁱ æð] [ð ⁱ l ⁱ γ ⁱ æð]	<i>dliged</i>	– ‘law’
kr	→ χr	[kruθ] [χruθ]	<i>cruth/chruth</i>	– ‘form’
kl	→ χl	[klaNd] [χlaNd]	<i>cland/chland</i>	– ‘family’
kn	→ χn	[knok] [χnok]	<i>cnoc/chnoc</i>	– ‘hill’
gr	→ γr	[gra:m] [γra:m]	<i>grán</i>	– ‘grain’
gl	→ γl	[glu:m] [γlu:m]	<i>glún</i>	– ‘knee’
gn	→ γn	[g ⁿ i ⁱ :ṽ] [γ ⁿ i ⁱ :ṽ]	<i>gním</i>	– ‘deed’
fr	→ r	[fraγ ⁱ] [raγ ⁱ]	<i>fraig</i>	– ‘wall’
fl	→ l	[flaθ ⁱ] [laθ ⁱ]	<i>flaith</i>	– ‘prince’
mr	→ ṽr	[mruγ ⁱ] [ṽruγ ⁱ]	<i>mruig</i>	– ‘farmland’
ml	→ ṽl	[mlas] [ṽlas]	<i>mlas</i>	– ‘taste’

What is worth noting here is the absence of initial [pn], [bn], [dn], [fn] and [mn] and, consequently, their presumed lenited counterparts. In fact, [dn] and [mn] occur in the language, but only in nasalized environments. For example, [dnu:θ] is a version of [tnu:θ] – ‘rage’ while the other cluster surfaces in a few oblique cases of the word [bⁱen] *ben* – ‘woman’. For instance, its apparently irregular genitive is [mna:] *mná*.

Another group of word-initial clusters is that including the coronal fricative. Sequences composed of *s*+obstruent and *s*+stop+liquid are immune to all possible weakening environments and invariably remain unlenited. A few of these clusters are dubious in that it is difficult to say whether they were part of Old or Middle Irish. These are marked with (?):

(8)

sp [s ⁱ p ⁱ irəð] <i>spirut</i>	– ‘spirit’	sp ^l ? [s ⁱ p ⁱ l ⁱ eð] <i>spləd</i>	– ‘play’		
st [stor ⁱ]	<i>stoir</i>	– ‘history’	str [?] [stro:ð] <i>stród</i>	– ‘conceit’	
sk [ska:θ]	<i>scáth</i>	– ‘shadow’	skl [s ⁱ k ⁱ l ⁱ eo]	<i>scléo</i>	– ‘sorrow’
			skr [s ⁱ k ^r i:in]	<i>scrín</i>	– ‘shrine’
sm [s ⁱ m ⁱ eχ]	<i>smech</i>	– ‘chin’	smr [?] [s ⁱ m ^r i:θ]	<i>Smrith</i>	– man’s name

The clusters [sk] as well as [sm], with or without the following liquid, represent native Celtic groups while the ones with [sp] and [st] are foreign borrowings. Regardless of provenance and the time of appearing in the system, none of these are lenited. On the other hand, all the clusters consisting of *s*+sonorant undergo regular weakening. Examples of this configuration are shown below:

(9)

sL → hl [sLo:γ]	[mə ‘hlo:γ]	<i>slóg/mo slóg</i>	– ‘army’/‘my army’
sR → hr [sRuθ]	[ə ‘hruθ]	<i>sruth/a sruth</i>	– ‘stream’/‘his stream’
sN → hn [sNa:θ ⁱ e]	[ə ‘hna:θ ⁱ e]	<i>snáithe/a snáithe</i>	– ‘thread’/‘his thread’

This set of *s*+sonorant clusters reveals another controversial phenomenon, that is, the apparent lenition of tense sonorants which follow the initial spirant. The assumption that they should be represented by the weak variants in a leniting context, although this is not indicated in the spelling, is based on the commonly held view that [N], [L] and [R] are always tense after [s] but lax after all the other consonants, e.g. [kruθ] *cruth* – ‘form’ (Lewis and Pedersen 1974:49; Thurneysen 1946:74ff.). Thus it transpires that, when [s] undergoes lenition, the following sonorant also loses tenseness. This may have been the case in Old Irish. However, it will be shown below that in prehistoric periods, that is, when lenition was phonological, the situation was slightly different.

As regards the cluster [sm], the details of what part it played in the process of lenition are unclear. The spelling usually gives no indication as to how this sequence was pronounced although occasionally the *punctum delens* (a superscript dot indicating that the segment is weakened or deleted) appears above *s*, i.e. *ṡ*. Thurneysen (1946:76), referring the reader to Gwynn (1926:63), claims that the Old Irish [sm] was regularly weakened, unlike that in Middle and Modern Irish where the sequence [hm] is viewed as basically intolerable.³ Lewis and Pedersen (1974:24), also following Gwynn, note that it was originally subject to lenition “but early gave up the lenited form”. How early this happened is hard to ascer-

³ Ó Siadhail (1989:112ff.) remarks that [hm] occurs in some Munster dialects nowadays.

tain but the only example they all provide (*ledmagtach* from *smacht* – ‘rule’) is contained in the Würzburg Glosses 11^d16. Interestingly, Thurneysen as well as Stokes and Strachan (1901:571), who edited this piece of writing, find this word difficult to interpret. Thus, if the cluster [sm] is really lenited, the dental spirant disappears altogether because [hm] is unpronounceable, which may be confirmed by the existence of words such as *mér* (a variant of *smér* – ‘blackberry’, possibly originating from the lenited version). Nevertheless, the facts that the phonological system of Old Irish found this lenition unendurable and that this particular type of weakening is extremely rarely marked in the spelling by the *punctum delens* above *ṡ* may indicate that there simultaneously existed two equally feasible principles of treating this cluster. The one which entailed lenition gave way to the other in the course of Old Irish.⁴ As a result, the end of the period witnessed the absence of lenition in this initial group.

Yet another issue is worth mentioning here. There is a minor group of words beginning with [s] which originated from the prehistoric **sw* or **sp*. Words like *siur* – ‘sister’ or *sesser* – ‘six persons,’ when lenited, become *fiur* and *fesser*, respectively (Thurneysen 1946:84). Lewis and Pedersen (1974:18) note that in the latter form the *punctum delens* appeared above *f*, thus giving [h] from [f]. Pokorny (1914:36) remarks that Indo-European lenited groups such as **sp*, **sv* become *f*. McCone (1996:130) implies also that very early in the history of Irish **w* merged with **h* to produce **f* and that *s* is substituted for *f* in some old Latin loanwords. Besides, Kortlandt (1982:80ff.) argues that this *f* was a bilabial fricative, while the one appearing independently in word-initial position was a labiodental spirant. All such differences were lost after the beginnings of writing. Putting all these confusing viewpoints together, it transpires that the labial spirant [f] functioned as a lenited variant of [s] if this coronal fricative had originally been followed by a labial segment. Whether this was a truly phonological process or a functional replacement is unclear.

Having inspected the details of initial lenition we arrive at the conclusion that it has three aspects as it involves three disparate processes. In terms of manner features, stops become continuants, e.g. [baL] → [vaL] *ball* – ‘limb’. As regards the place of articulation, both fricatives occurring independently in lexical items lose it: [s] becomes back in [salm] → [halm] *salm* – ‘psalm’, or disappears in [smaχt] → [maχt] *smacht* – ‘rule’, while [f] invariably gets deleted in [fⁱið] → [ið] *fid* – ‘wood’. Also in certain contexts [s] changes the place of articulation and becomes [f], e.g. [siur] → [fiur] *siur/fiur* – ‘sister’. Finally, sonorants lose tenseness, e.g. [Ru:n] → [ru:n] *rín* – ‘secret’. In the next section a GP approach

⁴ This obviously refers to words in which the deletion of the fricative was not lexicalized by the end of the period, as in *mér* for example.

to lenition in terms of phonological elements will be offered with a view to understanding the basic mechanisms of this process.

2.1.4. Element-based approach to lenition

Bearing in mind that triggers of lenition were no longer phonological in Old Irish, let us now focus on the aspect of weakening of Old Irish consonants connected with element complexity. The theory of elements presented in the introductory chapter will provide us with appropriate tools to conduct this analysis.

What needs to be clarified at the very outset of the discussion is the choice of elements proposed below. It is assumed here that all the segments contain the headed elements defining the place of articulation. The labial obstruents contain the headed (U), the dentals the combination (A-I),⁵ while the velars are defined by the element (@) considered as neutral. The necessity for segments to include headed elements is strictly connected with the fact that the prime (h) defining noise in standard GP is not employed here. Its absence in this analysis is associated with the adoption of Cyran's (1996, 2003) h-parameter. Among other things, his proposal establishes a correlation between the lack of affricates in a given language and the absence of the element (h). In Old Irish there were no affricates. Moreover, he claims that in a language which has no element (h), friction in obstruents can be represented by headedness. A similar standpoint is advocated by Ritter (1997). Leaving other details of their reasoning aside, we can also propose that the remaining elements constitute a sufficient set to represent Old Irish consonants. We also use the prime (H) to represent voicelessness, the element (ʔ) which stands for stopness, and (N) to denote nasality. Consider the following structures in which all stops become fricatives.

(10)	Fortis stop	→	Fricative		Lenis stop	→	Fricative
	p (<u>U</u> , ʔ, H)	→	f (<u>U</u> , H)		b (<u>U</u> , ʔ)	→	v (<u>U</u>)
	t (<u>A</u> -I, ʔ, H)	→	θ (<u>A</u> -I, H)		d (<u>A</u> -I, ʔ)	→	ð (<u>A</u> -I)
	k (@, ʔ, H)	→	χ (@, H)		g (@, ʔ)	→	ɣ (@)
					m (<u>U</u> , ʔ, N)	→	ṽ (<u>U</u> , N)

The schematized set above illustrates what happens to Old Irish weakened stops in terms of the element make-up. This picture is surprisingly regular in every detail since all the consonants lose only one phonological prime due to lenition. Moreover, it is always the same element, that is (ʔ). Accordingly, all of them be-

⁵ It is proposed here that in the combination (A-I) the first element is headed. This combination is postulated by Cyran (1997) as a representation of coronality for Modern Irish.

come corresponding fricatives. The nasal [m] is treated here as a true consonant rather than a sonorant since it conforms to the standard observed in obstruents.

This table reveals another important thing. The process of lenition viewed as a loss of one element is regular for all the stops. Nevertheless, not all of these segments were present in the system of Irish when the triggers of lenition were purely phonological. The voiceless labial stop was not part of the inventory inherited from Proto-Celtic. The Indo-European [p] simply disappeared from Celtic languages, e.g. Latin *pater* vs. Old Irish *athair* – ‘father’. It was reintroduced into the system of Primitive Irish mainly with Latin loanwords and rapidly conformed to the pattern observed in all the other stops which had undergone the process of lenition early in prehistory.⁶ This shows that the tendency to spirantize stops, that is to deprive them of the property of stopness, was so strong that even when lenition was no longer phonological but morpho-syntactic, as it was in late Primitive and Old Irish, the newly introduced stop followed suit and was realized as the fricative [f] in so-called leniting environments.

To conclude: since all the stops lose only stopness, the working hypothesis is that lenition involves dropping one element at a time. We can assume, then, that when lenition was phonologically-triggered, this regularity was also observed and it is any deviation from this pattern which requires further explanation.

Before we turn to the Old Irish fricatives and sonorants which occur independently in lexical items as well as to their weak counterparts, a word of comment is needed to justify the employment of elements in the coronal segments.

The adoption of the h-parameter limits the number of element combinations, which results in the need to make different use of the remaining primes. For example, the standard GP (e.g. Harris 1994:171) perceives certain segments as differing by the element (h) only, i.e. [d] = (R, ?, h), while [l] = (R, ?). We have replaced the element (R) by (A-I) in the dental stops and disposed of the prime (h) altogether. At this juncture, the representations of both [d] and [l] will be identical, i.e. (A-I, ?). So as to solve this problem we can theoretically resort to the concept of headedness and propose that [d] = (A-I, ?), as suggested in (10), while [l] = (A-I, ?). However, the notion of headedness will turn out to be necessary for the differentiation between tense and lax sonorants (see below), which means that we need to represent the liquid [l] using different elements. This can be done if we introduce a formal division of coronal segments into dentals and ([t, d, θ, ð, n]) alveolars ([s] and liquids). Such a division, although it is only functional here, has some phonetic justification. Thus, the place of articulation in dentals will be represented by (A-I), while (A) will stand for the same property

⁶ The names and chronology of relevant prehistoric periods will be given while dealing with the historical causes of lenition below.

in alveolars.⁷ Keeping in mind this formal distinction, consider the element structures of the two radical and lenited fricatives:

- (11) s (A, H) → h (H)
 f (U, H) → \emptyset

We can see that the coronal spirant [s] loses one element, similarly to the stops, while the labial fricative is deprived of two. Thus, its lenition is incongruous from the systemic viewpoint because as many as two elements are lost. Later on it will be shown that there is a historical reason for this apparent irregularity in the system, which will strengthen the observation that lenition as a phonological process involved the deletion of one prime.

A similar problem can be noticed in the case of the lenition of [s] to [f] in certain words. For example, *siur* – ‘sister’ when lenited, becomes *fiur*. Cases like these, when treated synchronically, are totally irregular because the change of (A, H) into (U, H) does not entail any element loss whatsoever, but rather element replacement. This constitutes a problem because weakening consists in losing elements, while the substitution of (U) for (A) can hardly be viewed as weakening. Nonetheless, two synchronic solutions can be offered. One is that there is another sound [s], let us label it [s]₂, whose element make up is, say, (U, A, H) which, when lenited, becomes the regular [f] = (U, H).⁸ There may also exist a different [f], let us name it [f]₂, which results from the lenition of the regular [s] = (A, H) to [f]₂ = (H). The synchronic co-existence of disparate element structures producing identical phonetic entities within phonological systems is advocated by Gussmann (2001). However, knowing that Old Irish lenition is far from being truly phonological, we may treat this change from [s] to [f] as a reflection of a past phonological phenomenon. In the sections dealing with pre-Old Irish mutations we will see that phonology had much to do with this change but this fact cannot be discovered when looking at Old Irish alone.

As to the Old Irish sonorants, it has already been mentioned that they are tense when unlenited and lax if lenited. The following tentative structures can be given for the tense sonorants:

- (12) N (A-I, N)
 L (A, ?)
 R (A)

⁷ A similar division is proposed for Welsh in Cyran (2003:66).

⁸ Hamp (1951) also proposes that there were two different segments [s] in Old Irish.

Such a proposal can be justified in the following way. The dental nasal, similarly to the other dentals is defined by the combination (A-I) and incorporates the element (N) responsible for nasality. The occlusion element is not considered to be part of this nasal because there is no evidence that it should be present there. The liquids, being lateral and alveolar, are defined by the element (A). Additionally, the liquid [l] contains the stopness element.⁹

This choice of elements shows that, unlike in stops and fricatives, the lenition of sonorants must manifest itself in a different way. What is altered in both these groups is the force of articulation. However, in the case of stops this alteration involves the change from stops to fricatives, which is connected with the loss of the stopness element (?), while in sonorants tenseness is lost. Tenseness can be observed in certain languages, such as English for example, in vowels. In English short vowels are lax while the long ones show considerable tenseness. In GP such a distinction can be rendered by employing the notion of headedness. Tense segments are headed while lax expressions lack headship. Since sonorants are closer to vowels in the sonority hierarchy than stops, we may cautiously assume a similar differentiation for the Old Irish sonorants.¹⁰ This is shown below:

- (13) N (A-I, N) → n (A-I, N)
 L (A, ?) → l (A, ?)
 R (A) → r (A)

As suggested above, the lax sonorants differ from their stronger congeners only in the headship of one element. The headed prime is invariably (A) because all the sonorants are coronals and it is typical in GP analyses to ascribe headedness to the element determining the primary place of articulation, while in dentals (I) represents the secondary place.¹¹

To sum up, the lenition of stops and [s] involves the delinking of one prime, the weakening of sonorants can be viewed as the suppression of headship, while [f] remains a maverick in that it loses two primes when lenited. This and other interesting issues will be tackled when we have discussed the other Old Irish mutation, that is nasalization.

⁹ Cyran (2003) assumes that the prime (?) is present in laterals but may or may not be present in nasals. This standpoint is followed here.

¹⁰ In fact, tenseness and headedness in vowels are frequently combined with their being linked to two skeletal positions (e.g. in English). Nonetheless, at this stage there is no reason for postulating double linking in the case of Old Irish sonorants.

¹¹ Cyran (1997:180ff.) offers an analysis of r-sounds in Modern Irish in which the strong variant, viewed as a trill or fricative, is represented by the headed (A), while the weak one, realized as a flap, with (A).

2.1.5. Old Irish initial nasalization

Similarly to lenition, nasalization has a purely grammatical function in Old Irish because the prehistoric context shown in (1c), that is ...N#CV..., is no longer present, as exemplified by [tⁱey] *teg* – ‘house’ → [ə dⁱey] *a teg* – ‘their house’. The very term ‘nasalization’ is also somewhat imprecise when we look at what happens to the radical consonantal segments in nasalizing environments. In particular, only the radical voiced stops are nasalized, while the voiceless obstruents cease to be voiceless. Therefore, the more neutral term ‘eclipsis’ is frequently used while dealing with this mutation.

Moreover, the details of pronunciation in the case of nasalized obstruents are debatable because the mediaeval spelling can be interpreted in different ways. For example, Grijzenhout (1995:103) argues that initial sequences such as *mb*, *nd*, *ng* should be phonetically interpreted as [m^b], [n^d], [ŋ^g], respectively, while the voicing of voiceless stops consists in their deaspiration, e.g. radical [t^h] → nasalized [t]. Other scholars, including Quin (1975:9), Lehmann and Lehmann (1975:22), McCone (1987:268) and Ahlqvist (1994:31), represent a different approach to the phenomenon of nasalization and its possible phonetic details. In general, the prevailing standpoint is that, similarly to what is observed in Modern Irish, voiceless stops and [f] become voiced, while voiced stops are replaced by the corresponding nasals due to eclipsis. Consider the examples below in which the more common view is presented:

(14) a. *Voiceless obstruents*

p	→ b	[p ⁱ eN] [ə b ⁱ eN]	<i>penn/a penn</i>	– ‘pen’/‘their pen’
t	→ d	[t ⁱ eŋəð ⁱ] [ə d ⁱ eŋəð ⁱ]	<i>tengid/a tengid</i>	– ‘tongues’/‘their tongues’
k	→ g	[kol] [ə ‘gol]	<i>coll/a col</i>	– ‘sin’/‘their sin’
f	→ v	[ful ⁱ] [ə ‘vul ⁱ]	<i>fuil/a fuil</i>	– ‘blood’/‘their blood’

b. *Voiced stops*

b	→ m	[bo:] [ə ‘mo:]	<i>bó/a mbó</i>	– ‘cow’/‘their cow’
d	→ N	[du:m] [ə ‘Nu:m]	<i>dún/a ndún</i>	– ‘fort’/‘their fort’
g	→ ŋ	[g ⁱ ene] [ə ‘ŋ ⁱ ene]	<i>genae/a ngenae</i>	– ‘mouths’/‘their mouths’

It is shown above that, as a result of eclipsis, the voiceless stops and the labial fricative [f] are turned into their voiced counterparts. The lenis series, in turn, display ‘true’ nasalization because they are turned into the corresponding nasals.

As regards initial clusters, the effects of eclipsis are comparable to those observed in initial single consonants, just like in the case of lenition. Specifically, groups such as [tn], [br], [fl] etc. become [dn], [mr], and [vl] respectively, e.g.

[bro:] vs. [ə 'mro:] *bró/a mbró* – ‘quern’/‘their quern’. On the other hand, configurations involving *s*+consonant remain unaffected by this process. Further details will be provided whenever necessary.

The remaining five consonants, that is *n*, *l*, *r*, *s* and *m* are frequently doubled in the spelling when eclipsed. This orthographic device was used by mediaeval scribes to indicate the absence of lenition. No phonetic effects of nasalization are said to be visible in these segments. This is not surprising in the case of the sonorants, since it is difficult to imagine the nasalization of liquids or the idea that nasals could be even more nasalized. The coronal spirant [s] has no voiced counterpart in the system of Irish so eclipsis cannot apply to it either.

To sum up, in consequence of nasalization the radical voiceless obstruents are replaced by their voiced counterparts, whereas the voiced stops acquire the nasal property. The following section will provide an element-based analysis of this initial mutation.

2.1.6. Nasalization in terms of elements

In this part we will see how the process of Old Irish eclipsis described above can be explained in terms of changes in the element make-up of the segments involved. Bearing in mind that the radical voiceless stops become voiced, while the voiced ones are turned into the corresponding nasals, we can make the following systemic assumptions as regards the element structures of nasalized segments. First, given the representations in (10), we assume that the radical voiceless obstruents possess the element (H), while their voiced counterparts lack it. Thus, the eclipsis of voiceless obstruents consists in the loss of this element. As for the radical voiced stops, these become the corresponding nasals. Given that nasality is represented by the element (N), the eclipsed voiced stops acquire this prime. Consider the following structures.

(15)	LOSS OF (H)	ADDITION OF (N)
	<i>Fortis obstruents</i> → <i>Lenis obstruents</i>	<i>Lenis stops</i> → <i>Nasals</i>
	p (<u>U</u> , ? , H) → b (<u>U</u> , ?)	b (<u>U</u> , ?) → m (<u>U</u> , ? , N)
	t (<u>A</u> -I, ? , H) → d (<u>A</u> -I, ?)	d (<u>A</u> -I, ?) → N (<u>A</u> -I, ? , N)
	k (@, ? , H) → g (@, ?)	g (@, ?) → ŋ (@, ? , N)
	f (<u>U</u> , H) → v (<u>U</u>)	

The table above suggests that, as a result of eclipsis, the Old Irish consonantal segments are subject to two diverse element alterations. Specifically, the radical voiceless obstruents lose the element (H) responsible for voicelessness, while the

voiced stops acquire the nasal element (N). In other words, the fortis segments undergo decomposition while the lenis ones experience composition. This seems slightly peculiar since a phonological process should ideally manifest itself in the same way in all the segments involved. However, as shown in the introduction, eclipsis in Old Irish is no longer a phonologically motivated process, which means that we cannot treat it on a par with purely phonological processes that occur in languages synchronically. Thus, there may be a few reasons why in Old Irish eclipsis entails two dissimilar operations.

First, the prehistoric phonological process of nasalization and its reflection in Old Irish may differ with respect to the details of element operations. In particular, the original process may have been uniform in the treatment of the nasal element addition, while the intervening stages of language development obliterated that regularity.

Second, it is not unlikely that in prehistory there were two distinct phonological operations, composition and decomposition, whose roles in segment alternations were similar and which merged in Old Irish due to the grammaticalization of all past phonological processes.

Third, the element structures of Old Irish segments shown in (15) and based on systemic assumptions may be incorrect. As already mentioned, Gussmann (2001) proposes that certain identical phonetic segments in Russian, Polish and Welsh have different phonological structures, i.e. they are ‘double agents’. Thus, from the viewpoint of the Element Theory, it is not impossible in principle to assume that the Old Irish nasalization of, say, [t] to [d], involved the addition of the prime (N) to the voiceless consonants as well, i.e. [t] = (A-I, ?, H) → [d] = (A-I, ?, H, N). Under such an assumption, there would be two different phonological structures realized as [d] in Old Irish: one radical (A-I, ?), while the other resulting only from eclipsis (A-I, ?, H, N). The same hypothesis refers to all the radical voiced stops. We may also assume that the tense dental nasal is a double agent in that the radical [N], e.g. [NⁱeRt] *nert* – ‘strength’ consists of (A-I, N), as proposed in (13), while the [N] which represents the eclipsed [d], e.g. [du:n] vs. [ə 'Nu:n] *dún/a ndún* – ‘fort’/‘their fort’, is composed of (A-I, ?, N), as suggested in (15).

It goes without saying that none of these hypotheses can be verified when looking at Old Irish alone. Thus, the remainder of this chapter will be devoted to a diachronic analysis of both lenition and nasalization. Particular attention will be paid not only to the description of changes occurring at the beginnings of words, but also to finding the reasons why mutations did not take place in certain environments.

2.2. The history of leniting and non-leniting contexts

2.2.1. Introduction

The leniting and non-leniting contexts were exactly opposite in the prehistory of Irish and, consequently, they produce different results in Old Irish. As shown in (2.1.1.) the Proto-Indo-European possessive pronouns, that is *esjo – 3sg. masculine (ending with a vowel, i.e. leniting) and *esja:s – 3sg. feminine (ending in a spirant, i.e. non-leniting), had different influence on the initial consonant of the following noun in the prehistory of Irish, e.g. *esjo tegos → [ə 'θⁱeɣ] *a theg* – ‘his house’ (spirantization of [t]) vs. *esja:s tegos → [ə 'tⁱeɣ] *a teg* – ‘her house’ (no change of [t]). In some cases, however, the results brought about by leniting and non-leniting contexts were identical. Consider two representative examples below:

(16)

- a. *esja sintus → [ə 'he:d] *a sét* – ‘his path’ LENITING
 b. *esja:s (j)ænto- → [ə 'he:d] *a ét* – ‘her jealousy’ NON-LENITING

In (16a) we can see a reconstructed version of the masculine possessive pronoun followed by a noun beginning in the spirant [s]. Other details apart, this fricative is intervocally lenited, i.e. *esja sintus → *ehja hintuh, due to which the Old Irish version of the noun in *a sét* displays the initial [h]. In (16b) the prehistoric feminine pronoun ends in a spirant, while the noun begins in a vowel (or semi-vowel), which means that there is no lenition. And yet the Old Irish version of *a ét* – ‘her jealousy’ is phonologically (and phonetically) identical to the phrase *a sét* – ‘his path’ in (16a).

Another example comes from nouns preceded by the definite articles. The PIE nominative singular masculine *sindos is non-leniting in Celtic, while the nominative singular feminine *sinda: is leniting. Also here the Old Irish versions of the following phrases are not indicative of their prehistoric shape.

(17)

- a. *sinda: su:lis → [iN 'tu:lⁱ] *int súil* – ‘the eye’ LENITING
 b. *sindos ek^wos → [iNⁱ 'tⁱeɣ] *int ech* – ‘the horse’ NON-LENITING

Similarly to those in (16), the examples in (17) show a leniting item, i.e. the definite article *sinda: (nom.sg.fem.) in (17a), and its non-leniting counterpart *sindos (nom.sg.masc.) in (17b). The results in Old Irish are identical in that both the nouns begin with a phonetic [t]. Taking into account lenition alone, that is the weakening of [s] to [h] in *sinda: su:lis → *inda: hu:lⁱh, it is impossible to

account for the origin of the stop [t] in [iN 'tu:l¹]. Nor can we explain why the original *sindos ek^wos became [iNⁱ 'tⁱeχ] *int ech* in Old Irish.¹²

These examples are but tiny pieces of evidence which suggest that the analyses of leniting and non-leniting contexts should be carried out together and that discovering regularities in one may contribute to the understanding of the other. Moreover, the cases in (16) and (17) indicate that also the developments which followed lenition and preceded Old Irish should be carefully examined. Before this is conducted, let us see how lenition was triggered in some environments and prevented in others.

2.2.2. *The history of lenition*

Lenition affected the consonantal system of Celtic consonants many centuries before the period of Old Irish. It is not particularly important to pinpoint exactly when particular developments took place but rather to propose a relative chronology of these changes. Such a method is employed in the majority of accounts of early Celtic developments. Kortlandt (1979) and, particularly, McCone (1996) maintain that, after Proto-Indo-European (PIE), we can distinguish the following prehistoric stages of development relevant to this study:

(18)

PIE → PROTO-CELTIC → INSULAR CELTIC → PRIMITIVE IRISH → OLD IRISH

These are cover terms which are normally used to describe long eras of development. It was not the case, however, that a particular process began and ended in exactly one epoch. Intervocalic lenition, both word-medial and initial, is said to have commenced in the period called Proto-Celtic and basically ended in a much later stage named Primitive Irish. At first, any single intervocalic voiced stop was weakened to the corresponding fricative. Afterwards the weakening affected also word-initial voiced stops and [s]. Later still, voiceless stops were subject to phonetic weakening in all word positions. This is illustrated below:

¹² The loss of the initial [s] in the articles occurred between Proto-Celtic and Insular Celtic. Since this development had no impact on mutations, below we will not be discussing this issue in detail.

(19)		‘the prayer’	‘his house’	
	PROTO-CELTIC (word-medial)			
d	g	b	m	
↓	↓	↓	↓	
ð	ɣ	v	ṽ	
		*sinda: g ^w idija:	*esjo tegos	
		↓	↓	
		*sinda: g ^w iðija:	*esjo teɣos	
	INSULAR CELTIC (word-initial and medial)			
s	d	g	b	m
↓	↓	↓	↓	↓
h	ð	ɣ	v	ṽ
		*inda: g ^w iðeja:	*esjo teɣos	
		↓	↓	
		*inda: ɣuðeja:	*ehja teɣh	
	PRIMITIVE IRISH			
t	k	(later) p	w	
↓	↓	↓	↓	
θ	χ	f	ø	
			*ehja teɣh	
			↓	
			*ehja θeɣa	
	OLD IRISH VERSIONS	[iN ‘ɣuð ⁱ e] <i>in guide</i>	[ə ‘θ ⁱ eɣ] <i>a theg</i>	

Thus, voiced stops and [m] were lenited as early as in Proto-Celtic, the fricative [s] in Insular Celtic (when Irish and Welsh were still similar enough to undergo the same processes), while voiceless stops (except [p] which had not yet been borrowed into Celtic) in Primitive Irish (McCone 1996:96ff.). The labial voiceless stop was imported some time between Primitive Irish and Early Old Irish and automatically followed the pattern of lenition observed in the other stops. Therefore its lenition must have taken place at that time. As for the glide [w], it was lenited to zero either in late Primitive Irish or in Early Old Irish.

For the present analysis, the exact dating of these events is not particularly important, because what is salient is not the time but the order in which things developed. Nor was every phase of development important for every single lexical item. Thus, while using the reconstructed versions of phonological phrases which help to discover the processes which ultimately produced the Old Irish forms, terms such as ‘Proto-Celtic’ or ‘Primitive Irish’ will not be used too frequently in this discussion. What we will be focusing upon is the reconstructed versions of certain utterances and their relationship with forms present during earlier or subsequent major phases of evolution. Consequently, we will be following the standard principle of relative chronology and dealing with ‘stages’ of development. A ‘stage’ itself will not be associated with a particular period but rather with its own position in a sequence of changes illustrating a given problematic issue. So, for example, in the case of [ə ‘θⁱeɣ] *a theg* – ‘his house’, Stage I

will display *ehja teyah while Stage II *ehja θeyah, because the development relevant to this analysis (initial lenition) took place only between these two stages, both of which belong to Primitive Irish. The fact that [ə 'θⁱey] is derived from the Proto-Celtic *esjo tegos is irrelevant since no initial lenition can be observed during this period. In [iN 'yudⁱe] *in guide* – ‘the prayer’, Stage I will comprise *sinda: g^wiðija:, while Stage II *inda: yudeja:, because it was between these two Insular Celtic phases that the initial lenition occurred.

As to word-initial lenition proper, it can be unequivocally stated that words ending in vowels, be they lexical or function words, caused the weakening of word-initial segments of the following lexical items in close syntactic groups of words. This weakening was a development of intervocalic word-internal lenition, i.e. when the context ...V#CV... became equal to ...VCV... . Consider the following examples (McCone 1996:41, 84, 89, 111, 120). They illustrate a few relevant stages of development of certain phrases in which phonological lenition took place across word boundaries in the prehistory of Irish.¹³

(20) WORD-INITIAL LENITION AFTER ITEMS ENDING IN VOWELS

<i>Stage I</i>		<i>Stage II</i>		<i>Old Irish</i>
*sinda: b anna:		*inda: v anna:		[iN ⁱ 'v ⁱ eN 'ṽar]
m a:ra:	→	ṽ a:ra:	→	– ‘the great peak’ (fem.) ¹⁴
*sinda: k loka:		*inda: χ loχa:		[iN 'χloχ 'θrom]
t rumba:	→	θ rumba:	→	– ‘the heavy stone’ (fem.)
*sinda: g ^w iðija:	→	*inda: yudeja:	→	[iN 'yud ⁱ e] – ‘the prayer’ (fem.)
*esjo su:lis	→	*ehja hu:lih	→	[ə 'hu:l ⁱ] – ‘his eye’
*ehja teyah	→	*ehja θeyah	→	[ə 'θ ⁱ ey] – ‘his house’
*ehja la:ṽa:	→	*ehja la:ṽa:	→	[ə 'la:ṽ] – ‘his hand’

The examples in (20) show the major stages¹⁵ in the development of certain syntactic phrases. Stage I in (20) above shows phonological phrases from before the

¹³ Most examples used in this work are gathered from and based on McCone (1996). No direct page reference can sometimes be given since these cases are collected from different parts of this book and the order of relevant stages is frequently incomplete.

¹⁴ Irish syntax requires that the order of words in these examples be article+noun+adjective, so ‘the great peak’ is literally ‘the peak great’.

¹⁵ I name the stages shown here ‘major’ because only these developments are relevant to the present discussion. The fact that after, for example, *inda: vanna: ṽa:ra: there were phases involving ‘minor’ changes, such as final-vowel shortening *iNda vanna ṽa:ra, final vowel reduction *iNdə vannə ṽa:rə, and deletion (apocope) *iNd vann ṽa:r, and a few other adjustments, is disregarded here for the sake of simplicity.

initial lenition, be they Proto-Celtic, Insular Celtic or Primitive Irish. In Stage II we can observe the same forms which have already undergone weakening, e.g. *banna: ma:ra: → *vanna: \tilde{v} a:ra: – ‘great peak’, *kloka: trumba: → * χ lo χ a: θ rumba: – ‘heavy stone’ and *sinda: g^w iðija: → *inda: γ uðeja: – ‘the prayer’. These prehistoric developments show, among other things, why the Old Irish definite article ending in a consonant, e.g. [iN 'γuð¹e] – ‘the prayer’, triggered lenition in the initial consonant of the closely connected following word. The prehistoric version of the article was *sinda:, which means that it ended in a vowel and created a weakening site at the time when lenition was phonological. Thus, the Old Irish reflex of the article is of no importance. Note also that the initial consonants of the adjectives ma:ra: and trumba: are lenited after the final vowels of the nouns, e.g. *banna: ma:ra: → *vanna: \tilde{v} a:ra: and *kloka: trumba: → * χ lo χ a: θ rumba:, which means that not only function words but also lexical items ending in vowels were capable of triggering lenition in the initial segments of the following words.

Generally, then, the examples in (20) show the expected development of stops into fricatives, e.g. [b, m, k, g, s, t] into [v, \tilde{v} , χ , γ , h, θ], respectively, as well as one surprising phenomenon. Specifically, nothing happens to the liquid in the prehistoric development of [ə 'la: \tilde{v}] – ‘his hand’. Let us recall that in Old Irish sonorants such as *l* occur as tense [L] in non-leniting contexts and as lax [l] in weakening sites. In fact, the resonants were never tense before the leniting phase so they cannot be viewed as lenited afterwards. We will return to the question of why sonorants are ever tense in the ensuing sections.

It is also worth noting that a leniting context need not be only ...V#CV... but also ...V#CRV..., where the symbol R stands for any resonant, as exemplified by *sinda: kloka: trumba: → *inda: χ lo χ a: θ rumba:. Discovering the reasons why a sonorant behaves like a vowel in creating a weakening environment belongs to the issues dealt with in the following chapter. Here we only observe that the presence of a sonorant before a vowel does not prevent the lenition of the preceding obstruent.

2.2.3. Non-leniting contexts

Now let us turn to the so-called non-leniting contexts. As already observed, the original word-initial radical consonants following other (non-nasal) consonants which ended closely connected syntactic groups did not undergo weakening. Consider the following examples of prehistoric phonological phrases as well as their Old Irish reflexes.

(21) ABSENCE OF LENITION AFTER ITEMS ENDING IN CONSONANTS

<i>Stage I</i>	<i>Stage II</i>	<i>Old Irish</i>
*sindos bra:tir ma:ros	*indah bra:θir → ma:rah	[iN 'bra:θər ⁱ 'ma:r] – ‘the big brother’ (masc.)
*sindos kalia:kos tanawyos	*indah kalijaχah → tanawijah	[iN 'kal ⁱ eχ 'tane] – ‘the thin cock’ (masc.)
*sindos ballos	→ *indah baLah	→ [iN 'baL] – ‘the limb’ (masc.)
*sindos ri:s bodar	→ *indah Ri:h boðar	→ [iN 'Ri: 'boðər] – ‘the deaf king’ (masc.)
*esja:s la:ma:	→ *ehja:h La:va:	→ [ə 'La:ṽ] – ‘her hand’

Stages I and II in (21) above reveal a few changes in the shape of the exemplary phonological phrases but word-initial lenition never takes place there. The main reason why this is so is that all the function words and lexical items in both stages end in consonants, e.g. *sindos **bra:tir** **ma:ros** → *indah **bra:θir** **ma:rah** – ‘the big brother’, which can be contrasted with *sinda: **banna: ma:ra:** → *inda: **vanna: va:ra:** – ‘the great peak’ from (20) above, where intervocalic lenition occurred. Thus, the absence of lenition is regular and predictable.

More interestingly, the original lax sonorants [r] and [l] in Stage I in (21) above, i.e. *sindos **ri:s** and *esja:s **lama:**, surface as tense [R] and [L] in Stage II, that is *indah **Ri:h** – ‘the king’ and *ehja:h **La:va:** – ‘her hand’, respectively. As regards the tensing of sonorants, McCone (1996:82, 87), among others, hypothesizes that the lax sonorants inherited from Proto-Celtic were strengthened to their tense counterparts exclusively in non-leniting environments but remained intact in leniting contexts, as exemplified by *ehja **la:va:** → *ehja **la:va:** → [ə 'la:ṽ] – ‘his hand’ in (20). Therefore, the generally accepted claim (e.g. Quin 1975:8) that in Old Irish the tense sonorants are weakened to their lax counterparts in leniting environments, e.g. radical [La:ṽ] – ‘hand’ → lenited [ə 'la:ṽ] – ‘his hand’, may result from a misinterpretation of the historical developments or from a simplification of the description of Old Irish. The changes in (21) suggest that it was not lenition in weakening contexts but, rather, fortition in non-leniting environments that affected sonorants in the prehistory of Irish. Thus, a regular Old Irish development should have been exactly the opposite, i.e. [la:ṽ] – ‘hand’ → [ə 'La:ṽ] – ‘her hand’. We will try to discover why the context-free [La:ṽ] also displayed the tense liquid later in this chapter.

To summarize, the developments shown in this section as well as in the preceding one consist in the regular lenition of radical obstruents in intervocalic environments, i.e. between two vowels or between a vowel and a sonorant, as well as the absence of weakening in non-leniting contexts. The prehistoric lax

sonorants behave differently in that they seem to be unaffected by weakening contexts and strengthened in no-mutation sites.

However, the exemplary phrases in (20) and (21) show only regular changes and they do not explain all the word-initial adjustments which took place between Proto-Indo-European (or Proto-Celtic) and Old Irish, such as, for example, those presented in (2.2.1.), i.e. leniting *sinda: su:lis → [iN 'tu:l^l] *int súil* – ‘the eye’ and non-leniting *sindos ek^wos → [iNⁱ 'tⁱeχ] *int ech* – ‘the horse’.

The ensuing sections will deal with adjustment processes which chronologically followed the phenomena illustrated in (20) and (21) above, that is lenition and no-mutation respectively. We will be scrutinizing the development of phonological phrases (i.e. close syntactic groups) until the period of Old Irish. Since the so-called non-leniting contexts may shed more light on the nature of all adjustment processes than the weakening ones, we will first concentrate on these non-mutating environments.

2.3. Non-leniting environments and pre-Old-Irish adjustment processes

2.3.1. Non-leniting definite articles

The nominative singular masculine definite article creates one of the contexts where no phonological process is believed to have taken place in prehistory. This is the standard view (Thurneysen 1946:294, Strachan 1949:1). The historical development of this article is shown below:

(22)

*sindos → *indah → *iNda → *iNdə → *iNd → [iN / iNt] (Old Irish)

As shown above, this article displays two versions in Old Irish. The examples below show that one variant occurs before consonants, while the other before vowels.

(23) a. BEFORE TRUE CONSONANTS [iN]

[iN ⁱ 'f ⁱ er]	<i>in fer</i>	– ‘the man’
[iN ⁱ 'g ⁱ in]	<i>in gin</i>	– ‘the mouth’
[iN ⁱ 'm ⁱ es]	<i>in mess</i>	– ‘the judgement’

b. BEFORE TENSE SONORANTS [iN]

[iN 'Ri:]	<i>in rí</i>	– ‘the king’
[iN ⁱ 'N ⁱ e:l]	<i>in nél</i>	– ‘the cloud’
[iN ⁱ 'L ⁱ evər]	<i>in lebor</i>	– ‘the book’

c. BEFORE VOWELS [iNt]

[iN ⁱ tar ⁱ e]	<i>int aire</i>	– ‘the nobleman’
[iN ⁱ tiask]	<i>int íasc</i>	– ‘the fish’
[iN ⁱ t ⁱ eχ]	<i>int ech</i>	– ‘the horse’

The distribution of the nom.sg.masc. definite article is complementary: it surfaces as [iN] in front of radical true consonants (23a) and tense sonorants (23b), while it appears as [iNt] before vowels (23c).¹⁶ As indicated by (23a, b), there seems to be no difference between a radical obstruent and a tense sonorant in the treatment of the preceding article in that both these groups of segments follow the form [iN].

A similar phenomenon can also be observed in Modern Irish, where the occurrence of [t] between the definite article and a vowel-initial noun is called *t*-prefixation, e.g. [ən tasəl] *an t-asal* – ‘the donkey’. Analyzing *t*-prefixation in Munster Irish, Cyran (1997:143) proposes that, synchronically, the stop [t] is a floating segment which is underlyingly present in the structure of the article and which can be attached to an empty onset only if such a position is available:

(24)

		O ₁	N ₁	O ₂	N ₂	O ₃	N ₃
x	x	x	x	x	x	x	x
		/					
ə	n	t	a	s	ə	l	

[ən tasəl] *an t-asal* – ‘the donkey’

In this representation the floating dental fortis stop [t] terminating the article is attached to the onset position (O₁) provided by the vowel-initial lexical stem. When a lexical object begins with a consonant, there is no *t*-prefixation since the dental finds no available onset position to dock onto. As a consequence, the article appears as [ən], for example [ən tⁱgⁱ] *an tigh* – ‘the house’.¹⁷ What should be emphasized here is that, unlike in *an tigh*, the stop [t] in *an t-asal* is not lexically associated with any skeletal slot; it is a floating segment. This segment can become part of the phonological phrase and be phonetically realized only if an onset position is made available by vowel-initial words, just like in (24) above.

¹⁶ This distribution resembles that of the indefinite article in Modern English, that is [ə] before consonants and [ən] before vowels, e.g. [ə leg] *a leg* vs. [ən eg] *an egg*.

¹⁷ For similar analyses of floating sounds in English and French see Harris (1994:230ff.) and Kaye (1995).

A similar analysis could be postulated for Old Irish. In particular, it might be claimed that the nom.sg.masc. definite article was underlyingly [iNt] and that the final [t] was realized only if the following word was vowel-initial. However, if we look back on the development of the article presented in (22), the reason why [t] terminates the article [iNt] in front of vowels is far from being obvious: this article itself had never ended in [t] in the prehistory of Irish.

Thus, although synchronically in both Old and Modern Irish *t*-prefixation could be analyzed in the way shown in (24), another solution has to be sought if this phenomenon is to be explained in diachronic terms. The ensuing sections will offer a historical reason for the occurrence of *t*-prefixation in both Old and Modern Irish. First, however, we will concentrate on a related phenomenon, that is *h*-prefixation.

2.3.2. *h*-prefixation

The analysis of *t*-prefixation in Modern Irish proposed by Cyran (1997) takes into account only the synchronic state of affairs. Historical evidence suggests, however, that *t*-prefixation was not a one-step process either in or before Old Irish. In fact, in Old Irish we can observe only the final results of a chain of events, which involved the so-called *h*-prefixation, vowel deletion and a merger of consonants. Before we analyze this sequence of processes in detail, let us consider the following developments (McCone 1996:121):

(25) <i>Stage I</i>	<i>Stage II</i>	<i>Stage III</i>	<i>Old Irish</i>
a.*esjo ek ^w os	*ehja eχ ^w ah	*eja eχ ^w a	[ə 'eχ] <i>a ech</i> – ‘his horse’
b.*esjo tegos	*ehja θeγah	*eja θeγa	[ə 'θ'eγ] <i>a theg</i> – ‘his house’
c.*esja:s ek ^w os	*ehja:h eχ ^w ah	*eja: heχ ^w a	[ə 'heχ] <i>a ech</i> – ‘her horse’
d.*esja:s tegos	*ehja:h teγah	*eja: teγa	[ə 't'eγ] <i>a teg</i> – ‘her house’

The examples in (25a, b) show the development of the PIE possessive masculine pronoun *esjo (leniting) followed by nouns. In (25a) the noun begins in a vowel, i.e. *esjo ek^wos, while in (25b) with a consonant, i.e. *esjo tegos. The masculine pronoun *esjo ended in a vowel at every stage of development. As a result, the lenition of the original stop [t] to the fricative [θ], takes place in Stage II in *esjo tegos (25b) and the Old Irish version of this phrase displays [ə 'θ'eγ]. On the other hand, the ancient phrase *esjo ek^wos shows hiatus between the final vowel of the pronoun and the initial vowel of the noun [ə 'eχ] in Old Irish. These cases demonstrate that a leniting possessive pronoun causes the weakening in the following obstruent (Stage II in (25b)), while no process ever takes place before vowels.

In (25c, d) we can see the feminine version of the possessive pronoun *esja:s (non-leniting). In (25d) there is no lenition of the noun-initial segment of *tegos because the preceding function word ends in a consonant. The pronoun drops this final consonant at Stage III, and yet the intervocalic environment does not affect [t] in *eja: teɣa. This means that Stage III illustrates a phase when lenition is no longer phonological. In (25c) the feminine pronoun contains the spirant [h] (lenited [s]) in final position at Stage II. The third phase shows that the final fricative has not been dropped but is still present within the phrase. These two examples suggest that a non-leniting possessive pronoun does not cause the lenition in the initial consonant of following word, which is predictable, but that it provides the following vowel-initial word with the fricative [h].

This attachment of the fricative [h] to vowel-initial lexical items, traditionally called *h*-prefixation, is frequent in both Old and Modern Irish and is sometimes viewed as a way of avoiding hiatus. This is not the case, though. The developments in (25c) show that this insertion of [h] is by no means accidental and cannot be applied everywhere. In particular, when there is no historical source for the spirant [h], it never surfaces in either Old Irish or its descendants, which is exemplified by [də 'oɾ] *do ór* – ‘your gold’, [mə 'iask] *mo iasc* – ‘my fish’, in which neither of the two personal pronouns had ever contained the final [h].

The phenomenon of *h*-prefixation is also found in nouns preceded by some non-leniting definite articles. First, consider the development of the nominative plural feminine definite article:

(26)

*sinda:s → *inda:h → *iNda: → *iNda → *iNa → [iNə] (Old Irish)

This article resembles the feminine possessive pronoun *esja:s in the impact exerted on the initial segment of the following word. Relevant stages in the development of two representative phrases of the nom.pl.fem. preceded by the definite article are provided below (McCone 1996: 120).

(27) <i>Stage I</i>	<i>Stage II</i>	<i>Old Irish</i>
a. *iNda:h eledi:h	*iNda: heledi:	[iNə 'h ⁱ el ⁱ d ⁱ] <i>inna eilti</i> – ‘the deer’
b. *iNda:h to:θa:h	*iNda: to:θa:	[iNə 'tuaθa] <i>inna túatha</i> – ‘the tribes’

These cases illustrate exactly the same trend which we observed in (25c, d). *h*-prefixation occurs in Stage II in (27a) when the lexical word begins in a vowel, similarly to *ehja:h eχ^wah → *eja: heχ^wa – ‘her horse’ in (25c). The changes in (27b) are parallel to those in (25d), that is *ehja:h teɣah → *eja: teɣa – ‘her

house'. In (27b) the word begins in a consonant and the presence of [h] blocks lenition at Stage I. During Stage II, when lenition is not phonological any longer, the loss of [h] is of no consequence and the initial stop of the noun [t] survives intact. The changes between Stages I and II are graphically represented below:

(28)	a.	<p>Stage I</p> <p>O N</p> <p> </p> <p>x x</p> <p>→</p> <p>iNda: h e ledi: h</p>		<p>Stage II</p> <p>O N</p> <p> </p> <p>x x</p> <p>/ </p> <p>iNda: h e ledi:</p>
	b.	<p>Stage I</p> <p>O N</p> <p> </p> <p>x x</p> <p>→</p> <p>iNda: h t o: θa: h</p>		<p>Stage II</p> <p>O N</p> <p> </p> <p>x x</p> <p> </p> <p>iNda: t o: θa:</p>

At Stage I all the fricatives [h] in both (28a) and (28b) become floating. A floating segment can only dock onto an available onset, which takes place at Stage II in (28a). This analysis is identical to that of *t*-prefixation in Modern Irish illustrated in (24). In (28b) the initial onset of the noun is already occupied by [t]. Consequently, the floating fricative [h] is not phonetically realized.

The developments in (25c) and (27a), which show *h*-prefixation to vowel-initial words, suggest that the segment [h] was lexicalized as a word-initial consonant in phrases which originally contained this segment in word-final position. This observation is reinforced by the fact that function words such as the nom.pl. fem. article *sinda:s as well as the feminine pronoun *esja:s successively lost their endings and yet the fricative [h] kept remaining in the phonological phrases until Old Irish (and Modern Irish). Let us recapitulate these changes below:

(29)

*sinda:s eledi:s → *inda:h eledi:h → (*h*-prefixation) *iNda: heledi: → (final-vowel shortening) *iNda heldi → [iNə ˈh¹el¹d¹i] *inna eilti* – ‘the deer’

Thus, after *h*-prefixation, final vowel shortening took place in the article. This vowel was probably further reduced to schwa in Old Irish. Given that the final [h] was dropped everywhere, e.g. *iNda:h to:θa:h → *iNda: to:θa: – ‘the tribes’,

except before a vowel-initial lexical item, we may assume that this fricative was lexicalized in phrases such as *iNda: heledi: – ‘the deer’ and *eja: heχ^wa – ‘her horse’. The next section will provide more evidence to support this assumption.

2.3.3. *t*-prefixation as a consequence of *h*-prefixation

We have just seen that the presence of the final [h] is responsible for subsequent *h*-prefixation in vowel-initial lexical items, e.g. *eja:h eχ^wah → *eja: heχ^wa – ‘her horse’. Now let us consider different consequences of *h*-prefixation in other cases. First, let us focus on the nom.sg.masc., which represents the so-called non-leniting environment. The representative examples are juxtaposed with the nom.pl.fem. cases from (27) which are repeated here for convenience.

(30)	<i>Stage I</i>	<i>Stage II</i>	<i>Stage III</i>	<i>Old Irish</i>
a.	*iNdah eχ ^w ah	*iNda heχ ^w a	*iNd heχ	[iN ⁱ t ⁱ eχ] <i>int ech</i> – ‘the horse’
b.	*iNda:h eledi:h	*iNda: heledi:	*iNda heledi	[iNə h ⁱ el ⁱ d ⁱ i] <i>inna eilti</i> – ‘the deer’
c.	*iNdah baLah	*iNda baLa	*iNd baL	[iN 'baL] <i>in ball</i> – ‘the limb’
d.	*iNda:h to:θa:h	*iNda: to:θa:	*iNda to:θa	[iNə 'tuaθa] <i>inna túatha</i> – ‘the tribes’

In (30a, b) we see *h*-prefixation to vowel-initial items in Stage II. No such process certainly takes place in (30c, d) because the nouns begin in consonants. Before Stage III, although the nom.pl.fem. article ends in a long vowel, while the nom.sg.masc. article has a short vowel at the end, the vowel-initial items (30a, b) display identical behaviour (they acquire [h]) and consonant-initial words (30c, d) also act in the same way (they resist lenition). At Stage III, however, the pair-members start behaving differently. In particular, the articles in (30a, c) lose the final short vowel, i.e. *iNda → *iNd, while in the articles in (30b, d) the final long vowels are shortened, i.e. *iNda: → *iNda. These differences have immense impact on the further development of the words in (30a, c). In particular, *iNd baL becomes [iN 'baL] *in ball* – ‘the limb’, while *iNd heχ becomes [iNⁱ tⁱeχ] *int ech* – ‘the horse’ in Old Irish. Note that no further (major) changes affect the phrases in (30b, d).

The change from *iNd baL to [iN 'baL] *in ball* – ‘the limb’ can be accounted for straightforwardly. Following the assumption employed while discussing the absence of *h*-prefixation in (28b), i.e. *iNda:h to:θa:h → *iNda: to:θa: – ‘the tribes’, we can propose the following development of *iNd baL → [iN 'baL]:

<p>(31) Stage III</p>		<p>Old Irish</p>
<p>O₁ N₁ O₂ N₂</p> <p> </p> <p>x x x x x x</p> <p> </p> <p>i N d b a L</p>	<p>→</p>	<p>O₁ N₁ O₂ N₂</p> <p> </p> <p>x x x x x x</p> <p> </p> <p>i N b a L</p>

At Stage III above the article-final stop [d] becomes a floating segment, i.e. a segment without a skeletal position. Since the noun-initial onset (O₁) is already occupied by the stop [b], there is no available onset for [d] to dock onto. As a result, [d] is removed from the representation in Old Irish.

Now let us turn to the more complicated case, that is *iNd heχ → [iNⁱ tⁱeχ] *int ech* – ‘the horse’. Note that the noun-initial [h] is a result of *h*-prefixation at Stage II in (30a), i.e. *iNdah eχ^{wa}h → *iNda heχ^{wa}a. After apocope, that is *iNda heχ^{wa}a → *iNd heχ, the article-final stop [d] and the noun-initial [h] were brought together, which ultimately led to the appearance of [t] in Old Irish.

Looking back at the element make-ups of both [h] and [d], which were proposed in (2.1.4.), we can see that the fricative [h] comprises (H), while [d] consists of (A-I, ?). The element structure of the fortis stop [t], in turn, is (A-I, ?, H). We must conclude that at some point the two sets of primes previously constituting [d] and [h] combined to produce the fortis dental stop [t]. All things considered, we can propose the following detailed derivation of *iNdah eχ^{wa}h → *iNda heχ^{wa}a → *iNd heχ → [iNⁱ tⁱeχ] *int ech* – ‘the horse’, in which the fricative [h] is represented by the high tone element (H), while the voiced stop [d] by (A-I, ?) in the two final stages:

<p>(32) Initial Stage</p>				
<p>O₁ N₁ O₂ N₂ O₃ N₃</p> <p> </p> <p>x x x x # x x</p> <p> </p> <p>iN d a H eχ^{wa}aH</p>	<p>→</p>	<p><i>h</i>-Floating Stage</p> <p>O₁ N₁ O₃ N₃</p> <p> </p> <p>x x # x x</p> <p> </p> <p>iN d a eχ^{wa}a</p> <p style="text-align: center;">H H</p>	<p>→</p>	<p><i>h</i>-Prefixation Stage</p> <p>O₁ N₁ O₃ N₃</p> <p> </p> <p>x x # x x</p> <p> </p> <p>iN d a H eχ^{wa}a</p>

<i>Final Vowel Deletion Stage</i>	<i>d-Floating Stage</i>	<i>t-formation Stage</i>
$ \begin{array}{cc} O_1 & N_1 & O_3 & N_3 \\ & & & \\ \rightarrow & x & x & \# & x & x \\ & & & & & \\ iN & d & & & H & e & \chi \end{array} $	$ \begin{array}{cc} O_3 & N_3 \\ & \\ \rightarrow & \# & x & x \\ & & & \\ iN & & H & e & \chi \\ & & \underline{A-I} & & \\ & & ? & & \end{array} $	$ \begin{array}{cc} O_3 & N_3 \\ & \\ \rightarrow & \# & x & x \\ & & & \\ iN & & H & e & \chi \\ & & & & \\ & & \underline{A-I} & & \\ & & & & \\ & & ? & & \end{array} $

The Initial Stage shows the Insular Celtic form *iNdah eχ^wah. The tone element (H) is associated with the onset position (O₂). During the *h*-floating Stage the onset (O₂) is deleted along with its skeletal position and the prime (H) becomes a floating tone, that is, it is not linked to a skeletal slot. In the *h*-prefixation Stage the floating element (H) docks onto the noun-initial empty onset (O₃). In the Final Vowel Deletion Stage the article-final short vowel is delinked from (N₂), due to which the now article-final [d] and the tone (H) come to stand side by side. At the *d*-floating Stage the onset (O₁) is removed from the representation along with the skeletal slot, as a result of which [d], represented by (A-I, ?), becomes a floating segment, i.e. it is not associated with a position. Finally, the *t*-formation Stage shows that the elements constituting the floating [d] combine with the tone (H) under the noun-initial onset (O₃) to form the voiceless stop [t] in the Old Irish close syntactic group [iNⁱ tⁱeχ] *int ech* – ‘the horse’.

This derivation shows a gradual ‘consumption’ of the article ending by the following noun. First, the final [h] of the article is lexicalized as a word-beginning and then the voiced stop [d] follows suit. Thus, the origin of [t] in vowel-initial stems can be accounted for phonologically because it has a local cause.

If we now return to the derivation of *iNda:h eledi:h → *iNda: heledi: – ‘the deer’, the absence of *t*-prefixation can be easily explained. The development of this phrase was initially identical to that of *iNdah eχ^wah → *iNda heχ^wa – ‘the horse’ because in both cases *h*-prefixation took place. Later on, the behaviour of these two phrases began to differ. Specifically, after *h*-prefixation, the final short vowel of the article was dropped in *iNda heχ^wa → *iNd heχ, as shown in Stage III in (30a). This vowel deletion made it possible for the segments [d] and [h] to stand side by side, fuse and produce [t], i.e. *iNd heχ → [iNⁱ tⁱeχ]. On the other hand, the article-final vowel in *iNda: heledi: was never dropped but only shortened, that is *iNda: heledi: → *iNda heledi, as a result of

which the segments [d] and [h] were never brought together. Thus, the only affixation which ever affected [iNə 'hⁱelⁱdⁱ] *inna eilti* – ‘the deer’ was *h*-prefixation, which is graphically illustrated in (28a).

The fact that there was never any [d] to merge with [h] in the feminine possessive pronoun *esja:s in, say, *esja:s ek^wos → *ehja:h eχ^wah → *eja: heχ^wa → [ə 'heχ] *a ech* – ‘her horse’, accounts for the absence of *t*-prefixation in this context as well.

We will return to the issue of *t*-prefixation while discussing leniting contexts later in this chapter. Now let us conclude that this type of affixation can only take place provided that two conditions are met: first, that *h*-prefixation has already occurred in a vowel-initial stem, and second, that there is a stop [d] immediately preceding the previously prefixed [h] in the phonological representation.

In the ensuing sections we will concentrate on other developments which were triggered by the fact that the high tone (H) became a floating object at some point in the prehistory of Irish.

2.3.4. *The floating high tone and the origin of the Irish* [f]

Now we will see that the floating tone (H), which has an important role in the pre-Old Irish *h*-prefixation and *t*-prefixation, also participates in another development in the prehistory of Irish. While discussing the details of lenition in Old Irish, it was stated that the segment [f] can basically be either an independent sound occurring word-initially or a product of the lenition of [p]. The first one was said to be special in that, unlike all the other consonants which lose one element due to lenition, it loses two primes and becomes inaudible, for instance [fⁱið]/[də 'ið] *fid/do fid* – ‘wood’/‘your wood’. The origin of this Old Irish fricative has received attention from scholars such as Watkins (1966), Cowgill (1967), Uhlich (1995), McCone (1996), and many others.

It is commonly held that, at the time when lenition was phonological, that is in prehistory, the system of Irish did not include the sound [f]. There were two reasons for this state of affairs.

First, the Old Irish [f] can be a segment obtained due to the lenition of [p], e.g. [pⁱian]/[ə 'fⁱian] *pian/a p(h)ian* – ‘punishment’/‘his punishment’. However, there was no descendant of the PIE sound [p] in Celtic until the introduction of loanwords, which took place later than the phonologically motivated lenition (McCone 1996:129). Thus, no [f] could be had as a result of weakening in early Primitive Irish. When Latin borrowings had already become part of the Irish lexicon, which was when lenition had been grammaticalized, the labial stop [p] underwent lenition similarly to the other obstruents and became [f] (McCone 1996:137).

Second, the other Old Irish [f] can be found either in non-leniting morpho-syntactic environments (e.g. after non-leniting function words as in [iNⁱ 'fⁱer] *in fer* – ‘the man’) or word-initially (without any item preceding it in sentences, e.g. [fⁱer] *fer* – ‘man’). This fricative was absent from the Insular Celtic and early Primitive Irish inventory or, to be more precise, its predecessor existed in the shape of [w].

This PIE semi-vowel or glide developed in three ways in late Primitive Irish (McCone 1996). In close contact with a voiced consonant or sonorant it turned into [v], e.g. *widwa → [fⁱeðəv] *fedb* – ‘widow’, *arwar → [arvər] *arbar* – ‘grain’. This was also the case across word-boundaries, e.g. *indan weran → *iNdan veran → *iNda vera → [iNə 'vⁱer] *inna fer* – ‘of the men’. Intervocally, both within single words and across word boundaries, it disappeared, e.g. *druwi → *druy → [druí] *druí* – ‘druid’ and *ehja wosto → *eja wosso → [ə 'os] *a foss* – ‘his servant’. These developments are obviously connected with phonological lenition which affected the glide [w] late in Primitive Irish or early in Old Irish. Thirdly, in non-leniting or independent (word-initial and sentence-initial) contexts, this semi-vowel surfaced as [f]. The difference between the non-leniting contexts and independent positions will be shown to be of importance below.

As for the element make-up of this prehistoric [w], it is more than likely that it contained the prime (U). Above all, the segment [w] is a labial and it is the element (U) that defines the labial place of articulation in GP. Moreover, [w] is a development of the PIE consonantal *u (Thurneysen 1946:122). Bearing this historical and structural information in mind, we can tentatively assume that when [w] became [v] after a voiced consonant, the change possibly consisted in the acquisition of headship by the element (U), that is (U) → (U).¹⁸

As regards leniting contexts, all consonantal segments (except sonorants *l*, *r*, *n*) lost one prime when weakened intervocally. After the leniting age, the newly borrowed segments, such as [p], followed suit and lost one element in historically determined weakening contexts. Given that [w] equals (U), it is hardly surprising that, when lenited, this segment had no elements left to remain pronounceable. Thus the lenition of [w] into \emptyset can be represented as (U) → (). This historical phonological process indirectly accounts for the deletion of [f] in weakening environments in Old Irish. In other words, the lenition of [w] was lexicalized when the process of weakening was no longer active. Subsequently, when [f] replaced [w] word-initially, its structure was totally unimportant to the system which treated this segment as one to be deleted in a leniting context.

¹⁸ A similar change of w → v, involving the acquisition of headedness, is also observed by Cyran and Nilsson (1998:96) in Slavonic languages.

It is the non-leniting environment, however, that is most intriguing and spectacular. McCone (1996:131) observes that, fairly long after the period of phonological lenition, the system allowed the alternation between the original [w] and the voiceless fricative [f]. Below we will see the behaviour of the prehistoric glide [w] in two contexts: leniting in (33a) and non-mutating in (33b). Consider the following examples:

(33)	<i>Stage I</i>	<i>Stage II</i>	<i>Old Irish</i>	
a.	*iNdi: wiri:	*iNdi iri	[iN ⁱ 'd ⁱ ir ⁱ]	<i>ind fir</i> – ‘of the man’ gen.sg. LENITION
b.	*iNdah werah	*iNda fera	[iN ⁱ 'f ⁱ er]	<i>in fer</i> – ‘the man’ nom.sg. NO MUTATION?
	*werah	*wera	*wer/[f ⁱ er]	<i>fer</i> – ‘man’ nom.sg. NO MUTATION

These stages present the developments of the ancient glide [w] in (apparently) two different environments. At Stage I all the forms of the noun display the initial glide [w]. The example in (33a) shows its intervocalic lenition to zero at Stage II, i.e. *iNdi: wiri: → *iNdi iri. Any [w] which had developed into neither [f] nor [v] was lost in that period (Kortlandt 1979:48ff.; McCone 1996:131). Later on, the final vowels of both the article and the noun were dropped, as a result of which the Old Irish form was [iNⁱ 'dⁱirⁱ] *ind fir*. At Stage II the examples in (33b) show a discrepancy between the non-mutating context after the definite article (or any closely connected preceding word) and a pure non-weakening environment, i.e. one without any preceding words. In particular, the original glide [w] in *wer, which is not preceded by any other item, remains intact for a long time until it is replaced by [f] in Classical Old Irish (McCone 1996:131). The development of *iNdah werah → *iNda fera, however, shows that [w] changes to [f] in the non-mutating context where we observed *h*-prefixation in the preceding sections. Let us focus on these two developments now.

The fact that the context-free variant *wer was present in the lexicon along the structure [iNⁱ 'fⁱer] until Early Old Irish (as shown in (33b)) suggests that the nominal form with the initial [f] was originally a context-dependent derivative, that is a variant which occurred only in specified environments. Explicitly, the radical segment was still [w], the lenited version was zero, while the variant occurring in *h*-prefixing contexts was [f]. Below we will compare the developments of the prehistoric glide [w] as a context-free segment and as one in the *h*-prefixing context. First, let us see a detailed derivation of the context-independent form *wer based on McCone (1996:131) graphically represented below:

<p>(34) <i>Stage I</i></p> <p>O N O N</p> <p> </p> <p>x x x x</p> <p> </p> <p>w e r a H</p>	<p>→</p>	<p><i>Stage II</i></p> <p>O N O N</p> <p> </p> <p>x x x x</p> <p> </p> <p>w e r ə</p>	<p>→</p>	<p><i>Stage III</i></p> <p>O N O N</p> <p> </p> <p>x x x x</p> <p> </p> <p>w e r</p>
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At Stage I, which historically corresponds to the period just after phonological lenition, the only change is that the final fricative (high tone) is delinked from the representation. In the second phase this context-free noun has already lost the consonantal ending [h], while in Stage III the noun has undergone apocope (final vowel deletion). What is worth noting is that no change at all has been observed in the initial glide, it has remained intact until it is replaced by [f] in Early Old Irish. The nature of this replacement will be discussed soon.

Now let us turn to the context-dependent version of this word where the noun is preceded by the definite article ending in the fricative [h], i.e. *iNdah werah. The glide [w] is represented as the element (U), while the fricative [h] by (H) in the following derivation:

<p>(35) <i>Stage I</i></p> <p>O N O N</p> <p> </p> <p>x x x x</p> <p> </p> <p>i N d a H U e r a H</p>	<p>→</p>	<p><i>Stage II</i></p> <p>O N O N</p> <p> </p> <p>x x x x</p> <p> </p> <p>i N d ə U e r ə</p> <p style="text-align: center;"> </p> <p style="text-align: center;">H</p>
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In Stage I the article-final [h], represented by the high tone (H), becomes a floating segment, similarly to the final segment of the noun. Stage II shows that the tone element (H) has been harboured by the noun-initial onset and has combined with the prime (U), previously determining the quality of this onset. As a result, the structure (U, H) is realized as [f], or, perhaps [ϕ]. It is likely that between Stages I and II above, the newly formed spirant [f] for some time occupied two consecutive onset positions before the structure was simplified through merger.

The changes illustrated in (34) and (35) show that there are two non-leniting contexts which differ with respect to the influence they exert on the prehistoric glide [w]. In the context-dependent, non-leniting and *h*-prefixing environment, i.e. *iNdah werah, where the ancient glide was preceded by the floating tone,

the origin of the segment [f] finds phonological explanation. The other situation, namely the context-independent non-leniting environment **werah*, cannot be accounted for in terms of phonology because the change of [w] to [f] occurs without a local cause (there is no preceding [h] or anything else). McCone (1996:131), following Watkins (1966:70-71), notes that [w] in unlenited initial position (**wer*) was replaced by the context-dependent variant [f] “under analogical pressure from the normal alternations” typical of the other obstruents. For example, the word *corp* appears with its radical initial consonant as [korp] *corp* – ‘body’ and as [iNⁱ korp] *in corp* – ‘the body’ when preceded by the definite article. Both the radical [k] and the unlenited [k] are identical. Analogically, the initial consonant in the unlenited variant of [iNⁱ tⁱer] *in fer* – ‘the man’, should also surface as [tⁱer] *fer* – ‘man’ without any preceding items.

A reverse situation, i.e. that the newly formed context-dependent version [f] is abandoned, is theoretically possible. However, given that the glide [w] was generally on the wane in late Primitive Irish and Early Old Irish, it is hardly surprising that this semi-vowel was eradicated as soon as an appropriate substitute appeared in the system. It is also worth noting that in nasalizing contexts, where radical fortis obstruents occurred as lenis, e.g. radical [k] surfaced as [g], the glide [w] appeared as [v], e.g. *iNdan *weran* → *iNdan *veran* – ‘of the men’. Thus, it must have been more natural for the phonological system of Irish at that time to accept the new opposition between [f] and [v] than that between [w] and [v]. The behaviour of [w] in nasalizing contexts is dealt with later in this chapter.

Therefore, we can conclude that the change of [w] to [f] in context-free position (**wer*) is merely a replacement of the radical segment by a mutated (i.e. strengthened) one and has nothing to do with regular phonological development, unlike the spirantization of [w] to [f] in [iNⁱ tⁱer].¹⁹

In the ensuing section we will investigate another phenomenon involving the merger of the high tone (H) and the prehistoric glide [w].

2.3.5. *The high tone and the lenition* [s → f]

While describing Old Irish lenition in (2.1.3.) and (2.1.4.) we noted a peculiar weakening of [s] to [f]. It was observed then that [f] sometimes replaces [s] in leniting contexts, e.g. *siur* – ‘sister’ when lenited, becomes *fiur*, while *sesser* – ‘six people’ turns into *fesser* in a weakening site (Thurneysen 1946:84). Being totally irregular when approached synchronically, this development can also be accounted for phonologically if viewed from the historical perspective.

¹⁹ The replacement of a radical segment by a mutated variant is not infrequent in Celtic languages. See e.g. Ball and Müller (1992) and Fiegel (2002) for ‘re-radicalization’ in Welsh and Irish, respectively.

Below we will see the prehistoric developments of the cluster [sw] in an independent no-mutation context and in a leniting environment with a view to finding a local source for the occurrence of [f] in the latter. Consider the following derivations taken from McCone (1996:105, 120):

(36) <i>Stage I</i>	<i>Stage II</i>	<i>Stage III</i>	<i>Old Irish</i>	
a. CONTEXT-FREE DEVELOPMENT				
*swess	*sweh	*se:	[s ⁱ e:] sé	– ‘six’
*swesur	*swehur	*siur	[s ⁱ iur] siur	– ‘sister’
b. DEVELOPMENT IN LENITING CONTEXTS				
*esjo swesur	*ehja hwehur	*eja fiur	[ə ⁱ fiur] a fiur	– ‘his sister’

In (36a) the context-free development of forms with the original word-initial cluster [sw] is illustrated. In Stage II we observe the phonological lenition of [s] to [h] in medial position in *swehur and in final position in *sweh. There is no initial lenition of [s] because no weakening context is involved. More importantly, Stage III reveals the simplification of the initial cluster to [s] alone.²⁰ This variant of the segment survives until Old Irish and, subsequently, until the present. In (36b) the leniting context is shown in Stage II. The cluster [sw] is lenited to [hw], which produces the single segment [f] in the third phase and, ultimately, in Old Irish.

The immediate vicinity of both [h] and [w], which led to the following development into [f], bears a striking resemblance to what we witnessed in the case of *iNdah werah → *iNdə fera – ‘the man’. The only difference is that in *ehja hwehur → *eja fiur we are dealing with this spirant-glide sequence within one word. It has already been demonstrated, however, that close syntactic groups which constitute phonological phrases behave similarly, if not identically, to phonological words and that morphological boundaries are of no importance. Therefore, if the cluster simplification occurred despite morphological boundaries in *iNdah werah → *iNdə fera – ‘the man’, the same process must have occurred within a morphologically simplex unit like *hwehur provided that it found itself in a leniting context. Consider the simplified development of the PIE cluster [sw] below in the phrase *esjo swesur → *ehja hwehur → *eja fiur. The segments [h] and [w] are represented by the phonological elements (H) and (U), respectively, at the word-beginning:

²⁰ This loss of [w] is a regular development which took place between Primitive Irish and Early Old Irish. Let us recall that [w] which had not changed into either [f] or [v] was regularly dropped in that period except in context-free word-initial position.

(37) <i>Initial Stage</i>	<i>Lenition Stage</i>	<i>Simplification Stage</i>
O N O N	O N O N	O N
x x x x	x x x x	x x
esjo s U e su:r	ehja H U e hu:r	eja U i u: r
		H

The Initial Stage shows the situation from before lenition, where the initial segment is still [s]. During the Lenition Stage above the tone element (H) and the labial prime (U) belong to two different skeletal slots, the result being the cluster [hw]. In the Simplification Stage these two primes merge under one position and are realized as one segment [f].

It transpires, then, that what used to be a purely phonological process in prehistory, was totally obscured in Old Irish. In this system we can only speak of the functional replacement of some *s*'s by some *f*'s in particular contexts. In other words, the prehistoric regular lenition of the original [sw] to [hw] and the subsequent merger to the spirant [f] became lexicalized in specific grammatical contexts in or before Old Irish.

In the ensuing section we will try to come to grips with another controversial phenomenon, namely the strengthening of original lax sonorants in non-leniting environments. Also there we will be making a clear distinction between two no-mutation contexts. One will be referred to as *h*-prefixing because in this environment vowel-initial stems are provided with the initial [h], e.g. *iNda^h eχ^wah → *iNda^h heχ^wa – ‘the horse’, and [f] is formed due to the merger of [h+w], e.g. *iNda^h werah → *iNdə^h fera – ‘the man’. The other one is a truly independent initial environment, that is, without any preceding items.

2.3.6. The high tone and the origin of the Irish tense sonorants

As already mentioned, the sonorants occurred in two variants in Old Irish: as tense (strong) segments [R, L, N], and as lax (weak) expressions [r, l, n].²¹ It is also commonly held that, word-initially, the weak series occurred in leniting contexts, while their strong congeners surfaced in non-leniting environments.²²

²¹ The nasal stop [m] is not normally treated as a sonorant but as a stop because, like all the other stops, in prehistory it underwent intervocalic weakening to the fricative [m̃].

²² Tense sonorants also occurred in nasalizing contexts. These will be discussed later on.

Below, we will compare the tense sonorants in no-mutation sites with the lax ones in weakening environments:

(38) WITH A PRECEDING FUNCTION WORD CONTEXT-FREE OCCURRENCE

a. *Non-leniting Contexts*

[ə 'La:ĩ]	<i>a l(l)ám</i>	– ‘her hand’	[La:ĩ]	<i>lám</i>	– ‘hand’
[ə 'Ri:]	<i>a r(r)í</i>	– ‘her king’	[Ri:]	<i>rí</i>	– ‘king’

b. *Leniting Contexts*

[ə 'la:ĩ]	<i>a lám</i>	– ‘his hand’
[ə 'ri:]	<i>a rí</i>	– ‘his king’ ²³

In (38b) we observe the lax resonants after leniting function words, e.g. [ə 'la:ĩ] – ‘his hand’. In (38a) the tense sonorants occur after non-leniting function words (i.e. in *h*-prefixing contexts), e.g. [ə 'La:ĩ] – ‘her hand’ and without any closely connected preceding items, e.g. [La:ĩ] – ‘hand’. It will be shown soon that these two no-mutation contexts are not identical.

Viewing the tense-lax pairs of sonorants from the Old Irish perspective alone, as we did in (2.1.4.), one must conclude that the tense series are radical, while the lax ones are contextually weakened. However, the history of resonants indicates that this need not be the case. In particular, there is no evidence to counter the view that there were only lax series in PIE and all the Old Irish tense resonants historically derive from these lax expressions (Lewis and Pedersen 1974; Kortlandt 1979; McCone 1996), although there is no agreement among scholars as regards the time and circumstances when that tensing occurred.

According to McCone (1996:82, 84, 96ff.), who is one of the few who try to date exactly the transformation of these lax segments into tense, the strengthening (tensing) of the original lax resonants probably took place in Insular Celtic, which was when Proto-Celtic had split into Continental Celtic and Insular Celtic. We are interested in the insular branch here. That was the time when the voiced stops had already been affected by lenition and when [s] was also undergoing weakening. Taking into account these chronological assumptions and the proposal that the development of tense sonorants from their lax congeners was confined to all non-leniting contexts, let us consider the original lax sonorant transformations in two no-mutation contexts: after non-leniting (*h*-prefixing) function words (39a), and without any preceding items (39b). On the other hand, (39c) shows no transformation in typical leniting environments.

²³ We assume that the initial [R] and [r] are non-palatalized, like in Modern Irish.

(39)	<i>Stage I</i>	<i>Stage II</i>	<i>Stage III</i>	<i>Old Irish</i>
a.	*sindos ri:s	*indah Ri:h	*iNda Ri:	[iN 'Ri:] – ‘the king’
	*esja:s la:ma:	*ehja:h La:~va:	*ehja: La:~va:	[ə 'La:~v] – ‘her hand’
b.	*ri:s	*Ri:h	*Ri:	[Ri:] – ‘king’
	*la:ma:	*La:~va:	*La:~va:	[La:~v] – ‘hand’
c.	*sindi: ri:gos	*indi: ri:yah	*iNdi ri:ya	[iN ^l d 'ri:γ] – ‘of the king’
	*esjo la:ma:	*ehja la:~va:	*ehja la:~va:	[ə 'la:~v] – ‘his hand’

In Stage I in (39a) we can see the Proto-Celtic forms with the final unlenited variant of [s] in the definite article and the possessive pronoun as well as the noun-initial lax sonorants. Stage II represents the Insular Celtic period when both the lenition of [s] to [h] and the tensing of the resonants have taken place, e.g. *indos ri:s → *indah Ri:h – ‘the king’. The third phase shows that, after the dropping of [h], which previously terminated the function words, the sonorants are still tense, like in Old Irish. In McCone’s (1996) approach, the context-free developments in (39b) are identical to those in (39a). (39c) shows leniting environments, i.e. after a vowel in the closely connected preceding item, in which nothing ever happened to the original noun-initial lax sonorants: they entered Old Irish intact.

Thus, the only condition to be met for the tensing to take place at Stage II in (39a) is that what precedes the original lax resonants must not be a vowel and their fortition seems spontaneous in (39b), where they do not follow any closely connected word.

Now, given that in the prehistory of Old Irish many developments taking place at word-boundaries seem to have had a phonological (i.e. local) cause, e.g. *h*- and *t*-prefixation, the origin of [f], and the changes to be discussed below, it is peculiar that the tensing of sonorants was totally dissimilar in this respect. Bearing this in mind, let us investigate further developments.

The Insular Celtic period preceded another crucial division, namely the split into Primitive Irish and Primitive (or Proto-) Welsh. This may also be called a separation of two geographically distinct dialects, that is Goidelic (Irish) and Brittonic (Welsh). Thus, when lax sonorants were tensed, there was probably no distinction between Irish and Welsh in the treatment of these segments. Interestingly, in Modern Welsh (and in the history of Welsh) the opposition between the unlenited and lenited liquids manifests itself in the aspiration (voicelessness) of the former (Ball and Müller 1992, Buczek 1995). In terms of elements, the tense liquids can be said to contain the prime (H), as suggested by Cyran (2003: 69). The fact that the Welsh reflexes of Insular Celtic forms display voiceless-

ness in sonorants (e.g. the Old Irish for ‘her hand’ is [ə ‘La:~ṽ] while the Middle Welsh is [i ɣaw]), may be viewed as irrelevant, but it may also indicate that at the beginning of Insular Celtic all sonorants were lax and it was only after the dropping of the preceding [h], whose element structure contains only (H), that they acquired the property of tenseness or voicelessness. Thus it is possible that, after a few centuries of separation, the Welsh reflexes of these sonorants were voiceless, while in Irish the effect was different. We shall return to the development of sonorants in Welsh soon.

Stage II in (39) above is based upon reconstructions proposed by McCone (1996:84, 120ff.), but even he admits that the final *-h* of, say, *ehja:h (feminine possessive pronoun) was “lost in various ways”, whereas Kortlandt (1979:47) argues that this loss was a gradual process. This means that *-h* may have been lost in different periods before different consonants, which is compatible with the hypothesis that phonological lenition was not a process which affected all consonants at the same time. Let us recall that, roughly, the first lenition affected voiced stops, the result of the second was the weakening of [s], while the third weakened voiceless stops (as shown in (19) above). This also indicates that the transition from phonological lenition to functional (grammatically motivated) weakening could have varied depending on the particular segment or group of segments. Consequently, the fact that sonorants were strengthened in Insular Celtic while the period of *h*-dropping was accomplished in Primitive Irish need not automatically mean that the strong variants of sonorants and the preceding [h] stood side by side at exactly the same time. It is not impossible, then, to hypothesize that the loss of the final *-h* contributed to the development of tense sonorants. Such a view would not be unprecedented since the relevant literature offers a similar proposal. In particular, Kortlandt (1982:81) argues that in close syntactic groups the resonants were geminated at the expense of the disappearing *-h*, or that this spirant was assimilated. Accepting this opinion would amount to saying that tenseness means gemination in the case of word-initial (doubly written) sonorants in *h*-prefixing contexts.

This, in turn, can find support in the interpretation of double resonants in other word positions, i.e. word-medial and final, as geminates (e.g. Thurneysen 1946; Greene 1956).²⁴ Without taking sides at this stage, let us consider the following examples of word-medial and final tense sonorants in Old Irish compared with their lax counterparts:

²⁴ Tense and lax sonorants also occur in consonant clusters. These are discussed in detail in Chapter Three.

(40)	a. <i>Tense</i>		b. <i>Lax</i>
	[b ⁱ eN] <i>benn</i> – ‘peak’		[b ⁱ en] <i>ben</i> – ‘woman’
	[k ⁱ e:L ⁱ e] <i>céille</i> – ‘sense’-gen.sg.		[k ⁱ e:l ⁱ e] <i>céile</i> – ‘companion’
	[koR] <i>corr</i> – ‘heron’		[kor] <i>cor</i> – ‘act of putting’

The examples above show two things. First and most obvious, that tenseness is contrastive. Second, that tense sonorants are mostly written double in Old Irish, which is also true of word-initial sonorants in close syntactic groups. Prehistoric developments of the Old Irish tense resonants, which are shown below, are also revealing:

(41)				
	*banna:	→ *baNa	→ [b ⁱ eN]	<i>benn</i> – ‘peak’
	*karros	→ *kaRa	→ [kaR]	<i>carr</i> – ‘wagon’
	*ballos	→ *baLa	→ [baL]	<i>ball</i> – ‘limb’

Vowel changes apart, it transpires that, historically, the Old Irish tense sonorants in intervocalic contexts were double consonants or, simply, geminates. A CV-based structure of a geminate contrasted with that of a single consonant proposed in Chapter One is repeated below for convenience:

(42)	a. <i>Geminate</i>	b. <i>Single consonant</i>	
	O N O N	O	
	x x x x	x	
	/		
	\	β	
	β		β = any consonantal segment

The structures in (42) show that geminates are attached to two consecutive onset positions, whereas single consonants occupy one. These schematic representations of consonants are parallel to those of long and short vowels, respectively. While proposing element structures of Old Irish sonorants in (2.1.4.), we observed that the tense-lax dichotomy present in sonorants has a mirror image in tense and lax vowels in some languages. In English, for example, the tense vowels are long, while the lax ones are short. Consider the following pair *beat* – *bit* illustrating the difference in structure between the English tense and lax vowels.

<p>(43) a. <i>Tense</i></p> <p style="text-align: center;">O N O N O N</p> <p style="text-align: center;"> </p> <p style="text-align: center;">x x x x x x</p> <p style="text-align: center;"> \ / </p> <p style="text-align: center;">b i: t</p>	<p>b. <i>Lax</i></p> <p style="text-align: center;">O N O N</p> <p style="text-align: center;"> </p> <p style="text-align: center;">x x x x</p> <p style="text-align: center;"> </p> <p style="text-align: center;">b i t</p>
---	---

The similarity between the structure of the long vowel in (43a) and that of a geminate in (42a) is striking. Thus, if tenseness is a possible property of a given segment, double linking is able to provide this feature. Moreover, the English vowels are considered to be headed when long and tense, e.g. [i:] is (I) whereas the lax ones are regarded as headless, e.g. [ɪ] equals (I). This is exactly what was proposed in (2.1.4.) for the Old Irish tense and lax sonorants, e.g. the tense [R] = (A), while the lax [r] = (A). Given all these structural and element assumptions, it seems that gemination, headedness and tenseness are all interdependent. In particular, a resonant (structurally) attached to two positions is (articulatorily) tense and (elementally) headed, just like a tense long vowel.

It may be, then, that the Old Irish medial and final tense sonorants which derive from double segments, e.g. *banna: → *baNa → [bⁱeN] *benn* – ‘peak’ have geminate structure like that shown in (42a). A detailed analysis of tense sonorants in this position is provided in Chapter Three.²⁵ Now, assuming that geminate structure occurs non-initially in Old Irish, we can suspect that word-initial tense resonants which surfaced in *h*-prefixing contexts in prehistory display the same structure. Such a quantitative interpretation requires a historical reinterpretation of the changes shown in (39).

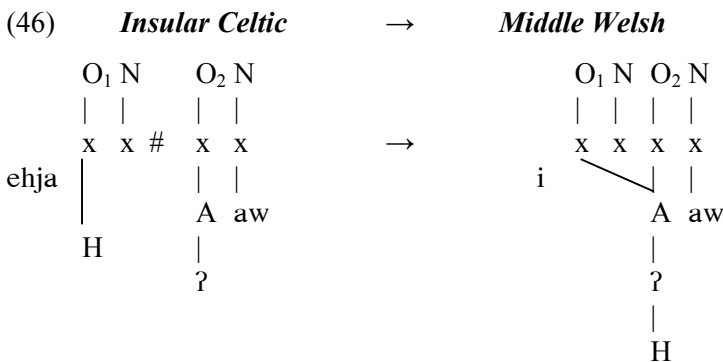
Unlike McCone (1996), below we propose that the original lax word-initial resonants were not always tensed spontaneously. On the contrary, their phonologically triggered tensing occurred when the final *-h* of the closely connected preceding word had been lost (i.e. in *h*-prefixing contexts), while unmotivated tensing took place only when nothing preceded a word-initial resonant:

(44) <i>Stage I</i>	<i>Stage II</i>	<i>Stage III</i>	<i>Old Irish</i>
a. *sindos ri:s	*indah ri:h	*iNda Ri:	[iN ‘Ri:] – ‘the king’
*esja:s la:ma:	*ehja:h la:va:	*ehja: La:va:	[ə ‘La:ṽ] – ‘her hand’
b. *ri:s	*ri:h	*Ri:	[‘Ri:] – ‘king’
*la:ma:	*la:va:	*La:va:	[La:ṽ] – ‘hand’

²⁵ There we also offer an analysis of the so-called Modern Irish vowel lengthening before tense sonorants.

man'. In the case of [w] after [h], the elements of both these segments merged to produce one segment [f], i.e. (H)+(U) = (U, H), while in the ancient Irish sonorants following [h], the element content of the final fricative had no impact on the quality of the tense sonorant.

In Brittonic the prehistoric lax resonants display voicelessness in exactly the same environments in which their Irish cousins show tenseness. This happens both in independent initial position (without any preceding words, e.g. the Old Irish for 'hand' is [La:~ṽ] whereas the Middle Welsh is [ɬaw]) and in contexts with the preceding [h] (e.g. the Old Irish for 'her hand' is [ə 'La:~ṽ] while the Middle Welsh is [i 'ɬaw]). We can speculate that these two related languages developed their sonorants in independent, although not entirely dissimilar ways. Consider the representations of the Middle Welsh reflex of the Insular Celtic form of *ehja:h la:~va: → [i 'ɬaw] – 'her hand'. For the sake of clarity, the transformation in (46) is extremely simplified in that the intermediate stages consisting in vowel reduction, vowel loss etc. have been disregarded.



In Insular Celtic the pronoun ends in the fricative [h] under the onset (O₁). This spirant is represented by the high tone element (H). The liquid [l] under (O₂) is lax and its element structure is (A, ?). In Middle Welsh the tone (H) merges with the elements previously constituting the lax [l], as a result of which the voiceless sonorant [ɬ] with the element content (A, ?, H) is formed. It is proposed in (46) that this segment has geminate structure (O₁O₂), which means that the new expression [ɬ] incorporates both the melody and the structure of two ancient segments: [h] and [l]. In melodic terms, this situation is parallel to that observed in the case of [h]+[w] = [f] in (2.3.4.). This is not the only possible interpretation, however. We may also speculate that there was no gemination at all and that in Brittonic the origin of voiceless resonants is parallel to the creation of [f] in Goidelic in structural terms as well. This is proposed below:

(47)	<i>Insular Celtic</i>	→	<i>Middle Welsh</i>
	O ₁ N O ₂ N		O ₂ N
	x x # x x	→	x x
ehja			i
	A aw		A aw
	H		
	? ?		?
			H

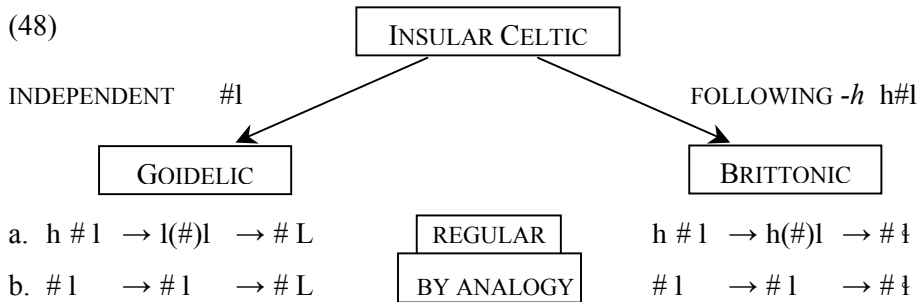
The Insular Celtic Stage shows the two onsets (O₁) and (O₂) occupied by [h] and the lax [l], respectively. In Middle Welsh the high tone prime has been delinked from its position (O₁) and has joined (O₂). Now the melody under (O₂) is enhanced by the prime (H), while (O₁), as an empty onset preceding an empty nucleus, has been removed from the representation.

What we have seen so far is that there is a slight difference in the treatment of the high tone (H) which previously terminated the possessive pronoun. On the one hand, in Brittonic the newly formed sonorant segment incorporates the element (H) previously attached to another position. This process may but need not have resulted in gemination. On the other hand, in Goidelic gemination did not entail the absorption of that tonal prime but the double linking provided the resulting sonorant with the property of tenseness.

What is also common to both Irish and Welsh is that the original lax sonorants in independent initial position (i.e. without any preceding items) were re-interpreted as tense (Irish) or voiceless (Welsh) at some period without any local cause. In particular, what used to be a lax sonorant in, say, the Insular Celtic *landa: – ‘land’, was turned into a tense resonant [L] in Irish (i.e. [LaNd] *land*) and into a voiceless liquid [ɬ] in Welsh (i.e. [ɬan] *llan*). The same is to a certain extent true of the Old Irish [R] and the Middle Welsh voiceless [r^h] or [r̥]. If the hypothesis that sonorants were doubly linked in connected speech (i.e. following the final *-h*) is accepted, the development of tense sonorants from the lax ones looks similar but not identical to that of [f] from [w], where the originally radical segment [w] was replaced by one which resulted from fortition in the vicinity of the final *-h*, e.g. *iNdah werah → *iNdə fera → [iNⁱ tⁱer] – *in fer* ‘the man’. However, there was neither any phonological source for the change of [w] into [f] nor for the double linking of sonorants when these occurred without any preceding items.

Let us recall that forms such as *wer – ‘man’ and [iNⁱ tⁱer] *in fer* – ‘the man’, the former context-independent while the latter historically following *-h*, were both present in the language for some time before the version with the fortis spirant [f] came to be perceived as the radical form, i.e. *wer → [fⁱer] *fer* – ‘man’. So, the radical [w] was reinterpreted as [f] by analogy with [f] which was formed in *h*-prefixing environments. We have argued that the original lax sonorants were tensed also in *h*-prefixing contexts. Given the similarity between the origin of [f] and the tense (or, in Welsh, voiceless) sonorants, analogical reinterpretation of radicals may have affected also the original lax sonorants in independent initial position. Thus the predecessors of the Old Irish forms such as [ə ‘Ri:] *a r(r)i* – ‘her king’ and [iN ‘Ri:] *in r(r)i* – ‘the king’, in which the sonorant became tense as a result of being doubly linked, as shown in (45), probably gave rise to the spontaneous strengthening of the same resonant in a context-independent form like [Ri:] *ri* – ‘king’ (Welsh [r^hi] *rhi*). The same pattern is observed in the Middle Welsh [tɔŋ] *llong* vs. Old Irish [Loŋ] *long* – ‘ship’ and the Middle Welsh [hiw] *lliw* vs. Old Irish [Lⁱi:] *lí* – ‘colour’.

To sum up, in Insular Celtic the original sonorants were lax. There was also a clear distinction between two types of non-mutating contexts: independent word-initial position (#1) and word-initial context following *-h* in connected speech (h#1). When the division into Irish and Welsh had occurred, the lax resonants in *h*-prefixing contexts were geminated in Goidelic and (probably) Brittonic. In the former system they became tense, e.g. [l] → [L]. In the latter they surfaced as voiceless, e.g. [l] → [ɬ]. Later on, contexts (h#1) came to be treated on a par with contexts (#1). As a result, the reinterpretation of the radical segments took place and all the sonorants in all nominally non-mutating environments were realized as tense (Irish) and as voiceless (Welsh). This is schematized below:



where [l] stands for sonorant²⁶

²⁶ In fact, in Welsh this symbol stands for liquids only because the IE nasal *n did not develop its voiceless counterpart in the environments described above.

This diagram shows clearly what happened to original PIE lax resonants in *h*-prefixing environments (48a) and in absolute initial position (48b). In both Brittonic (voicelessness) and Goidelic (tenseness) was connected with the gemination of the original lax sonorants at the expense of the deleting final *-h*. This gemination took place only in *h*-prefixing contexts shown in (48a). (48b) shows that the reanalysis of the original radical sounds occurred in context-independent position in both languages by analogy with the *h*-prefixing environments.

2.3.7. *Non-leniting environments – summary*

The aim of this discussion was to demonstrate that connected speech had immense impact on the treatment of various radical consonants and the ultimate shapes of word-forms and phrases in Old Irish. In the few sections above we were dealing with four types of adjustments which occurred in the so-called non-leniting environments in the prehistory of Irish: *h*-prefixation, *t*-prefixation, the origin of [f] and the tensing of PIE sonorants.

First, we saw that the phenomenon of *h*-prefixation and the successive developments were responsible for the occurrence of *t*-prefixation in Old Irish and, subsequently, Modern Irish. In particular, the word-final sound [h] was attached to vowel-initial stems of the closely connected following words and lexicalized there as a word-beginning, e.g. *ehja:h eχ^wah → (*h*-prefixation) *eja: heχ^wa → [ə 'heχ] *a ech* – ‘her horse’. The lexicalization of the fricative [h] word-initially led to the merger of this segment with [d], if this stop was locally available, which resulted in the so-called *t*-prefixation, e.g. *iNda:h eχ^wah → (*h*-prefixation) *iNda heχ^wa → (*h*-lexicalization) *iNd heχ → (merger of d+h=t) [iNⁱ 't'eχ] *in t-ech* – ‘the horse’. Next, we analyzed the development of the prehistoric labial glide [w] into the fricative [f] in connected speech in contexts following the word-final [h], e.g. *iNda:h werah → *iNdə fera → [iNⁱ 'f'ər] *in fer* – ‘the man’. The appearance of the spirant [f] in such phonological phrases gave rise to the reinterpretation of the radical segment in independent contexts, e.g. *werah → *wera → [f'ər] *fer* – ‘man’. Almost the same goes for the emergence of word-initial tense sonorants in the ancient Irish system. The original lax sonorants underwent gemination in connected speech in *h*-prefixing contexts, which resulted in the tensing of these resonants, e.g. *ehja:h la:va: → ehja: La:va: → [ə 'La:~v] *a llám* – ‘her hand’. These context-dependent tense resonants were subsequently treated as radical context-independently too, e.g. *la:~va: → *La:~va: → [La:~v] *lám* – ‘hand’.

An interesting side effect of the discussion above is the observation that leniting and non-leniting environments may often produce identical results, e.g. the leniting *sinda: su:lis → [iN 'tu:lⁱ] *int súil* – ‘the eye’ and the non-leniting

*sindos ek^wos → [iNⁱ 'tⁱeχ] *int ech* – ‘the horse’, which means that the ancient mutations had not yet crystallized their grammatical functions but had much in common with pure phonology.

In the ensuing part of this chapter we will focus on lenition in original weakening contexts and subsequent pre-Old Irish adjustments in connected speech.

2.4. Leniting environments and pre-Old Irish adjustment processes

2.4.1. Leniting definite articles

Having dealt with non-leniting contexts in the prehistory of Irish, in this part of the present chapter we will come to grips with leniting environments. The aim of this discussion is to demonstrate that pre-Old Irish adjustments, which chronologically followed lenition, were more significant to the ultimate phonological shape of many close syntactic groups in Old Irish than lenition itself.

The examples presented in the introduction to leniting and non-leniting contexts in (2.2.2.) were by and large uncontroversial in that, after the word-initial weakening of consonants, no subsequent changes had major impact on the shape of phonological phrases. Consider two relevant examples which show the development of close syntactic groups in two weakening contexts: after *sindi: – the genitive singular masculine definite article, and after *sinda: – the nominative singular feminine definite article.

(49) <i>Proto-Celtic</i>	<i>Lenition Stage</i>	<i>Old Irish</i>
a. *sindi: ke :liji:	*indi: χe:liji:	[iN ⁱ 'χ ⁱ e:l'i] <i>in chéili</i> – ‘of the fellow’
b. *sinda: banna :	*inda: vanna :	[iN ⁱ 'v ⁱ eN] <i>in benn</i> – ‘the peak’

In (49a) the radical noun-initial [k] of ***ke**:liji: – ‘companion’ undergoes lenition to [χ] at the Lenition Stage and remains unchanged later. Also in (49b) the original [b] of the noun **banna**: – ‘peak’ is subject to weakening to [v], but no further changes affect it. Later on, the whole phrases in (49a, b) experience the loss of vocalic endings (in both function words and lexical items) but these developments have no major influence on the shape of the word-beginnings in the relevant nouns.

Nevertheless, in Old Irish there were many close syntactic groups in which the changes which followed lenition had immense impact on the left-hand edge of lexical items. Since the groups to be discussed below include the definite articles shown in (49), let us first concentrate on the developments of these function words. Consider the morphological changes in the gen.sg.masc. definite article *sindi: in (50a) and the nom.sg.fem. definite article *sinda: in (50b):

(50) *Proto-Celtic**Old Irish*

- a. *sindi: → *indi → *iNdə → *iNd → [iNd/iN/iNt]
 b. *sinda: → *inda → *iNdə → *iNd → [iNd/iN/iNt]

The developments of two originally disparate definite articles show that these function words displayed identical shapes some time before Old Irish, namely from the stage of *iNdə onwards. What also seems certain is that when these articles contained vocalic endings (the first three stages), they caused lenition, while without these endings the weakening they triggered was no longer phonologically motivated. In other words, there was no longer any phonological or intervocalic context for lenition. It is not impossible to speculate that the grammaticalization of lenition took place when these articles were still vowel-final, but this cannot be proved in any way.

During the stages of phonological lenition the noun-initial weakened segments surfaced in their depleted versions, e.g. the lenited [b] was [v], the weakened [k] was [χ], etc., e.g. *sinda: banna: → *inda: vanna: → *iNda vanna → *iNdə vǣnnə – ‘the peak’. During all that time the articles ended in full or reduced vowels. This state of affairs lasted until the period of apocope, which was when the articles lost their final vowels, by then reduced to schwa. This took place in Primitive Irish around 500 A.D. (McCone 1996:127). So the final asterisked stage in (50) reveals the shape of these articles in the phase immediately preceding Old Irish. It should be noted that both the masculine and feminine articles still had one version, which was *iNd. The change of the nature of lenition from phonologically motivated to grammatical can be clearly observed in *iNdə vǣnnə → *iNd venn → [iNⁱ 'vⁱeN] *in benn* – ‘the peak’, where the intervocalic context for the lenition of [b] to [v] disappears for good but the effects of the process remain.

When we turn to Old Irish, these articles still perform their historically determined leniting functions but, interestingly, they display as many as three contextual variants: [iN], [iNd] and [iNt]. These variants depend on the nature of the first segment of the closely connected following word. Representative examples of all these variants followed by nouns beginning in different segments are provided below.

(51) *Nominative Singular Feminine* *Genitive Singular Masculine*

a.

[iN] BEFORE LENITED NON-DENTAL OBSTRUENTS

[iN 'χlaNd] <i>in chland</i> – ‘the family’	[iN 'χor ⁱ p ⁱ] <i>in choirp</i> – ‘of the body’
[iN 'γuð ⁱ e] <i>in guide</i> – ‘the prayer’	[iN 'ṽur ⁱ] <i>in múir</i> – ‘of the wall’
[iN ⁱ 'v ⁱ r ⁱ iaθər] <i>in briathar</i> – ‘the word’	[iN 'vaL ⁱ] <i>in bail</i> – ‘of the limb’

b.

[iNd] BEFORE VOWELS, LENITED f = [∅], AND LAX l, r, n

[iN 'daðəγ ⁱ] <i>ind adaig</i> – ‘the night’	[iN 'duL ⁱ t ⁱ] <i>ind fuilt</i> – ‘of the hair’
[iN 'dru:m] <i>ind rún</i> – ‘the secret’	[iN ⁱ 'd ⁱ eχ ⁱ] <i>ind eich</i> – ‘of the horse’
[iN 'dla:~ṽ] <i>ind lám</i> – ‘the hand’	[iN ⁱ 'd ⁱ n ⁱ eR ⁱ t ⁱ] <i>ind neirt</i> – ‘of the strength’

c.

[iNt] BEFORE LENITED s = [h]

[iN 'tu:l ⁱ] <i>int suil</i> – ‘the eye’	[iN 'tal ⁱ m ⁱ] <i>int sailm</i> – ‘of the psalm’
--	--

In (51a) the definite article [iN] is followed by a lenited obstruent, e.g. [χ], or a cluster containing a lenited obstruent and a lax sonorant, for example [χl]. In (51b) the article appears in its more ancient version, which is [iNd]. This variant of the article surfaces in front of vowels, e.g. [a], or lax sonorants, for instance [r], as well as before the lenited [f], that is zero. In (51c), in turn, we can observe the replacement of the lenited [s], that is [h], by the fortis version of the final segment of the article. This resembles the so-called *t*-prefixation with which we were dealing with while discussing non-leniting contexts. A detailed derivation of the form in (51c), i.e. *sinda: su:lⁱs → *inda: hu:lⁱh → *iNda hu:lⁱ → *iNd hu:lⁱ → [iN 'tu:lⁱ] *int súil* – ‘the eye’, suggests that we may be facing a similar development. This example also points to the fact that, similarly to the other consonants, [s] underwent regular lenition in prehistory.

All these examples represent historical leniting contexts but the different versions of the definite articles in Old Irish suggest that after the stage of lenition much happened to the phrases in (51) and that not all these phrases underwent the same changes. In the ensuing sections we will analyze the prehistoric changes which affected the representative phrases after the period of lenition.

2.4.2. *Leniting articles before lenited non-dental obstruents*

In Old Irish the leniting definite articles, both the gen.sg.masc. *sindi: and the nom.sg.fem. *sinda: surface as [iN] in front of prehistorically weakened obstruents. Consider the development of the gen.sg.masc. phrase [iN 'vaLⁱ] *in baill* – ‘of the limb’, which serves as an example of a leniting context.

(52) *Lenition Stage* *Old Irish*
 *sindi: balli: → *indi: valli: → *iNdi vaLi → *iNd vaLⁱ → [iN 'vaLⁱ]

In this phrase the original [b] of *balli: – ‘limb’ undergoes weakening at Lenition Stage. In terms of elements, this change can be represented as (U, ?) → (U). Later on, nothing happens to this word-beginning. The article experiences a gradual loss of the ending, i.e. *iNdi → *iNd → [iN]. Thus, in the phase which immediately preceded Old Irish, the shape of the article was *iNd. After this stage the deletion of the article-final [d] took place. Interestingly, a similar change occurred in the nom.sg. (non-leniting) of the same noun, i.e. [iN 'baL] *in ball* – ‘the limb’, which was presented in (30) and is repeated below for convenience.

(53)
 *iNdah baLah → *iNda baLa → *iNd baL → [iN 'baL]

In the phase immediately preceding Old Irish the definite article was also *iNd, although the context was historically non-leniting. So as to account for the deletion of [d] in the nominative [iN 'baL] *in ball* – ‘the limb’, we proposed in (31) that the article-final stop became a floating segment, i.e. one which was not associated with a skeletal position. This segment was later dropped because there was no available onset position for it to dock onto. Given that the developments in (52) and (53) are alike in that the shapes of both the nominative and genitive articles were identical, we can propose that the final [d] in the gen.sg.masc. definite article in the phrase *iNd vaLⁱ – ‘of the limb’ also became a floating sound. The change of *iNd vaLⁱ → [iN 'vaLⁱ] is graphically represented below.

(54) *Pre-Old Irish Stage* *Old Irish*

	O ₁ N ₁ O ₂ N ₂		O ₁ N ₁ O ₂ N ₂
x x	x x x x	→	x x x x
i N d	v a L		i N v a L

At the Pre-Old Irish Stage above the article-final stop [d] becomes a floating segment, i.e. a segment without a skeletal position. Because the noun-initial onset (O_1) is already occupied by the fricative [v], there is no available onset for [d] to dock onto. As a result, [d] is removed from the representation in Old Irish.

This derivation, identical to that in (31), shows that in the period which immediately preceded Old Irish, there was no difference in the treatment of ancient leniting and non-leniting contexts. All the developments were purely phonological and the fact that in *iNd vaLⁱ – ‘of the limb’ the article-final [d] preceded a previously weakened segment, while in the phrase *iNd baL – ‘the limb’ the noun-initial obstruent was radical, had no impact on the synchronic changes: [d] was dropped in the same way in both contexts.

2.4.3. Vowel-initial words after leniting articles

In vowel-initial items no weakening ever took place in the lenition stage because vowels cannot be lenited, but the subsequent development of the leniting definite article is extremely interesting. In this context the definite article (both gen.sg. masc. and nom.sg.fem.) surfaces as [iNd]. Consider the phrase [iNⁱ 'dⁱeχⁱ] *ind eich* – ‘of the horse’, in which the historically leniting gen.sg.masc. definite article precedes a vowel-initial noun.

(55)

*sindi: ek^wi: → *indi eχ^wi → *iNd eχⁱ → [iNⁱ 'dⁱeχⁱ]

This development shows that in the phase immediately preceding Old Irish the shape of the article was *iNd, similarly to consonant-initial items, e.g. *iNd vaLⁱ → [iN 'vaLⁱ] *in baill* – ‘of the limb’. In (55), however, the article survived into Old Irish without truncation. Employing the structure of the article proposed in (54) and the idea that the article-final [d] became a floating segment just before Old Irish, we can now graphically represent the development of *iNd eχⁱ → [iNⁱ 'dⁱeχⁱ] *ind eich* – ‘of the horse’.

(56) *Pre-Old Irish Stage*

Old Irish

				O ₁ N ₁ O ₂ N ₂					O ₁ N ₁ O ₂ N ₂
x	x	x	x	x	x	x	x	x	x
i	N	d		e	χ ⁱ			i	N

→

In Pre-Old Irish the article-final stop [d] becomes a floating segment. Because the noun-initial onset (O_1) is not occupied by a consonantal segment, the floating [d] can dock onto it. As a result, [d] survives in the phrase into Old Irish.

At this point it seems appropriate to recall the development of the nom.sg. of the phrase in (55), i.e. [iNⁱ tⁱeχ] *int ech* – ‘the horse’. Consider the historical development of this expression repeated below for convenience.

(57) *h-Prefixation* *Old Irish*
 *iNdah eχ^wah → *iNda heχ^wa → *iNd heχ → [iNⁱ tⁱeχ]

In this chain of events we are dealing with *h*-prefixation which subsequently led to *t*-prefixation. In the stage which immediately prefaced Old Irish the nom.sg. article surfaced as *iNd, similarly to that in *iNd eχⁱ → [iN tⁱdeχⁱ] *ind eich* – ‘of the horse’-gen.sg. However, given that the fricative [h] had previously been lexicalized as a word-beginning in the nom.sg., the article-final [d] merged with [h] to produce [t], as proposed in (32). In the gen.sg., where no prior *h*-prefixation was present, the article simply occupied the empty onset slot, as shown in (56).

These two developments confirm the view that, just before Old Irish, the distinction into historical leniting and non-leniting environments was unimportant to the phonology: the mutations had been lexicalized and the phonology utilized the segments locally available, i.e. [d+h] = [t] in *iNd heχ → [iNⁱ tⁱeχ] *int ech* – ‘the horse’-nom.sg., while [d+∅] = [d] in *iNd eχⁱ → [iNⁱ dⁱeχⁱ] *ind eich* – ‘of the horse’-gen.sg.

2.4.4. Leniting articles in front of lax sonorants

The definite article (both gen.sg.masc. and nom.sg.fem.) surfaces as [iNd] in front of lax sonorants in Old Irish, e.g. [iN tⁱdru:m] *ind rún* – ‘the mystery’. Such a shape of the leniting article in this context is peculiar given that [iNd] occurs only before vowel-initial words, e.g. [iNⁱ dⁱeχⁱ] *ind eich* – ‘of the horse’-gen.sg., while consonants are invariably preceded by the form [iN], e.g. [iN tⁱvaLⁱ] *in baill* – ‘of the limb’-gen.sg., as presented in (51). Consider the development of the article in front of the lax [l] in the phrase [iN tⁱdla:~ṽ] *ind lám* – ‘the hand’.

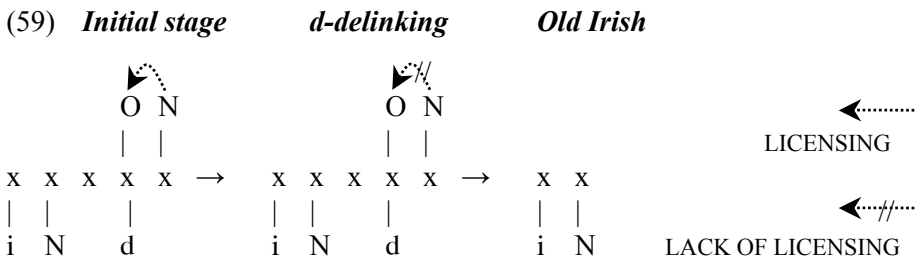
(58)
 *sinda: la:ma: → *inda: la:~va: → *iNda la:~va: → *iNd la:~ṽ → [iN tⁱdla:~ṽ]

We remember from (2.3.6.) that the original lax resonants were never lenited in weakening contexts, but they simply retained their original lax character. Thus, here we are interested in what happened in the stage just before Old Irish, i.e.

*iNd la:ĩ, that prevented the dropping of the article-final [d] and why the expected version *[iN 'la:ĩ] did not surface in Old Irish.

So far we have been able to explain the pre-Old-Irish adjustments without the need to resort to the theoretical notions of government and licensing. In order to account for the occurrence of [iNd] before the lax resonants, however, we need to take these concepts into consideration.

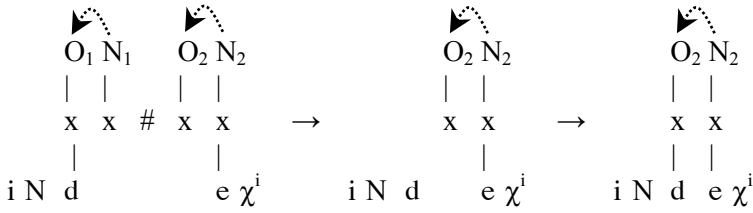
As shown in the Chapter One, in GP every onset must be licensed by the following nucleus. So must be every consonant cluster. In the prehistory of Irish, i.e. after the stage of *iNd, the article-final [d] was no longer licensed by its nucleus. As a result, this segment was apparently lost in isolation (this is implied by Quin (1975:20), who states that the general form is [iN], although it is unlikely to come across any article in isolation). Consider the structural development of the definite article (both nom.sg.fem. and gen.sg.masc.) between the stage of *iNd and the Old Irish [iN], where the licensing of the article-final segment [d] is shown. For the sake of simplicity, the other segments of this article are left unsyllabified.



In the Initial Stage, that is *iNd, the onset dominating the segment [d] is licensed by the following nucleus. In the *d-delinking* Stage the nucleus no longer provides licensing to the preceding onset, as a result of which [d] is delinked. Thus, the Old Irish version is [iN]. The deletion of the final [d] occurred also in lexical items. More details are provided in Chapter Three.

Now let us reconsider the simplified development of this article in front of vowel-initial lexical items and before words beginning in consonants. The changes in words with vocalic beginnings are represented by the form *iNd eχⁱ → [iNⁱ 'd'eχⁱ] *ind eich* – ‘of the horse’-gen.sg. The licensing of relevant positions is indicated by the arrows.

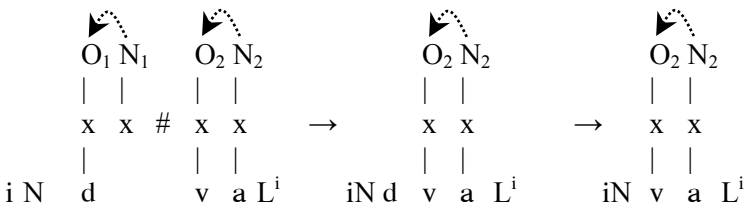
(60) *Initial stage* *d-delinking* *d-licensing (Old Irish)*



This development shows that in the Initial Stage the article-final [d] under (O₁) is licensed by the following nucleus (N₁). The noun-initial vowel [e] under (N₂) licenses the preceding onset (O₂). At the *d*-delinking Stage the segment [d] is no longer associated with a skeletal position. The positions (O₁) and (N₁), both being empty, are removed from the representation. In the *d*-licensing Stage [d] docks onto the onset (O₂) which is licensed by the following nucleus (N₂). The resulting contextual form of the article is [iNⁱ dⁱeχⁱ] *ind eich* – ‘of the horse’-gen.sg.

Now let us turn to the consonant-initial words and the changes in the definite article. Consider the development of the phrase *iNd vaLⁱ → [iNⁱ vaLⁱ] *in baill* – ‘of the limb’-gen.sg. in which the licensing of the relevant positions is shown.

(61) *Initial stage* *d-delinking* *Old Irish*

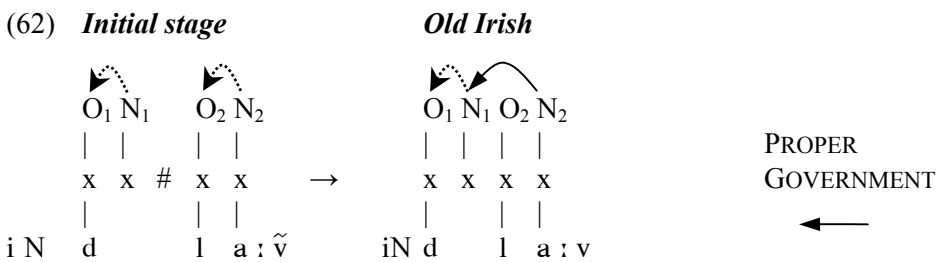


In the Initial Stage the nucleus (N₁) licenses the preceding article-final [d] under (O₁). The nucleus (N₂) licenses the onset (O₂), which dominates the fricative [v]. At the *d*-delinking Stage the segment [d] is no longer linked to a skeletal slot. Given that (O₂) is occupied by the noun-initial [v], there is no available onset for [d] to dock onto. Accordingly, the Final Stage displays no [d] in the phrase [iNⁱ vaLⁱ] *in baill* – ‘of the limb’-gen.sg.

Given these developments, we are now in a position to try to account for the surprising preservation of the article-final [d] in phrases including words which begin in lax resonants, e.g. *iNd la:~ṽ → [iNⁱ dⁱla:~ṽ] *ind lám* – ‘the hand’. The article-final [d] in such phrases behaves like the same segment in phrases with vowel-initial items, e.g. *iNd eχⁱ → [iNⁱ dⁱeχⁱ] *ind eich* – ‘of the horse’-gen.sg.

in (60), although its development should be comparable to that in expressions with consonant-initial lexical words, e.g. *iNd vaLⁱ → [iN 'vaLⁱ] *in baill* – ‘of the limb’-gen.sg. in (61). Briefly, the article-final [d] seems to be licensed by the word-beginning in phrases with resonant-initial words but not in obstruent-initial items.

There are two theoretical possibilities of explaining why this [d] was not dropped. One is that the article was incorporated into the phonological phrase, i.e. *iNd+la:ĩ → *iNdl a:ĩ – ‘the hand’, and the nucleus licensing of the previously article-final [d] was made stronger by becoming word-medial. This is represented below.

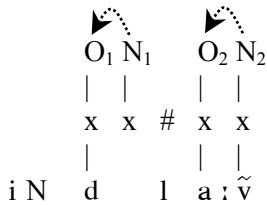


In the Initial Stage the article and the noun constitute two separate domains. The article-final [d] under (O₁) is licensed by the domain-final empty nucleus (N₁). The noun-initial onset (O₂) is naturally licensed by the following nucleus (N₂). When the morphological boundaries have been removed in Old Irish, the nucleus (N₂) properly governs the preceding one (N₁). This nuclear slot, in turn, is no longer domain-final and its licensing potential has been somehow enhanced. Given additional support, (N₁) can license the segment [d] under (O₁). Thanks to this licensing, [d] remains in the phrase [iN 'dla:ĩ] *ind lám* – ‘the hand’.

This analysis has at least one disadvantage, however. In particular, there is no structural way of explaining why an analogical development did not take place in the case of *iNd vaLⁱ → [iN 'vaLⁱ] *in baill* – ‘of the limb’-gen.sg. in (61). Theoretically, Proper Government could apply there as well because the initial structures in (61) and (62) are identical. Thus the only reason why the cluster [dl] is possible in [iN 'dla:ĩ] *ind lám* – ‘the hand’ while, say, [dv] is not permissible in the non-existent *[iN 'dvaLⁱ] *in baill* – ‘of the limb’, is the phonotactic restrictions of the phonological system.

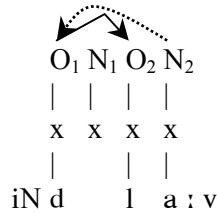
The other way of explaining why the article-final [d] is preserved is that this segment can contract a governing relation with the following resonant but not with another obstruent. This is represented below.

(63) *Initial stage*



→

Old Irish



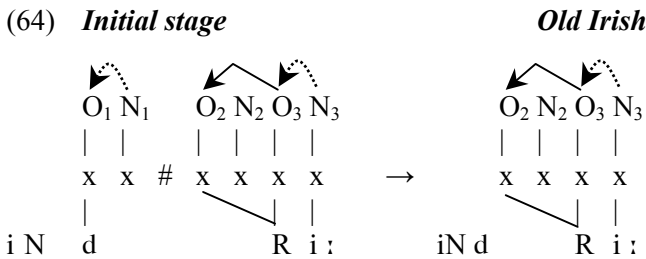
In the Initial Stage the article-final nucleus (N_1) licenses the preceding onset dominating [d] while the sonorant [l] attached to (O_2) is obviously licensed by (N_2). When the morphological boundaries no longer separate the article from the noun, a rightward governing relation is established between the governor [d] and the governee [l]. This relation is licensed by (N_2). Such a relation would be comparable to that obtaining in words which lexically begin with clusters like [dl], e.g. [iN'dlʊ:s] in *dlús* – ‘the density’.

However neat this proposal might appear, in Chapter Three it is argued that a rightward interonset relation, i.e. one in which the governor precedes the governee, is absent from the phonological system of Old Irish because all such relations were broken up in Proto-Celtic. It is theoretically possible to claim that rightward interonset relations were re-established in some cases just before Old Irish but there is no way to prove such a claim at this stage of research. Thus, both the solutions proposed in (62) and (63) leave something to be desired. What appears to get the upper hand is the phonotactics and not the structure.

At this point we should also return to the question of why the tense sonorants can only be preceded by the definite article in the shape of [iN], e.g. *sindos ri:s → *indah ri:h → *iNda Ri: → *iNd Ri: → [iN'Ri:] in *ri* – ‘the king’. Of course tense sonorants occur only in non-leniting contexts, but we saw in (2.4.3.) that the historical mutating and non-mutating contexts were treated uniformly by the phonology just before Old Irish, e.g. [d+h] = [t] in *iNd heχ → [iNⁱ tⁱeχ] *int ech* – ‘the horse’, whereas [d+∅] = [d] in *iNd eχⁱ → [iNⁱ dⁱeχⁱ] *ind eich* – ‘of the horse’-gen.sg.

In (2.3.6.) it was argued that the tense sonorants originate from the gemination of the original lax ones at the expense of the final -h, e.g. *iNdah ri:h → *iNda Ri: – ‘the king’. Just before Old Irish the version of this phrase must have been *iNd Ri:, which did not develop into *[iN'dRi:] but into [iN'Ri:]. Hence the article-final stop [d] was dropped, unlike before lax resonants, e.g. *iNd ri:γ → [iN'dri:γ] in *riγ* – ‘of the king’-gen.sg. Also here two analyses can be offered.

One is based on phonotactics. In particular, sequences such as [dR] occur nowhere in the system and this is why the article-final [d] was dropped in *iNd Ri: → [iN 'Ri:] *in rí* – ‘the king’. The other is that, since the tense sonorants were geminates, they were interonset governing domains. Thus, there was no way of contracting a governing relation, as that in (63), between [d] and the geminate [R] because the latter already participated in one relation. This is shown below:



The Initial Stage in (64) shows that the article-final [d] under (O_1) is licensed by its nucleus (N_1). The interonset relation (O_3O_2), which contains the geminate [R] is government-licensed by the vowel under (N_3). In Old Irish the onset-nucleus sequence (O_1N_1) is removed from the representation. The segment [d] cannot dock onto (O_2), which is governed by (O_3), nor can it preserve its own position (O_1) because (N_3) cannot act as a proper governor over a governing domain. Consequently, [d] is unlicensed and the phrase surfaces as [iN 'Ri:] *in rí*.

All things considered, it seems that the preservation of the article-final [d] before initial lax resonants in the following words, e.g. *iNd ri:γ → [iN 'dri:γ] *in ríγ* – ‘of the king’-gen.sg., had much to do with the phonotactics, i.e. clusters like [dr] were frequent within words, e.g. [drum¹] *druimm* – ‘back’. As a result, the previously article-final [d] was licensed as a word beginning. Whether there was a governing relation between this stop and the following resonant, as proposed in (63), or not, as suggested in (62), cannot be stated at this stage.

In the ensuing section we will deal with the fricative [s] following the leniting definite articles. Interestingly, the phenomena to be shown below are already familiar from non-leniting contexts.

2.4.5. Articles before lenited [s] and t-prefixation

The leniting definite article (both nom.sg.fem. and gen.sg.masc.) is realized as [iNt] in close syntactic phrases before the historically lenited [s], that is [h]. In fact, neither [s] nor its lenited variant ever surface in this context in Old Irish and we may speak about replacing this fricative by [t], e.g. [iN 'tu:l¹] *int suil* – ‘the eye’-nom.sg.fem. Thus, this looks like another instance of the so-called *t-*

prefixation, whose occurrence in non-leniting and *h*-prefixing contexts we discussed at length in (2.3.3.), e.g. [iNⁱ tⁱeχ] *int ech* – ‘the horse’-nom.sg.masc.

While describing *t*-prefixation in *h*-prefixing environments (i.e. to vowel-initial words), we argued that after the lenition of the definite article-final [s] to [h], e.g. *sindos → *indah, there occurred the lexicalization of this [h] as a word-beginning in words with initial vowels. Later on, after final-vowel deletion, the article-final [d] and the noun-initial [h] stood side by side, which ultimately resulted in their merger to [t]. This development is recapitulated below, the phrase [iNⁱ tⁱeχ] *int ech* – ‘the horse’-nom.sg.masc. serving as an example:

(65)

*sindos ek^wos → (lenition s→h) *indah eχ^wah → (*h*-prefixation) *iNda hēχ^wa
→ (vowel deletion) *iNd hēχ → (merger d+h = t) [iNⁱ tⁱeχ] *int ech* – ‘the horse’

This is how *t*-prefixation worked in *h*-prefixing contexts. Now let us turn to leniting environments, where the article never ended with [s], as it was either *sinda: (nom.sg.fem.) or *sindi: (gen.sg.masc.), but the noun began with this fricative. Consider the development of the phrase [iN tⁱu:lⁱ] *int súil* – ‘the eye’ below:

(65)

*sinda: su:lⁱs → (lenition s→h) *inda: hu:lⁱh → (vowel shortening) *iNda hu:lⁱ
→ (vowel deletion) *iNd hu:lⁱ → (merger d+h = t) [iN tⁱu:lⁱ] *int súil* – ‘the eye’

(65) shows that the initial [s] of *su:lⁱs – ‘eye’ was first lenited to [h] after the vowel of the preceding article *sinda:. The subsequent vowel deletion in the article, i.e. *iNda → *iNd, resulted in the immediate neighbourhood of the segment [d], which was article-final at that stage, and [h], which was noun-initial. This closeness led to the merger of these two sounds into one [t]. Consequently, the pre-Old Irish *iNd hu:lⁱ surfaced as [iN tⁱu:lⁱ] *int súil* – ‘the eye’ in Old Irish.

Minor details apart, the developments shown in (64) and (65) are almost identical in that after the lenition of [s] to [h], which took place irrespective of the position of this fricative (final in *sindos in (64) but initial in *su:lⁱs in (65)), and vowel deletion, the segments [d] and [h] were brought together just before Old Irish, which resulted in the appearance of [t].

t-prefixation is another phenomenon which occurs in both weakening and non-leniting historical environments. This confirms the view that the pre-Old Irish adjustments were made irrespective of prior mutations and that phonology was performed on the material synchronically available.

So far in our analysis of pre-Old Irish adjustments in weakening contexts we have been dealing with historically leniting articles which precede weakened

non-dental obstruents (2.4.2.), vowel-initial words (2.4.3.), lax resonants (2.4.4.) and the lenited fricative [s] (this section). Readers will have noticed the conspicuous absence of dental stops and their lenited counterparts in the collection of cases in (51) above and in the present discussion. There is a good reason why they have not been analyzed yet. In the following section we will inspect the behaviour of the leniting articles in front of [t] and [d].

2.4.6. Leniting articles in homorganic contexts

Unlike the other consonants, the dental stops [t] and [d] do not undergo weakening when they follow the regularly leniting definite article in Old Irish. They appear in their radical versions. Consider the cases below containing phrases with leniting articles (nom.sg.fem. and (gen.sg.masc.) followed by lexical words which begin in [t] and [d].

(66) <i>Nominative Singular Feminine</i>	<i>Genitive Singular Masculine</i>
[iN 'tuaθ] in <i>túath</i> – ‘the tribe’	[iN 'tur ^h k ⁱ] in <i>tuirc</i> – ‘of the boar’
[iN 'daɣ ⁱ] in <i>daig</i> – ‘the fire’	[iN 'da ^h v ⁱ] in <i>daim</i> – ‘of the ox’

The influence of the normally leniting articles in these cases considerably differs from what we observed in (2.4.2.), e.g. *iNd vaLⁱ → [iN 'vaLⁱ] in *baill* – ‘of the limb’-gen.sg. The dental stops, unlike all the other true consonants, are never lenited into the corresponding fricatives. On the face of it, it is slightly surprising that such incongruities occur in the system. However, if we decide to go back in time and investigate the reasons behind the state of affairs present in Old Irish, these phenomena are no longer so unexpected.

The definite articles in question, that is those which constituted a historical leniting context, had always displayed the final vowel, e.g. *sinda: → *iNda → *iNdə (nom.sg.fem.) until the period of apocope (final-vowel loss) when they became *iNd. According to McCone (1996:127) that process occurred immediately before Early Old Irish. Thus, there was no reason why dentals should have remained unaffected by weakening at the stage of phonological mutation.

Suffice it to say that [t] and [d] were lenited on a regular basis after a vowel, e.g. *esjo to:ta: → *ehja θo:θa: → [ə 'θuaθ] a *túath* – ‘his tribe’, which results from the fact that the masculine pronoun had a final vowel at the time of purely phonological lenition. It must be admitted, then, that words containing original initial dental stops entered the period of Primitive Irish and, possibly, Early Old Irish with initial dental fricatives after the leniting definite articles too. Thus, *iNda θo:θa – ‘the tribe’ and *iNda ðæɣ^wih – ‘the fire’ seem to be expected predecessors of [iN 'tuaθ] and [iN 'daɣⁱ] respectively (see also McCone 1996:

111, 134). After the vocalic ending of the article had been dropped, that is *iNdə → *iNd, the two homorganic sounds, that is [d] of the article and [ð] or [θ] of the noun, were brought together. We saw earlier that when certain sounds come together, they may interact, e.g. [h+w] = [f] in *iNdah werah → *iNdə fera – ‘the man’ and [d+h] = [t] in *iNd heχ → [iNⁱ tⁱeχ] *int ech* – ‘the horse’.

Thurneysen (1946:86) states that under such circumstances, i.e. in immediate vicinity, homorganic lenited segments may have combined “to give the corresponding unlenited geminate”. This amounts to saying that under the influence of a homorganic segment the dental fricatives were delenited and turned back into stops. This would not have been an unusual operation. A similar phenomenon was also observed in the case of word-medial homorganic sequences where dental, labial or velar fricatives, when brought together, were strengthened to stops. Consider for example *nevə vυithə → *nev vυith → [Nⁱebəðⁱ] *nepuid* – ‘non-being’ and *teγə γnaθəðe → *teγ γnaθðe → [tⁱegnatⁱe] *tecnate* – ‘domesticus’, where homorganic clusters such as [vυ], [γγ] and [θð] which were later strengthened to [b], [g] and [t] respectively, resulted from syncope (a process of word-medial vowel deletion which took place after apocope and just before Early Old Irish). Taking these remarks into account, we may propose the following development of phrases in which dental-initial words follow leniting articles:

(67)	‘the tribe’		‘the fire’	
a.	*sinda: to:ta:	BEFORE MUTATIONS	*sinda: deg ^w is	↓
b.	*inda θo:θa	LENITION	*inda ðæγ ^w ih	
c.	*iNdə θo:θə	VOWEL REDUCTION	*iNdə ðæγi	
d.	*iNd θo:θ	APOCOPE	*iNd ðay ⁱ	
e.	*iNd to:θ	DELENITION	*iNd day ⁱ	
	[iN ‘tuaθ]	OLD IRISH	[iN ‘day ⁱ] ²⁷	

In (67b) we see the regular intervocalic lenition of both original dental stops, that is [t] → [θ] and [d] → [ð]. In (67d) the two dentals originally belonging to different morphological objects, the article and the noun, stand side by side, i.e. [dθ] and [dð], since apocope has eliminated the intervening vowels. Thurneysen (1946:86ff.) postulates that just before Old Irish (67e) delenition occurs owing to this vicinity, the result being [dt] and [dd]. The fact that in the former case the ultimate result was [t] and not [d] indicates that the original voiceless segment was restored. He also states that although these unlenited segments were originally geminates, they were in the process of being simplified within Old Irish. Consequently, the Old Irish reflexes displayed single dental stops noun-initially.

²⁷ The breaking of [o:] into [ua] in Early Old Irish is disregarded for the sake of clarity.

The syllabic status of [t] in [iN 'tuaθ] and [d] in [iN 'dayⁱ] in Old Irish is not only uncertain but also unimportant. We can only see the input [dθ] and [dð] as well as the output [t] and [d]. What we know about the historical developments of similar forms indicates that all the necessary conditions for dental spirants to become stops were met. So, what matters here is the result and the environment.

2.4.7. Leniting and non-leniting contexts – summary

Above the developments of close syntactic groups in both weakening and non-leniting contexts from Proto-Celtic to Old Irish have been analyzed. It has been demonstrated that the age of phonological lenition, which turned stops into fricatives and [s] into [h], was only a stage in the whole chain of events that led to the form of the language known as Old Irish. Processes such as *h*-prefixation, the origin of [f] and tense sonorants and the merger of [h+d] → [t] were equally important in the formation of Irish. In many cases these were the only ones that mattered. We have also seen that at every stage the phonology of the language made use of the contexts currently present, e.g. the original distinction into leniting and non-leniting contexts was insignificant to the phonology just before Old Irish. The relevant developments are summarized below (^L = leniting context):

(68)

PROTO-CELTIC	<i>lenition</i>	<i>h-prefixation</i>	<i>apocope</i>	OLD IRISH
		<i>h-deletion</i>		<i>d-prefixation</i>
		<i>vowel shortening</i>		<i>d-deletion</i>
		<i>mergers</i> h+w = f h+r = R		<i>merger</i> d+h = t
				<i>delenition of dentals</i>
*sindi: e ^w k ^w i:	*indi: eχ ^w i:	*iNdi eχi	*iNd eχ ⁱ	[iN ⁱ 'd ⁱ eχ ⁱ] ^L
*sindos e ^w os	*indah eχ ^w ah	*iNdə heχə	*iNd heχ	[iN ⁱ 't ⁱ eχ]
*sinda: su:lis	*inda: hu:l ⁱ h	*iNdə hu:li	*iNd hu:l ⁱ	[iN 'tu:l ⁱ] ^L
*sindos wiros	*indah werah	*iNdə fərə	*iNd fer	[iN ⁱ 'f ⁱ er]
*sindos ri:s	*indah ri:h	*iNdə Ri:	*iNd Ri:	[iN 'Ri:]
*sindi: ri:gos	*indi: ri:yah	*iNdi ri:yə	*iNd ri:γ	[iN 'dri:γ] ^L
*sindos ballos	*indah baLah	*iNdə baLə	*iNd baL	[iN 'baL]
*sindi: balli:	*indi: valli:	*iNdi vaLi	*iNd vaL ⁱ	[iN 'vaL ⁱ] ^L
*sindos tegos	*indah teyah	*iNdə teyə	*iNd teγ	[iN ⁱ 't ⁱ eγ] ^L
*sinda: to:ta:	*inda: θo:θa:	*iNdə θo:θə	*iNd θo:θ	[iN 'tuaθ] ^L

The ensuing sections deal with the other word-initial mutation important to the development of Irish, namely nasalization.

2.5. The history of nasalizing contexts

2.5.1. Introduction

Similarly to lenition, word-initial nasalization was a purely phonological process in the prehistory of Irish. Specifically, words ending in a nasal influenced the initial consonants of the following lexical items some time between Primitive Irish and Early Old Irish (McCone 1996:108). Eclipsis affected a number of consonants, so it must be viewed as the second (after lenition) significant archaic mutation whose impact on the subsequent development of the Irish language was immense. Let us recall that in Old Irish, due to eclipsis, the radical fortis stops become lenis, e.g. [kol]/[ə 'gɔl] *col/a col* – ‘sin’/‘their sin’, while the radical lenis stops turn into the corresponding tense nasals, e.g. [dun]/[ə 'Nu:n] *dún/a ndún* – ‘fort’/‘their fort’. The spirant [f] surfaces as [v] in a nasalizing context, whereas the sibilant [s] is frequently doubled in the spelling, which indicates the lack of lenition. Moreover, sonorants are said to be unaffected by this mutation.

2.5.2. Historical causes of nasalization

Although eclipsis had important grammatical functions to perform in Old Irish, similarly to those in Modern Irish, such alternations reflected the historical process of nasalization which was entirely phonological. Consider the following cases showing the development of archaic forms which ultimately led to Old Irish (McCone 1996). Stage I shows the situation from before the nasalization, while at Stage II the word-initial segments have undergone eclipsis.

(69) <i>Stage I</i>	<i>Stage II</i>	<i>Old Irish</i>
*sindoihan karantan	→ *indoja gareda	→ [iNə 'garəd] <i>inna carat</i> – ‘of the friends’-gen.pl.
*ejan teyah	→ *eja deya	→ [ə 'd'eɣ] <i>a teg</i> – ‘their house’
*ejan dæɣ ^w ih	→ *eja ndæɣ ^w i	→ [ə 'Nay ⁱ] <i>a ndaig</i> – ‘their fire’
*ejan bæanna:	→ *eja mbenna	→ [ə 'm'eN] <i>a mbenn</i> – ‘their peak’
*sindan eχ ^w an began	→ *inda neχ ^w a mbega	→ [iN ⁱ 'N ⁱ eχ 'm ⁱ eg] <i>in n-ech mbecc</i> – ‘the small horse’-acc.sg.
*sindoihan Ri:yan	→ *indoja Ri:ya	→ [iNə 'Ri:ya] <i>inna ríga</i> – ‘of the kings’ gen.pl.

The example of *sindoihan **karantan** → *iNdoja **gareda** – ‘of the friends’-gen. pl. shows that in Stage II the original voiceless [k] becomes [g], which is accompanied by the loss of the nasal previously terminating the article. It is noteworthy that the word-medial sequence [nt] underwent a parallel change yielding [d]. The case of *ejan **teyah** → *eja **deya** – ‘their house’ illustrates the change of the original [t] to [d] due to nasalization in Stage II. Moreover, the article-final nasal disappears. In *ejan **dæy^wih** → *eja **ndæy^wi** – ‘their fire’ and *ejan **bænna:** → *eja **mbænna** – ‘their peak’ we see that the original voiced stops [d] and [b] first cause the assimilation of the preceding nasals as regards the place of articulation (**nd* and **mb*, respectively, in Stage II). In Old Irish it is the tense nasals that replace the homorganic voiced oral stops. Also in the penultimate case we can observe the so-called *n*-prefixation to the word [eχ], which originally displayed the initial vowel [e]. Finally, in *sindoihan **Ri:yan** → *iNdoja **Ri:ya** – ‘of the kings’-gen.pl. we see that the prehistoric liquid [R] is immune to eclipsis since apparently nothing happens to it at any stage. This view will soon be challenged.

Although it is not uncommon to encounter views that eclipsis is confined to word boundaries, in prehistory its activity was also observed in the interior of words. However, it must be admitted that word-internal nasalization was anything but spectacular. Readers will have noticed the word-internal change of [nt] into [d] in *karantan → *gareda. This change is comparable to that in *ejan **teyah** → *eja **deya**. The only difference between these two developments is the presence of a morphological boundary in the latter case. We know, however, that boundaries do not play any significant roles in mutations, as shown earlier in this chapter. Thus, we may ignore them. Now consider another few examples of historical forms affected by internal nasalization based on McCone (1996:107):

(70) <i>Stage I</i>	<i>Stage II</i>	<i>Stage III</i>	<i>Old Irish</i>	
*kæntan	*kændan	*kɛ:dan	[k ¹ e:d]	<i>cét</i> – ‘hundred’
*winta	*winda	*weda	[f ⁱ ed]	<i>fet</i> – ‘whistle’
*toŋketah	*toŋgetah	*togeθa	[togəð]	<i>tocad</i> – ‘fortune’

As shown in (70), nasalization primarily affected only two consonant clusters, namely the coronal [nt] and the velar [ŋk] which, after the transitional Stage II, gave rise to [d] and [g], respectively, with or without the concomitant compensatory lengthening of the preceding vowel. The development of these clusters into single segments accounts for the absence of word-medial [nt] and [ŋk] in Old Irish.²⁸ As regards the labial cluster [mp], it did not follow suit because there

²⁸ The cluster *-nt-* seems to occur in syncopated forms only, e.g. *oinoθu:θ → *ointu* – ‘unity’.

was no such combination in either Insular Celtic or Primitive Irish. The main reason for its absence is the systemic lack of [p] in Insular Celtic and early Primitive Irish. This segment was borrowed from Latin much later. In fact, the cluster [mp] had just started to appear with either loanwords, e.g. [tⁱempul] *tempul* – ‘temple’, or as a development of the labial nasal followed by [b] and [h], e.g. *imbu-how → *imbhoy → [impi] : *impai* – ‘turns’ (dependent verbal form). Interestingly, this merger of [b]+[h] producing the Old Irish [p] is another argument in favour of the view that fortis consonants contain all the primes of their voiced counterparts plus the tone (H) which is realized as [h] in isolation.

These examples, particularly Stages I and II, also indicate that, between the major Stages I and II in (69), there must have been at least one phase when the article-final nasal assimilated as regards the place of articulation to the following fortis consonant, e.g. *sindoihan karantan → *indoihan^h karantan → *indoihan^h garandan → *iNdoja gareda – ‘of the friends’.

Therefore, the process of nasalization began in Insular Celtic with the simplification of two word-medial clusters only and subsequently developed into a sizeable morphophonological activity (Kortlandt 1982:78). The reason why nasalization started to play a role in altering the shape of word-initial segments can be sought in the fact that at some point morphological boundaries ceased to matter for phonology. Let us recall that word-initial lenition of obstruents took place when the medial intervocalic context V_V, e.g. *kladibos → *klaðivah → [klaðⁱəv] *claideb* – ‘sword’, became indistinguishable from V#_V, e.g. *indi:balli: → *iNdi: valli: → [iNⁱ ‘vaLⁱ] – ‘of the limb’. We have also seen that segments previously belonging to two different morphemes could merge to form one expression, e.g. *iNdah werah → *iNda fera → [iNⁱ ‘fⁱer] – ‘the man’. The origin of [f] from [h+w] in this phrase resembles the merger of [n+t] into [d] in, say, *ejan teyah → *eja deya → [ə ‘dⁱeɣ] *a teg* – ‘their house’. There are also other similarities between *h*-prefixing and nasalizing contexts. For example, *h*-prefixation in *ehja:h eχ^wah → *eja: heχ^wa → [ə ‘heχ] *a ech* – ‘her horse’ is parallel to *n*-prefixation in *indan eχ^wan → *iNda neχ^wa → [iNⁱ ‘Nⁱeχ] *in n-ech* – ‘the horse’-acc.sg. This similarity may not be accidental because the final *-h* and *-n*, which terminated words in Primitive Irish were dropped in more or less the same period (McCone 1996:120ff.). As a result of their loss, all the mutations became totally grammaticalized. Consider the following exemplary phrases in which we can see the developments of three possible phonological contexts: leniting in (71a), non-mutating (*h*-prefixing) in (71b), and nasalizing (*n*-prefixing) in (71c). Prefixations take place only if the lexical items begin in a vowel.

(71)	<i>Stage I</i>	<i>Stage II</i>	<i>Stage III</i>	<i>Old Irish</i>
a.	*esjo tegos *esjo ek ^w os	*eja θeγah *eja eχ ^w ah	*eja θeγa *eja eχ ^w a	[ə 'θ ⁱ eγ] <i>a teg</i> – ‘his house’ [ə 'eχ] <i>a ech</i> – ‘his horse’
b.	*esja:s tegos *esja:s ek ^w os	*eja:h teγah *eja:h eχ ^w ah	*eja: teγa *eja: heχ ^w a	[ə 't ⁱ eγ] <i>a teg</i> – ‘her house’ [ə 'heχ] <i>a ech</i> – ‘her horse’
c.	*esjo:m tegos *esjo:m ek ^w os	*ejan teγah *ejan eχ ^w ah	*eja deγa *eja neχ ^w a	[ə 'd ⁱ eγ] <i>a teg</i> – ‘their house’ [ə 'N ⁱ eχ] <i>a n-ech</i> – ‘their horse’

Stage I shows the Proto-Celtic situation. At Stage II in (71a) lenition takes place in the case of the a consonant-initial item, i.e. *tegos → *θeγah, but nothing happens to the initial vowel in the word *ek^wos because there is no preceding consonant to be prefixed to the word-beginning. Finally, Stage III reveals that in both (71b) and (71c) the previously pronoun-final [h] and [n], respectively, have been shifted to the beginning of the following vowel-initial word, i.e. *eja:h eχ^wah → *eja: heχ^wa and *ejan eχ^wah → *eja neχ^wa. Moreover, the pronoun-final [h] has disappeared before the consonant-initial word, i.e. *eja:h teγah → *eja: teγa, while the previously final [n] has led to the voicing of the initial consonant in *ejan teγah → *eja deγa.

The reason why these two segments, that is [h] and [n], were prone to deletion in word-final position may be that they were both the simplest expressions possible. To put it differently, it may be postulated that they contained only one element. So far we have been assuming that [h] consists of the high tone element (H) only. It is not impossible to assume that [n] includes also only one prime. Despite the fact that in Old Irish [n] was a dental nasal, there is no evidence to assume that the nasal segment [n] in word-final position in prehistory had any oral place of articulation. This view may be confirmed by the fact that this sound easily assimilated to the following oral stops as regards the place of articulation. Hence, a one-element make-up of [n] is quite probable in this particular position. The most likely candidate to be this prime seems to be the nasal element (N). Nevertheless, in the light of parallel developments of both the final [h] and [n], for example *h*-prefixation ([iNə 'hⁱeⁱdⁱ] *inna eilti* – ‘the deer’-acc.pl.) as well as *n*-prefixation ([iNⁱ 'Nⁱeχ] *in n-ech* – ‘the horse’-acc.sg.) to word-initial vowels, one might be led to assume that the low tone (L) is an equally good solution. What is more, viewing both these prefixations as tonal effects would simplify the workings of the system. In particular, both *h*-prefixation and *n*-prefixation as well as [f]-formation and nasalization of obstruents would be perceived only as tonal operations.

Be that as it may, the present analysis will not deal with the problem of which of these two elements should represent nasalization because we are interested

here in the phenomenon of nasalization in terms of formal structure. In the remainder of this chapter the nasal component will be represented by (N/L), which means that nasality and voicing may be two sides of the same coin and there is no point in deciding which symbol to use.²⁹

2.5.3. *n*-prefixation

The phenomenon of *n*-prefixation occurs in lexical items beginning in vowels. What must be made clear at the outset is that the exact quality of the prefixed nasal, that is, whether we are dealing with [n] or [N], is not certain. The scholars of Old Irish either carefully avoid this issue (Pokorny 1914; Thurneysen 1946; McCone 1996) or employ either phonetic symbol to refer to the sandhi-*n*. For example, Lehmann and Lehmann (1975) and Ahlqvist (1994) use the lax [n], while Lewis and Pedersen (1974) and Quin (1975) transcribe the sandhi-*n* as [N]. Below we will propose that both [n] and [N] should be used in the transcription and that the choice should not be accidental. It will be claimed that there were two *n*-prefixing contexts in Primitive Irish and that they ought to be treated as distinct. The forms [iNⁱ 'Nⁱeχ] *in n-ech* – ‘the horse’-acc.sg. and [ə 'Nⁱeχ] *a n-ech* – ‘their horse’ will serve as examples.

As shown in (69), early in prehistory the acc.sg.masc. definite article ended in a nasal, which was later shifted to the beginning of the noun. A detailed derivation of *in n-ech* – ‘the horse’-acc.sg. is as follows: *indan eχ^{wa}n → *iNda neχ^{wa}a → *iNdə neχ^{wa}ə → *iNd neχ → [iNⁱ 'Nⁱeχ]. The final phase, that is Old Irish, differs from the penultimate stage *iNd neχ in that the article no longer ends in the dental stop, while the prefixed nasal is tense (Lewis and Pedersen 1974:113). The reason why this nasal is tense is never accounted for in the existing analyses. The only quasi-cause of this tenseness is that all word-initial sonorants in non-leniting environments are believed to have been tense in Old Irish and since the one in [iNⁱ 'Nⁱeχ] *in n-ech* – ‘the horse’-acc.sg. precedes a stressed vowel and actually belongs to the stressed word, it is *ipso facto* strong. Our task now is to try to pinpoint the reason behind this property of the nasal segment and decide if it can be explained in terms of phonology.

Thus, what we are dealing with superficially is the deletion of one segment, namely [d] → ∅, and the fortition of the other, that is [n] → [N]. This development bears a striking resemblance to what could be observed in leniting and non-leniting contexts described above. In particular, we saw the apparent reduction of [d] → ∅ and the fortition of [h] to [t], e.g. *iNd heχ → [iNⁱ 'tⁱeχ] *int ech* (see

²⁹ Nasukawa (1998) and Ploch (1999), among others, argue that the properties of nasalization and voicing can be both represented by the same element (N), either headed or headless.

(32) above for details). Consider the detailed development of the phrase *indan eχ^wan → *iNda neχ^wa → *iNd neχ → [iNⁱ Nⁱeχ] in *n-ech* – ‘the horse’-acc. sg., which is comparable to that of *t*-prefixation illustrated in (32). Now we are dealing with the floating [n], which is represented by the element (N/L), while the floating [d] by (A-I, ?):

<i>(72) Initial Stage</i>	<i>n-Floating Stage</i>	<i>n-Prefixation Stage</i>
$\begin{array}{cccc} O_1 & N_1 & O_2 & N_2 \\ & & & \\ x & x & x & x \# \\ & & & \\ iN & d & a & n \end{array}$	$\begin{array}{cc} O_3 & N_3 \\ & \\ x & x \\ & \\ iN & d & a \\ & N/L \end{array}$	$\begin{array}{cc} O_1 & N_1 \\ & \\ x & x \# \\ & \\ iN & d & a \\ & N/L \end{array}$
	→	→
$\begin{array}{cc} O_3 & N_3 \\ & \\ x & x \\ & \\ e\chi^w & a \end{array}$	$\begin{array}{cc} O_1 & N_1 \\ & \\ x & x \# \\ & \\ iN & d & a \\ & N/L \end{array}$	$\begin{array}{cc} O_3 & N_3 \\ & \\ x & x \\ & \\ N/L & e\chi^w & a \end{array}$

<i>Final Vowel Deletion Stage</i>	<i>d-Floating Stage</i>	<i>N-formation Stage</i>
$\begin{array}{cc} O_1 & N_1 \\ & \\ x & x \# \\ & \\ iN & d \end{array}$	$\begin{array}{cc} O_3 & N_3 \\ & \\ \# & x & x \\ & \\ iN & N/L & e \chi \end{array}$	$\begin{array}{cc} O_3 & N_3 \\ & \\ \# & x & x \\ & \\ iN & N/L & e \chi \end{array}$
	→	→
	$\begin{array}{c} \underline{A}\text{-I} \\ ? \end{array}$	$\begin{array}{c} \underline{A}\text{-I} \\ ? \end{array}$

The Initial Stage shows the Insular Celtic form *indan eχ^wan. The lax nasal [n] is associated with the onset position (O₂). During the *n*-floating Stage the onset (O₂) is deleted along with its skeletal position and [n], represented by the prime (N/L), becomes floating, that is, it is not linked to a skeletal slot. In the *n*-prefixation Stage the floating element (N/L) docks onto the noun-initial empty onset (O₃). In the Final Vowel Deletion Stage the article-final short vowel is delinked from (N₂), due to which the now article-final [d] and the prime (N/L) come to stand side by side. At the *d*-floating Stage the onset (O₁) is removed from the representation along with the skeletal slot, as a result of which [d] becomes a floating segment, i.e. it is not linked to a position. It is now represented by (A-I, ?). Finally, the *N*-formation Stage shows that the floating (A-I, ?) combine with the prime (N/L) under the noun-initial onset (O₃) to form the tense nasal [N].

The presumed make-up of this nasal is (A-I, ?, N/L). This element structure differs from that proposed in (2.1.6.) for the Old Irish tense [N] in that the one in (72) contains the stopness element. In the introductory sections, however, we considered the matter of element make-ups of segments theoretically and systematically, while here we have access to prehistoric forms and can observe actual processes. Of course, this does not mean that the structure suggested in (2.1.6.) is wrong because there may have existed a few element versions of tense and lax sonorants in prehistory, all of which were apparently levelled in or just before Old Irish. In any case, the development in (72) indicates that, in this particular context, two sets of elements, that is (A-I, ?) and (N/L), merged to produce one expression which was realized as the tense [N].

At this point it seems proper to ask the question of why the sequence [dn] did not become petrified and survive until Old Irish similarly to the same cluster [dn] in leniting environments, e.g. [iNⁱ 'dⁱnⁱeRⁱtⁱ] *ind neirt* – ‘of the strength’, which was shown in (51b). Compare the developments of these two phrases:

(73)

- a. *indan eχ^wan → *iNda neχ^wa → *iNd neχ → [iNⁱ 'Nⁱeχ] *in n-ech*
 – ‘the horse’-acc.sg.
- b. *indi: nerti: → *iNdi nerti → *iNd neRt → [iNⁱ 'dⁱnⁱeRⁱtⁱ] *ind neirt*
 – ‘of the strength’

In the stage which immediately preceded Old Irish, the sequence [dn] was apparently the same in both these phrases. What surfaces noun-initially in Old Irish is no longer identical, though. The tense sonorant [N] appears in [iNⁱ 'Nⁱeχ] in (73a) while the sequence [dn] remains unchanged in [iNⁱ 'dⁱnⁱeRⁱtⁱ]. The reason for this may be that in the weakening context in (73b) the nasal segment [n] was a full-fledged phonological expression whose structure was (A-I, N/L), while the sandhi-*n* in *iNd neχ was simply the floating (N/L) which could combine with a regular consonant to produce a stronger segment. Let us recall that in leniting and non-leniting contexts only the high tone (H) was able to combine with selected segments, e.g. (H) + [d] = [t], (H) + [w] = [f] but there were no element fusions whatsoever which involved other single primes, not to mention mergers of two segments, both of which would be composed of more than one prime. Thus, it seems that, following Gussmann (2001), who names two seemingly identical segments which behave in dissimilar ways in the same system double agents, we need to propose a phonological distinction between the two segments [n]: one was word-final and participated in *n*-prefixation, e.g. *indan eχ^wan → *iNda neχ^wa – ‘the horse’-acc.sg., while the other occurred in lexical items in other intervocalic positions and never underwent changes, e.g. *indi: nerti: → *iNdi

nerti – ‘of the strength’. The structure of the *n*-prefixing expression would be only one element (N/L), whereas that of the other sound should be (A-I, N/L).

Now the idea that nasality should be represented by the low tone (L), parallel to the floating high tone (H), seems to be reasonable from the systemic viewpoint because both *h*-prefixation and *n*-prefixation and, consequently nasalization and lack of lenition, respectively, could be viewed as tonal operations: any mergers involve only tones. This is just one argument, though, and it should be borne in mind that it is not conclusive.

Let us now return to the problem of the distinction between the lax and tense nasals. It was not always the case that the lax nasal segment or the floating (N/L) found local element support to form a tense variant in Old Irish. The development of *iNd *neχ* into [iNⁱ 'Nⁱeχ], reveals that the tense nasal can be perceived as an amalgam of two merged segments, i.e. [d+n]. If we now look at Old Irish phrases with the third person plural possessive pronoun, which also allegedly display the tense nasal, e.g. [ə 'Nⁱeχ] *a n-ech* – ‘their horse’, we can see that the tense nasal also phonetically occurs at the left-hand edge of the noun. This phrase has a different history, however. Compare the relevant stages of development of [ə 'Nⁱeχ] *a n-ech* – ‘their horse’ (74a) juxtaposed with those of [iNⁱ 'Nⁱeχ] *in n-ech* – ‘the horse’-acc.sg. (74b) repeated below for convenience:

(74)

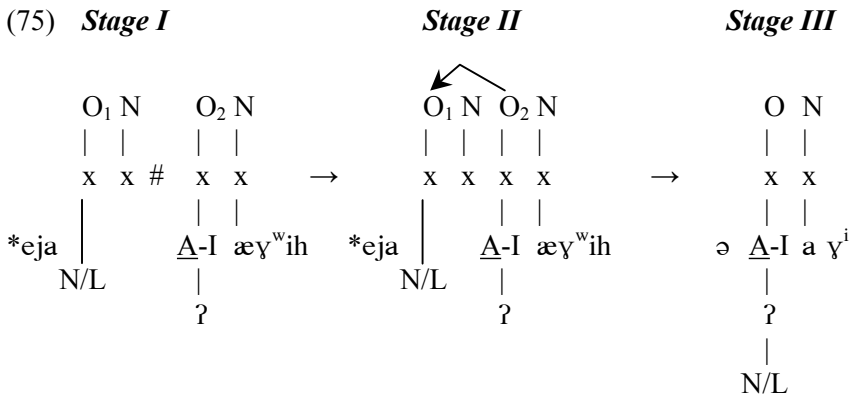
- a. *ejan eχ^wah → *eja neχ^wa → *eja neχ → [ə 'Nⁱeχ]
 b. *indan eχ^wan → *iNda neχ^wa → *iNd neχ → [iNⁱ 'Nⁱeχ]

The development of [ə 'Nⁱeχ] *a n-ech* – ‘their horse’, clearly shows that there was never any [d] to combine with the floating (N/L) to produce [N], unlike in the form [iNⁱ 'Nⁱeχ] *in n-ech* – ‘the horse’-acc.sg., where the fusion of [d+n] took place, as shown in (72). Thus, the nasal in [ə 'Nⁱeχ] was either tensed for some inexplicable reasons, e.g. Old Irish levelling, or it was not tense at all. Whatever the Old Irish pronunciation of this phrase might have been, there seems to be no phonological reason for claiming that in the Old Irish *a n-ech* – ‘their horse’ the sandhi nasal was tense. This amounts to saying that the transcription of this expression should be [ə 'nⁱeχ]. In the following section we will examine eclipsis on consonant-initial words.

2.5.4. Nasalization of voiced stops

Now let us turn to the other two effects of nasalization, that is the alternation of consonants resulting from eclipsis. First, let us consider the Primitive Irish transformation of voiced stops into the homorganic nasals: [b] → [m], [d] → [N] and

[g] → [ŋ]. This historical phenomenon will be illustrated by the close syntactic group [ə 'Naɣⁱ] *a ndaig* – ‘their fire’. Similarly to the example of *n*-prefixation discussed above, e.g. [iNⁱ 'Nⁱeχ] *in n-ech* – ‘the horse’-acc.sg., the Old Irish version of this possessive pronoun+noun sequence displays the noun-initial nasal [N]. Here again the historical development of the group **ejan dæɣ^wih* → **eja ndæɣ^wi* → [ə 'Naɣⁱ] *a ndaig* – ‘their fire’ indicates that this dental segment originates from the merger of the floating nasal [n], represented by the element (N/L) and the dental oral stop [d]. The essential difference is that in the case of [iNⁱ 'Nⁱeχ] the tense nasal originated from the prehistoric sequence [dn] (*iNd nēχ), while here the linear order was reverse, that is [nd] (*ndæɣ^wi). Otherwise the quality of the input and the result are identical, which indicates that the different order of the component parts had no impact on the further development of the tense nasal. The relevant stages of development, i.e. **ejan dæɣ^wih* → **eja ndæɣ^wi* → [ə 'Naɣⁱ] – ‘their fire’, are graphically represented below, the prime (N/L) stands for the floating segment [n], while (A-I, ?) for [d]:



At Stage I above the two onsets (O₁) and (O₂) formally belong to two separate words, while in the second phase interonset government between them seems to have been established. The nasal segment in (O₁), consisting only of the element (N/L) agrees with respect to the place of articulation with the onset (O₂), occupied by [d], having the structure (A-I, ?), which implies that (O₂) performs the function of the governor in this relationship. In Stage III, all the primes previously constituting two segments, the dental oral stop and the lax nasal, have merged into one expression, that is the tense nasal [N] with the element structure (A-I, ?, N/L). In Chapter Three it is argued that some tense sonorants are geminates. This is a possibility word-initially too, but here we ignore this for the sake of simplicity.

complexity. Now, assuming that eclipsis entails the spreading of (N/L), the newly formed [d] must contain more elements than [t], that is (A-I, ?, H, N/L). It is impossible to decide whether that was the case in Stage III, hence the (hypothetical) dotted association lines between (O₃) and the primes (H) and (N/L).

At first glance the structure (A-I, ?, H, N/L) may be frowned upon for a few reasons. First, we postulate a new structure for a segment whose make-up we seemingly already know. Second, the idea that one segment contains so many elements in a minimalist approach (we have already reduced the number of primes by eliminating (h)) appears rather awkward. Third, the presence of both the element responsible for voicelessness (H) and the one standing for voicedness (N/L) should produce an unpronounceable segment in a language which does not employ tones in the way tone languages do.³⁰ Or, perhaps, the resulting sound would be voiced and aspirated, e.g. [d^h], or nasal and aspirated, e.g. [n^h].

All the same, it is likely that two primes providing contradicting properties cannot be licensed by the skeletal position and are automatically excluded from the structure. Formally, we may propose a constraint according to which the elements (H) and (N/L) do not combine and must be both suppressed.

Thus, it seems proper to conclude that for some short time, just after nasalization, two segments [d] functioned in Primitive Irish: one radical, having the structure (A-I, ?), while the other, obtained due to eclipsis, containing (A-I, ?, H, N/L). It is unlikely that they survived long because the radical structure, containing all the salient properties, was sufficient to represent [d] in the system.

2.5.6. *Voiceless fricatives in nasalization environments*

Let us now turn to the effects of nasalization occurring in voiceless fricatives. Let us recall that [s] does not undergo this process (it is simply doubled in writing e.g. [i 'salm] *i ssalm* – ‘in the psalm’), while [f] is transformed into its voiced counterpart [v] in Old Irish.

As regards [s], the reasons why this segment was not affected by nasalization are unknown. Given that all the voiceless obstruents surfaced as voiced in nasalization contexts, [s] would have to be realized as [z], which is not confirmed in the relevant literature. From the perspective of Modern Irish, where eclipsis can be perceived as the suppression of the tone (H), the situation seems clear: such an operation is unlikely to take place in the case of [s] because the result would be [r] (Cyrán 1997:192ff.). When we turn to Primitive Irish, we may face similar restrictions. In particular, if the element make-up of [s], that is (A, H), were enhanced by the prime (N/L), the resulting structure would be (A, H, N/L). It has

³⁰ Two tones in one segment are not impossible in principle. They can occur side by side, especially in tone languages (Harris 1994:135).

already been argued that structures containing the two opposite tones were probably reduced, which would result in (A) in this case. However, as we remember from (13), this is the make-up of [R] and the occurrence of [R] as an eclipsed variant of [s] would complicate the system. Another possibility comes from Modern Irish too. According to Ó Siadhail (1989:114), some dialects of Modern Irish do display [z] in eclipsis contexts. We have no knowledge of Old Irish dialectal variations but a supposition that there was a dialect in which [z] surfaced as an eclipsed variant of [s] cannot be rejected. Such a process may have taken place on some scale and could have ceased to be active due to the influence of other dialects or even the impact of Brittonic, where the eclipsis of [s] never occurred. Whether or not these are accurate hypotheses is difficult to say. No other logical solution can be offered at this stage of research.

Turning to [f], we must remark that, at the time of eclipsis, there was no [f] to be nasalized. As shown in (2.3.4.), the predecessor of this voiceless fricative was [w], and this segment found itself in a nasalizing context. Consider the development of this glide in an eclipsing context reproduced after McCone (1996:120):

- (77) *Nasalization* *Old Irish*
- *indan weran → *iNdan veran → *iNda vera → [iNə 'vⁱer] *inna fer*
 – ‘of the men’

This chain of events shows that the original noun-initial [w] was transformed into [v] under the influence of the article-final nasal [n]. This nasal was subsequently dropped and the resulting Old Irish form was [iNə 'vⁱer]. A similar change was observed word-medially, e.g. *an-wiss → *anvⁱh → [anⁱəvⁱ] *ainb* – ‘ignorant’, *widwa → *wiðva → [fⁱədəv] *fedb* – ‘widow’ as well as *marwos → *marvah → [marəv] *marb* – ‘dead’.³¹ It seems, then, that the original glide [w] was spirantized in the vicinity of a non-voiceless segment only. McCone (1996) observes, however, that these changes are clear only from the Old Irish evidence. Thus, it cannot be ascertained which development was first, i.e. word-medial or initial, if there was any time difference between them. Nor can it be stated whether we are dealing with a phonologically triggered process in either case.

Let us also recall that in *h*-prefixing contexts the glide [w] was spirantized into [f], e.g. *iNdah werah → *iNda fera → [iNⁱ 'fⁱer] *in fer* – ‘the man’, where we held the tone (H) responsible for this change. If we look at the developments of [w] in *indan weran → *iNdan veran and *iNdah werah → *iNda fera, the resemblance between them is striking. The difference is in the nature of the pre-

³¹ Vowel epenthesis in these cases is discussed in Chapter Three.

ceding segment and in the assumption that in *indan weran → *iNdan veran the nasal remained after the following glide had been spirantized. There seems to be no tangible evidence, however, to counter the logical assumption that the nasal was dropped after spirantization and that the two developments were alike. Consider the hypothetical parallel changes in both *h*-prefixing and nasalizing environments:

(78)

- a. *iNdah werah → *iNda fera → [iNⁱ 'fⁱer] *in fer* – ‘the man’
 b. *iNdan weran → *iNda vera → [iNə 'vⁱer] *inna fer* – ‘of the men’

Briefly, [h+w] = [f], while [n+w] = [v]. In terms of elements, (H)+(U) = (U, H), whereas (N/L)+(U) = (U, N/L). Given that final [h] and [n] were lost or attached to the following lexical items at more or less the same time, the idea that they contributed in a similar fashion to the development of the glide [w] into [f] and [v], respectively, seems justifiable. Thus, we need to posit the presence of another double agent in Primitive Irish: [v] obtained due to the spirantization of [w] has the structure (U, N/L), while [v] which results from the lenition of [b] contains (U) only. Whether this state of affairs continued into Old Irish is unsettled.

What also remains unsolved is the problem of spirantization of [w] into [v] in the vicinity of voiced sounds, e.g. *widwa → *wiðva – ‘widow’ and *marwos → *marvah – ‘dead’. Neither [d] nor [r] seem to have contained the element (N/L), in which case the voicing and spirantization of the glide must have been somehow different in these examples. At this stage a straightforward solution cannot be offered, though.

2.5.7. Resonants in nasalizing contexts

Finally, let us concentrate on the behaviour of resonants in nasalization environments. The four segments: [m], [N], [L], [R], apparently did not undergo change in these contexts. Consider the example of *inna ríga* – ‘of the kings’-gen.pl.

(79)

- *sindoihan Ri:yan → *indoja Ri:ya → [iNə 'Ri:ya]

This interpretation is based on the assumption that the lax resonants, that is [n], [l], [r], were tensed to [N], [L], [R] as early as in Insular Celtic, and the Primitive Irish eclipsis did not have any impact on them (McCone 1996:120). The same hypothesis is offered as regards the tensing of resonants in *h*-prefixing contexts, e.g. *sindos ri:s → *indah Ri:h → *iNda Ri: → [iN 'Ri:] *in rí* – ‘the king’.

However, it was argued in (2.3.6.) that in *h*-prefixing contexts the development of the tense resonants [N], [L], [R] can be accounted for in terms of gemination which took place at the expense of the final [h]. In particular, we posited the changes of *sindos ri:s → *indah ri:h → *iNda Ri: → [iN 'Ri:] *in rí* – ‘the king’, which means that the tensing of [R] occurred when the article-final [h] had been dropped. By analogy with this development, we can propose that the strengthening of the original lax resonants in nasalizing contexts was in fact a process of gemination at the expense of the final [n]. This is shown below:

- (80) **Tensing Stage**
 *sindoihan ri:yan → *indoja Ri:ya → [iNə 'Ri:ya] *inna ríga*
 – ‘of the kings’ gen.pl.

The changes in (80) show that the original noun-initial lax [r] stood side by side with the article-final [n] and that the liquid surfaced as [R] only after the nasal had been dropped. In (2.3.6.) we also argued that the disappearing final [h] did not enhance the element make-up of the newly formed tense resonants. What was taken over by these segments was the skeletal position vacated by the fricative. In (80) the situation was probably the same. The final nasal left its position for the noun-initial resonant to occupy and no element change took place. The double linking of the elements which made-up the resonant resulted in the tensing of these segments. This is graphically represented below (the element (N/L) stands for the nasal, while the prime (A) for [r]):

- (81) **Stage I** **Stage II**
- | | | | |
|--------------------|------------------|---------|-----------------------------------|
| N O ₁ N | O ₂ N | | O ₁ N O ₂ N |
| | | | |
| x x x # | x x | → | # x x x x |
| | | | |
| *sindoih a | A i: yan | *indoja | A i: ya |
| N/L | | | |
- *sindoihan ri:yan → *indoja Ri:ya

In Stage I the nasal is linked (O₁), while the lax liquid to (O₂). At Stage II the nasal has been dropped and the position (O₁) is taken over by the liquid. Due to being doubly linked, the lax liquid [r] is tensed to [R]. A side effect is the headedness of the element (A).

Therefore, the Irish resonants need not be viewed as segments which resisted nasalization. They may be perceived as lax sonorants which became tense in

nasalizing contexts in the same way as they were earlier tensed in *h*-prefixing environments. The only difference is the type of the tone, which was high in *h*-prefixation but low in nasalization.

2.5.8. *Nasalization – summary*

The phenomenon of eclipsis, which started as the phonological merger of two nasal+voiceless stop clusters, played a prominent part in the phonology of the Irish system before the period of Old Irish. This process, however, does not have much in common with the other one, that is lenition. On the contrary, nasalizing contexts have been shown to bear a resemblance to those where lenition was absent in stops, where gemination occurred in resonants, where [f] was formed, and where [h] was prefixed to vowel-initial lexical items. Taking the phenomenon of *n*-prefixation to vowel-initial items as a point of departure, it has been argued that this type of affixation, which is found in nasalizing environments, was comparable to *h*-prefixation in geminating contexts. As regards the effects of nasalization on obstruents, it has been shown that it consisted in the propagation of the element (N/L) which enhanced the make-up of the radical voiced stops. The original voiceless stops were apparently enriched with this prime for a short time, but due to the inability of co-existing with the high tone (H), both the elements providing the properties of voicing and voicelessness were suppressed. It has also been proposed that the nasalizing contexts, similarly to *h*-prefixing environments, contributed to the origin of tense resonants in that they provided the original lax sonorants with a skeletal position to spread their melody onto. Finally, it has been hypothesized that the origin of the segment [v] in eclipsis environments was parallel to the formation of [f] in *h*-prefixing contexts.

2.6. Conclusions

In this chapter the developments of selected phonological phrases since Proto-Celtic until Old Irish have been analyzed. The aim of this discussion was to demonstrate that many incongruous Old Irish phenomena, such as the lenition of [s] to [f] or the occurrence of radical consonants after vowels of the preceding closely connected words for example, which must be synchronically viewed as morphophonological, can be accounted for in terms of phonology provided that they are analyzed from a diachronic perspective.

Taking Old Irish lenition as a point of departure, it was assumed that stops and fricatives lose one prime when weakened. The incongruous lenitions of [f] to [ø] and [s] to [f] were found synchronically exceptional. As a result of a diachronic analysis, we discovered that these lenitions could be neatly explained as element decomposition and composition, respectively. There were two other

findings of this analysis. One was the conclusion that the pre-Old Irish phonology made no difference between historical weakening and non-leniting contexts. The other was that a reinterpretation of radicals occurred in the Primitive Irish system, i.e. the historical radical [w] was replaced by the radical [f] by analogy with a development occurring in close syntactic groups.

The origin of the Old Irish tense sonorants [N], [L], [R] was also connected with the development of original lax resonants in close syntactic phrases. It has been argued above that the sonorants were first tensed in *h*-prefixing (and later *n*-prefixing) contexts and then all no-mutation sites were treated by the system in a uniform fashion. The occurrence of lax and tense sonorants in Old Irish in leniting and non-leniting contexts, respectively, was a result of historical changes which indicate that their distribution was complementary but had nothing to do with lenition as such.

Another issue connected with the fact that pre-Old Irish phonology treated weakening and non-leniting contexts in the same way was *t*-prefixation. Given that *t*-prefixation took place both in items which were lexically vowel-initial and *s*-initial, it has been claimed that this phenomenon occurred only in the environments which were previously affected by either *h*-prefixation or by the lenition of [s]. The necessary factor was also the availability of the segment [d] in the immediate vicinity of [h].

In the part devoted to nasalization, we discovered that this prehistoric mutation had much in common with *h*-prefixing or geminating sites, but it did not resemble lenition in any way. We found that the tense Irish resonants first surfaced in both eclipsing and geminating contexts, and that *n*-prefixation to vowel-initial items was parallel to *h*-prefixation. Also the development of the prehistoric glide [w] into the Primitive Irish [v] and [f] was apparently similar in these two environments. As for the eclipse of stops, it has been argued that the floating prime (N/L) was added to the structure of the radical segments. In the case of voiced stops, this addition resulted in their transformation into the corresponding nasals. As regards the voiceless stops, we did not find evidence to either prove or disprove the view that the prime (N/L) contributed to their element make-up. However, taking a systemic viewpoint, it has been hypothesized that although (N/L) was initially added to their structures, it had to be suppressed along with the prime (H) due to a systemic constraint according to which these two elements could not combine in one segment.

3 Consonant clusters in Old Irish - governing relations between segments

3.1. Introduction – Old Irish consonant clusters

In this chapter we will survey consonant clusters occurring in the phonological systems of Old Irish and its predecessors. These consonantal sequences surface in word-initial, medial and final position. The chief aim of the following discussion is to shed some light on the canonical shape of the Old Irish word, to detect the irregularities and to propose a suitable explanation. Although establishing the sonority profile of consonant clusters is not a particularly complicated task, the governing relations between the segments constituting consonant groups are far from being clear. Two problems will receive special attention.

The first is connected with the question of why some left-hand members of word-initial clusters undergo lenition in a historical weakening context, similarly to single consonants discussed in Chapter Two, while others do not. Consider the following examples showing single stops and clusters in lenition contexts:

- (1) a. **Radical consonant** vs. **Lenited consonant**
[kⁱeN] *cenn* vs. [ə 'χⁱeN] *a chenn* – ‘head’/‘his head’
- b. **Radical cluster** vs. **Lenited cluster**
[klaNd] *cland* vs. [iN 'χlaNd] *in chland* – ‘family’/‘the family’

The initial stops in clusters like [kl] undergo regular lenition in (1b), similarly to the single stops in (1a). However, initial segments in clusters composed of *s*+stop are not lenited, e.g. [sⁱkⁱe:l] *scél* vs. [ə 'sⁱkⁱe:l] *a scél* – ‘story’/‘his story’, although the single [s] is regularly weakened to [h], e.g. [suθ] *suth* vs. [ə 'huθ] *a suth* – ‘offspring’/‘his offspring’.

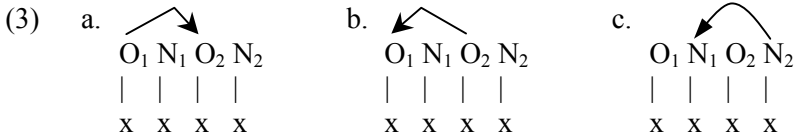
The second issue concerns apparently similar word-final clusters which were treated in dissimilar ways by the mediaeval Irish poetry and which developed in different ways after the period of Old Irish. For example, the sonorant+stop cluster [Lt], e.g. [foLt] *folt* – ‘hair’, which has remained unchanged until the present day, was perceived as metrically different from other sonorant+stop groups such as [Ld], e.g. [mⁱeLd] *meld* – ‘pleasant’ and [lg], e.g. [bolg] *bolg* – ‘belly’. Subse-

quently, the latter two also developed in different ways. Below the relations are represented schematically, a detailed discussion will follow later in this chapter.

- (2) a. *Metrical treatment* [lg] = [Ld] [lg] ≠ [Lt] [Ld] ≠ [Lt]
 b. *Subsequent development* [lg] → [ləg] [Ld] → [L] [Lt] → [Lt]

(2a) shows that the clusters [lg] and [Ld] were treated by the verse in the same way, as opposed to [Lt]. After Old Irish, all these three types developed in three different ways (2b): [lg] was split by an epenthetic vowel, i.e. [ləg], [Ld] underwent simplification to [L], while [Lt] remained unchanged. Below it will be argued that these developments began as early as in Old Irish because these consonant clusters had three diverse structures already in that phonological system.

As a result of adopting a theoretical model in which there are no branching constituents and each non-nuclear position is followed by a nuclear slot, the only uncertain thing is the presence or the absence of governing relations between consecutive consonants. The presence of a relation can be discovered only due to a phonological analysis because both interonset relations and Proper Government can produce phonetic consonant clusters. The interonset relations will be referred to as Interonset Government (IO). Thus, formally, we have three possible structures of consonant clusters:



In (3a) we can see a head-initial governing relation holding between the governor (O_1) and the governee (O_2), e.g. stop+liquid [tr, pl]. In such a relationship the governor must be elementally more complex than the governee. The intervening nucleus is silent because the IO relation allows it to remain mute. In the structure in (3b) the government is head-final, the governor (O_2) is stronger than the governed segment (O_1), e.g. liquid+stop [rt, lp]. Here also (N_1) remains inaudible thanks to IO. In (3c) an IO relation between (O_1) and (O_2) cannot be established for whatever reasons. There are two fundamental criteria which determine the presence or absence of IO. One is that the substantive complexity of cluster members does not allow them to contract IO. The other is that the nucleus which follows a cluster is prosodically too weak to license a potential IO relation. Under such circumstances, the nucleus (N_1) can remain mute only if it is properly governed by (N_2).

The relations between the participants of these exemplary clusters cannot be taken for granted, however. Although all the clusters from (2) seem to belong to type (3b), their behaviour in Old Irish and subsequent developments indicate that this need not be so. By the same token, the cluster [kl] from (1b) looks like a typical representative of type (3a). Nonetheless, its behaviour in leniting contexts may indicate a different interpretation.

Apart from word-initial and final consonant sequences, also medial clusters will be analyzed in this chapter. The analysis of the abovementioned structures will be prefaced with a selection of relevant data and a theoretical introduction.

3.1.1. Word-initial consonant clusters

In this part the inventory of word-initial consonant clusters will be provided. We will see context-free clusters as well as combinations occurring only in morpho-syntactically-conditioned initial-mutation environments. The former clusters will be referred to as ‘radical’, while the latter as ‘mutated’.

3.1.1.1. Radical word-initial consonant clusters

First, consider an exhaustive inventory of radical clusters along with some representative cases. Sequences of obstruents followed by lax liquids are listed below:

(4)	OBSTRUENT (OR m)+LAX LIQUID	
	pr br tr dr kr gr fr mr	pl bl tl dl kl gl fl ml
	[b ⁱ r ⁱ θ ⁱ ə̃ṽ] <i>brithem</i> – ‘judge’	[d ⁱ l ⁱ iγ ⁱ ə̃ð] <i>dliged</i> – ‘law’
	[k ⁱ r ⁱ ið ⁱ e] <i>cride</i> – ‘heart’	[klað ⁱ ə̃ṽ] <i>claideb</i> – ‘sword’
	[mruγ ⁱ] <i>mruig</i> – ‘land’	[f ⁱ l ⁱ esk] <i>flesc</i> – ‘wand’

Let us note that all the stops present in the system of Old Irish can be followed by both lax liquids, that is [r] and [l]. Moreover, the only fricative preceding [r] and [l] is [f]. Finally, [m] patterns with the stops and [f] in that, unlike other sonorants, it can be followed by these liquids.

The next set comprises stops followed by the lax nasal [n]. This set is much more restricted since there is a systemic absence of the potential clusters [pn, bn, dn, fn, mn]. Let us also note that no fricative can precede [n] word-initially.

(5)	STOP+n	tn	kn	gn
	[tnu:θ]	<i>tnúth</i>	– ‘rage’	
	[knu:]	<i>cnú</i>	– ‘nut’	
	[gnu:s ⁱ]	<i>gnúis</i>	– ‘face’	

The set below contains the sequences of [s] followed by the tense sonorants. Note that [s] is the only segment which can precede the tense sonorants in word-initial position.

(6) s+TENSE SONORANT sL sR sN

[sLo:ɣ] *slóg* – ‘army’
 [sRuθ] *sruth* – ‘stream’
 [sⁱNⁱeχte] *snechtae* – ‘snow’

The voiceless fricative [s] followed by voiceless stops or [m] constitute the next group. Let us note that the labial nasal patterns with the voiceless stops since no voiced stops occur in this position.

(7) s+VOICELESS STOP OR [m] sp st sk sm

[sⁱpⁱrəd] *spirut* – ‘spirit’ [ska:θ] *scáth* – ‘shadow’
 [storⁱ] *stoir* – ‘history’ [sⁱmⁱeχ] *smech* – ‘chin’

Finally, let us consider triconsonantal sequences composed of [s] followed by voiceless stop+lax liquid clusters. These are the only word-initial ternary groups found in Old Irish. As mentioned in Chapter Two, it is sometimes difficult to state precisely if all of these were part of the Irish inventory as early as in Old Irish. Most probably those with [t] and [p] are quite late borrowings.

(8) s+CLUSTER (VOICELESS STOP+LAX LIQUID) spr ? spl ? str ? skr skl

[sprog] *sproc* – ‘fear’
 [sⁱkⁱlⁱeo] *scléo* – ‘sorrow’
 [sⁱkⁱrⁱed] *scret* – ‘scream’

What is shown in (4-8) is an exhaustive list of possible word-initial consonant sequences in the system of Old Irish. This division of radical clusters into five groups becomes evident if we look at the inventory of consonantal combinations in mutation contexts.

3.1.1.2. Word-initial clusters in leniting contexts

First, let us consider the possible clusters in lenition contexts. The first set shows the lenited versions of clusters from the group in (4), that is obstruents followed by the lax liquids.

(9) FRICATIVE+LAX LIQUID fr fl vr vl θr θl δr δl χr χl γr γl ʋr ʋl

Radical Lenited

[brat]	[ə 'vrat]	<i>bratt/a bratt</i>	– ‘cloak’/‘his cloak’
[dluγ]	[də 'ðluγ]	<i>dlug/do dlug</i>	– ‘claim’/‘your claim’
[klaNd]	[iN 'χlaNd]	<i>cland/in chland</i>	– ‘family’/‘the family’
[gra:m]	[mə 'γra:m]	<i>grán/mo grán</i>	– ‘grain’/‘my grain’
[mraθ]	[ə ʋraθ]	<i>mrath/a mrath</i>	– ‘treachery’/‘his treachery’

We should observe that all the initial stops from (4) above (including [m]) are turned into the corresponding fricatives in a leniting context. The liquids remain unchanged. The fricative [f] disappears and the radical clusters [fr] and [fl] are realized as [r] and [l], respectively. In other words, they are no longer clusters.

Now let us observe the behaviour of clusters from (5), namely stops followed by [n], in a leniting environment.

(10) FRICATIVE+n θn χn γn

Radical Lenited

[tnu:θ]	[ə 'θnu:θ]	<i>tnúth/a thnúth</i>	– ‘rage’/‘his rage’
[g ⁱ n ⁱ :vo]	[iN 'γ ⁱ n ⁱ :vo]	<i>gnímo/in gnímo</i>	– ‘of a deed’/‘of the deed’

In this group the original stops from (5) are also turned into the corresponding fricatives similarly to those in (9). The lax nasal remains unaltered.

The group in (11) below is a lenited version of *s*+tense sonorant clusters presented in (6) above.

(11) h+LAX SONORANT hl hr hn

Radical Lenited

[sLo:γ]	[ə 'hlo:γ]	<i>slóg/a slóg</i>	– ‘army’/‘his army’
[sRo:m]	[mə 'hro:m]	<i>srón/mo srón</i>	– ‘nose’/‘my nose’

The *s*+tense sonorant sequences from (6) surface as *h*+lax sonorant clusters in a leniting environment in (11). The difference between these clusters and those in (9-10) is that the sequences in (11) display the replacement of two segments in the leniting environment, while in the previous two groups only the initial segments undergo changes.

The radical [s] followed by voiceless stops, e.g. [sk], or by clusters composed of voiceless stops and liquids, e.g. [skr], from (7-8) does not undergo lenition in a weakening context. A word of comment is in order here, however.

The cluster [sm] from (7) above, discussed in Chapter Two, is slightly problematic in that the phonological system of Old Irish treated it in two different ways, either as a non-leniting one or as a configuration which deleted the spirant, thus becoming [m] alone. By the end of Old Irish, though, the survivors, that is the items in which the whole cluster was preserved, *sm* came to be regarded as an invariably unlenitable *s*+stop group.¹ The same cannot be said about the initial dental spirant [s] followed by a sonorant in (6), e.g. [sN]. Although the details are discussed in Chapter Two, let us briefly recall that this initial fricative is transformed into [h] when it is preceded by a vowel (e.g. [sLo:γ] *slóg* – ‘army’ vs. [mə 'hlo:γ] *mo slóg* – ‘my army’), or is replaced by [t] when it follows a leniting article ending in a dental nasal (e.g. [sRoθo] *srotho* – ‘of a stream’ vs. [iN 'troθo] *int srotho* – ‘of the stream’). Both these changes are apparently accompanied by the exchange of the tense sonorant for a lax one. It should be made clear, however, that these assumptions are based totally on spelling. Thurneysen (1946:142) claims that in certain manuscripts a *punctum delens* (a raised dot above *ṡ*) was used in spelling, which might indicate the lenition of the dental fricative before sonorants, but this practice was highly inconsistent and this diacritic may have also been used even when unnecessary. Grijzenhout (1995:82-85) argues that the spirant was rather unlenited when preceding voiceless stops but does not mention the situation in front of sonorants. It is extremely difficult to decide what the situation was really like in Old Irish, but certain assumptions can be made. Taking into account the development of the Irish language and the fact that in Modern Irish initial clusters consisting of [s] followed by stops do not undergo lenition, while the same spirant preceding sonorants is lenited to [h], we may suppose that the status of this fricative was the same in Old Irish. In other words, [s] was lenited before all sonorants except [m].

The number of clusters found exclusively in leniting sites is by far smaller than that of radical groups occurring in non-mutating contexts. This is due to the fact that many combinations, i.e. those from (7-8) including [s] followed by voiceless stops, e.g. [sk], and clusters composed of voiceless stops and liquids, e.g. [skr], are immune to weakening.

¹ Nonetheless, Ó Siadhail (1989:112ff.) notes that in some Munster dialects the cluster [hm] occurs.

3.1.1.3. Nasalization of word-initial clusters

Now let us turn to the other mutation. Consider the consonant combinations occurring in nasalization contexts. The clusters in (12) are eclipsed versions of radical sequences from (4), while these in (13) reflect the groups from (5) above.

(12) VOICED OBSTRUENT OR NASAL+LAX LIQUID

br bl mr ml dr dl Nr Nl gr gl nr nl vr vl

Radical Nasalized

[brat] [ə 'mrat] *bratt/a mbratt* – ‘cloak’/‘their cloak’
 [trayⁱidⁱ] [ə 'drayⁱidⁱ] *traigid/a traigid* – ‘feet’/‘their feet’
 [gⁱl^eN] [ə 'ŋⁱl^eN] *glenn/a nglenn* – ‘valley’/‘their valley’

(13) VOICED STOP OR VELAR NASAL+n dn gn ɲn

Radical Nasalized

[tnu:θ] [ə 'dnu:θ] *tnúth/a tnúth* – ‘rage’/‘their rage’
 [gⁱnⁱ:ṽ] [iNⁱ ɲⁱnⁱ:ṽ] *gním/in ngním* – ‘deed’/‘the deed’-acc.sg.

In the nasalizing contexts in (12) and (13) the radical voiceless stops from (4) and (5) surface as the corresponding voiced stops, while the radical voiced stops are realized as the corresponding nasals.² The second component of the cluster, that is the lax liquid in (12) and the lax nasal in (13), invariably remains unaltered. Note also that, due to eclipsis, a few peculiar clusters surface, e.g. [ŋl], [ɲn].

There is yet another cluster which occurs exclusively in a nasalizing environment, namely [mn]. This combination is found in the oblique cases and derivatives of [bⁱen] *ben* – ‘woman’ whose gen.sg., nom.pl. and acc.pl. is [mna:] *mná*.

Let us also note that *s*+consonant clusters from (6-8) above, e.g. [sk], [skr], [sL], are immune to eclipsis.

The aim of the brief discussion about lenition and nasalization contexts above was to indicate that the possibilities of consonant combinations are limited and that the occurrence of certain clusters is contextually conditioned. We will discuss the implications of this fact when analyzing word-initial clusters in detail in later parts of this chapter. The following section will be devoted to the presentation of consonant clusters occurring at the right-hand edge of words.

² The interpretation of the word-initial orthographic sequences *mb*, *nd* and *ng* as [m, N, ŋ] is based on Quin (1975:9), although it is possible to assume that they were realized as [mb], [Nd] and [ŋg], respectively.

3.1.2. Word-final consonant clusters

In word-final position consonants display combinations which are, in a number of cases, mirror images of what can be observed in word anlaut. The most typical combinations include sonorant+stop groups. Consider the possibilities below.

(14)	LIQUID+STOP (INCLUDING m)												
	rp	rb	Rt	Rdrk	rg	rm		lp	lb	Lt	Ld lk	lg	lm
[korp]	<i>corp</i>							[skalp]	<i>scalp</i>				– ‘fissure’
[borb]	<i>borb</i>							[skolb]	<i>scolb</i>				– ‘splinter’
[goRt]	<i>gort</i>							[foLt]	<i>folt</i>				– ‘hair’
[aRd]	<i>ard</i>							[m ⁱ eLd]	<i>mel(d)</i>				– ‘pleasant’
[d ⁱ erk]	<i>derc</i>							[olk]	<i>olc</i>				– ‘bad’
[d ⁱ erg]	<i>derg</i>							[bolg]	<i>bolg</i>				– ‘belly’
[gorm]	<i>gorm</i>							[salm]	<i>salm</i>				– ‘psalm’

The clusters in (14) comprise word-final stops preceded by liquids. These resonants are always lax, i.e. [r] and [l], when preceding non-homorganic stops, but invariably tense, that is [R] and [L], if they stand before homorganic obstruents. The labial nasal patterns with stops in this position, just as it does word-initially (see (4) and (9) above).

(15)	NASAL+NOMORGANIC VOICED STOP				mb	Nd	ŋg
[Loŋg]?	<i>long</i>	– ‘ship’	or	[Loŋ] ?			
[kamb]	<i>camb</i>	– ‘crooked’	also	[kam]	<i>cam(m)</i>		
[klaNd]	<i>cland</i>	– ‘family’	also	[klaN]	<i>clann</i>		

This set is slightly controversial in that sequences such as [mb], [Nd], and [ŋg] were on the wane during the period of Classical Old Irish to be simplified to sonorants alone in Late Old Irish or Early Middle Irish. In other words, it is not certain whether in Old Irish they were still clusters. In any case, it is worth noting that potential word-final sequences including these nasals followed by the homorganic voiceless stops, that is [ŋk], [mp] and [Nt], were practically absent from the system of Old Irish. Only the last of these can be found in function words, e.g. the definite article [iNt] occurred before the lenited [s] in the following word (see Chapter Two for details).

Now, let us consider another group of consonantal sequences representing the same falling-sonority profile, although now the word-final segment is the voiced labial fricative.

(16) SONORANT+ LABIAL FRICATIVE rv lv nv

[d ⁱ elv]	<i>delb</i>	– ‘image’
[marv]	<i>marb</i>	– ‘dead’
[banv]	<i>banb</i>	– ‘piglet’

In (16) we can see the three lax sonorants [l, r, n] preceding the lenis labial fricative [v]. Apparently, this is the only spirant found in such a context.

Generally speaking, the combinations presented in (14-16) above belong to the type characterized by sonority falling to the right.

It seems proper at this point to note that the clusters in (14-16), although they appear to represent the same pattern, that is sonorants followed by obstruents, should not be treated in a similar fashion. There are two reasons for this. One is that as early as in mediaeval verse, some clusters were allowed to rhyme with each other whereas others were not, e.g. [korp] *corp* – ‘body’ was treated on a par with [olk] *olc* – ‘bad’, but not with [borb] *borb* – ‘rough’ (Greene 1952). The simplest cause of the differentiation seems to be the fact that the final consonant is voiceless in the first two cases, that is [korp] and [olk], but not in the third, i.e. [borb]. There are more complex sources of this distinction, however, and these will be discussed shortly. The other reason is even more important. In particular, the development of the language and the Modern Irish versions of some words show that there were three ways in which the clusters from (14-16) developed. These are schematized below:

(17)	TYPE	EXAMPLE	CHANGE	RESULT
a.	Sonorant+voiceless obstruent	[korp]	– no change	
b.	Sonorant+voiced obstruent	[borb]	– vowel epenthesis	→ [borəb]
c.	Tense sonorant+ Homorganic voiced stop	[klaN(d)]–	vowel lengthening or diphthongization	→ [klauN]

These developments need not but may mean that in Old Irish the superficially parallel consonant clusters should be analyzed as dissimilar.

While being the most typical word-final clusters, the non-vocalic sequences above do not exhaust the combinatorial possibilities found in Old Irish lexical items. The much less frequent, although by no means marginal word-final clusters can be divided into three groups: (i) [ð] followed by a voiced obstruent or [m], (ii) a voiceless fricative preceding a voiceless stop, and (iii) two sonorants. Consider the following examples:

(18) VOICED DENTAL FRICATIVE+VOICED STOP (INCLUDING *m*)
OR VOICED LABIAL FRICATIVE *ðb* *ðg* *ðm* *ðv*

[<i>oðb</i>]	<i>odb</i>	– ‘knot’ (rare cluster)	[<i>maðm</i>]	<i>madm</i>	– ‘breaking’
[<i>taðg</i>]	<i>Tadgg</i>	– a man’s name	[<i>fⁱeðv</i>]	<i>fedb</i>	– ‘widow’

In these sequences the sonority slope between the cluster members is shallow or null. The labial nasal [*m*] patterns with stops in that it can occur finally following a fricative. Interestingly, the labial spirant [*v*] can follow a preceding fricative. The subsequent development of these sequences shows that they have not continued to exist in Modern Irish. By and large, they have been simplified to the final segment alone, which has been accompanied by the vowel diphthongization, e.g. [*faib*] *fadhb* – ‘knot of timber’, [*taig*] *Tadhg* – a man’s name.

The second minor group comprises fortis non-labial fricatives followed by voiceless non-labial stops.

(19) VOICELESS FRICATIVE+VOICELESS STOP *st* *sk* *χt*

[<i>tⁱesⁱtⁱ</i>]	<i>teist</i>	– ‘testimony’
[<i>Resk</i>]	<i>resc</i>	– ‘talk’
[<i>oχt</i>]	<i>ocht</i>	– ‘eight’

In these sequences of voiceless consonants there are no exceptions in that no fricative can occur word-finally after another spirant. As regards the subsequent development, these clusters have survived into Modern Irish virtually intact, e.g. [*iæsk*] *iasc* – ‘fish’ and [*ri:χt*] *ríocht* – ‘kingdom’.

Finally, let us consider a minor group of clusters composed of two resonants (the first one is extremely rare and the tenseness in the resonants is debatable).

(20) SONORANT+SONORANT *RN* *nm*

[<i>doRN</i>]	<i>dornn</i>	– ‘fist’
[<i>anⁱmⁱ</i>]	<i>ainm</i>	– ‘name’

In these sequences there seems to be no sonority difference between the cluster members. This is not surprising in the case of [*m*] which patterns with stops in that it can also follow liquids, e.g. [*salm*] *salm* – ‘psalm’, as well as the voiced fricative [*ð*], e.g. [*maðm*] *madm* – ‘breaking’. We follow Thurneysen (1946: 74ff.) in the interpretation of the orthographic sequence *rnn* as a cluster of two tense sonorants, although this combination is peculiar because [*N*] can follow no other consonantal segment word-finally. As far as the further development of

these clusters is concerned, words such as [dɔrN] and [anⁱmⁱ] have generally developed svarabhakti vowels and are in some dialects pronounced as [dɔrən] and [anⁱimⁱ], respectively (Ní Chiosáin 1999:560ff.).

In terms of metrical properties, the clusters from (18), e.g. [ðb] and those from (20), e.g. [nm], can rhyme with the more common sequences from (17b), e.g. [rb], and (17c), e.g. [Nd], in mediaeval verse (Greene 1952). As regards the clusters from (19), e.g. [χt], these can rhyme with the ones from (17a), e.g. [rp]. Apparently, the main criterion for such a division of word-final clusters seems to be the voicing of the final consonant. This observation will be verified soon.

The ensuing section presents word-medial consonant combinations, a number of which look similar to both word-initial and word-final clusters shown so far.

3.1.3. Binary sequences in word-medial position

Let us first consider word-medial clusters which exhibit the same sonority profiles as the groups occurring in word-initial position (either radical or mutated):

(21) a. STOP+LAX SONORANT	b. FRICATIVE+LIQUID
[e:ɔrom] <i>étromm</i> – ‘light’	[k ⁱ el ⁱ əvrəð ⁱ] <i>celebraid</i> – ‘bid farewell’
[egla] <i>ecla</i> – ‘fear’	[d ⁱ i:θrəv] <i>díthrub</i> – ‘wilderness’
[kodləð] <i>cotlud</i> – ‘sleep’	[g ⁱ iʏrəN] <i>gigrann</i> – ‘goose’
[egne] <i>ecnae</i> – ‘wisdom’	[aχrəN] <i>achrann</i> – ‘thicket’

The examples in (21) show clusters with sonority rising to the right and display either stops (21a) or fricatives (21b) followed by resonants. Such cases constitute a minor group in the language. In other words, few words conforming to this pattern can be found in this particular environment. Let us note that the sequences in (21b) are the expected outcomes of intervocalic lenition, while those in (21a) are not, because the latter do not display fricatives.

What is interesting about these Old Irish groups of medial clusters is that in some varieties of Modern Irish (e.g. Munster) the survivors show vowel epenthesis, e.g. [egla] and [aχrəN] are now realized as [agəla] and [aχərəN], respectively (Doyle and Gussmann 1991:418; Green 2003).³ In other words, we are currently dealing with a tendency to eliminate word-medial obstruent+sonorant sequences from the linguistic system of Irish.

A greater number of available items represent the reverse pattern, i.e. where sonority decreases to the right. Most of these combinations were presented when discussing word-final clusters in (3.1.2.). Consider a few cases below.

³ Modern Irish clusters are also well-discussed in Ó Sé (2000).

- (22) a. n/N +OBSTRUENT (INCLUDING m)
- | | | | |
|-------------------------|------------------------------|-------------------------------------|---------------------------|
| [b ⁱ eNdəχt] | <i>bendacht</i> – ‘blessing’ | [in ⁱ γ ⁱ ən] | <i>ingen</i> – ‘daughter’ |
| [oiNtu] | <i>ointu</i> – ‘unity’ | [m ⁱ enme] | <i>menmae</i> – ‘mind’ |
| [aNse] | <i>ansae</i> – ‘difficult’ | | |
- b. r/R +OBSTRUENT (INCLUDING m)
- | | | | |
|-----------------------|--------------------------|----------|----------------------------|
| [oRdu] | <i>ordu</i> – ‘thumb’ | [karbəd] | <i>carpat</i> – ‘chariot’ |
| [k ⁱ eRta] | <i>certa</i> – ‘justice’ | [argəd] | <i>argat</i> – ‘silver’ |
| | | [forməd] | <i>format</i> – ‘jealousy’ |
- c. l/L +OBSTRUENT (INCLUDING m)
- | | | | |
|--|------------------------------|--|-------------------------------|
| [daLte] | <i>daltae</i> – ‘fosterling’ | [t ⁱ el ⁱ g ⁱ id ⁱ] | <i>telcid</i> – ‘throw!’-2pl. |
| [maLdəχt] | <i>maldacht</i> – ‘curse’ | [albu] | <i>Albu</i> – ‘Scotland’ |
| [d ⁱ i:L ⁱ s ⁱ e] | <i>dilse</i> – ‘propriety’ | [tulχəχ] | <i>tulchach</i> – ‘hilly’ |
| | | [falmər ⁱ] | <i>falmoir</i> – ‘chest’ |
- d. VELAR NASAL+VOICED VELAR STOP
- | | |
|-------------------------------------|--------------------------|
| [t ⁱ enɡe] | <i>tengae</i> – ‘tongue’ |
| [in ⁱ g ⁱ ən] | <i>ingen</i> – ‘nail’ |
- e. m+HOMORGANIC STOP
- | | |
|-------------------------------------|----------------------------|
| [im ⁱ b ⁱ əd] | <i>imbed</i> – ‘abundance’ |
| [t ⁱ empəl] | <i>tempul</i> – ‘temple’ |
- f. VOICELESS FRICATIVE+VOICELESS STOP
- | | |
|---------------------------------------|-----------------------------------|
| [k ⁱ esto] | <i>cesto</i> – ‘question’-gen.sg. |
| [s ⁱ N ⁱ ex̣te] | <i>snechtae</i> – ‘snow’ |
| [tosko] | <i>tosco</i> – ‘need’-gen.sg. |

In the examples above we can see sonorants followed by obstruents in (22a-e). In (22a) the tense coronal nasal precedes the homorganic obstruent, either voiced or voiceless. The nasal is lax when it is followed by a non-homorganic obstruent, as in [inⁱγⁱən] *ingen* – ‘daughter’. In (22b) the liquid [r] is followed by stops or fricatives. It is worth noting that it surfaces as tense when preceding a homorganic consonant, as in [oRdu] *ordu* – ‘thumb’. (22c) shows the liquid [l] followed by stops or fricatives. Also here it should be noticed that the liquid is tense before homorganic obstruents, as in [daLte] *daltae* – ‘fosterling’. The velar nasal is followed by the homorganic voiced stop in (22d). In this interpretation we assume that the orthographic *ng* represents two segments, which need not be true but which cannot be proved either right or wrong at this stage. In (22e) the labial

nasal is followed by a homorganic stop. Finally, in (22f) voiceless spirants are followed by voiceless stops.

The list above, possibly not exhaustive, points to the existence of certain tendencies in the phonological system of Old Irish. The fact that words representing the pattern of falling sonority illustrated in (22) clearly outnumber those displaying the reverse order shown in (21) leads to the conclusion that a wider range of combinations are possible in word-internal consonant clusters provided that sonority decreases to the right.

A word or two should be said about the reasons behind the selection of consonant clusters offered in this section. There are a number of clusters in which vowel-zero alternations can be observed, e.g. [anⁱv̥ⁱe] *ainme* but [anⁱi^{v̥}ⁱ] *ainim* – gen.sg./‘defect’ or [enge] *encae* but [eNəg] *ennac* – gen.sg./‘innocent’. Those have not been included in what was shown above because they represent a different group of cases which may be called syncopated. They include clusters which are not truly adjacent in all forms occurring synchronically in the phonological system. Other reasons and appropriate explanations will be offered whenever necessary. Now it is time we considered ternary clusters occurring in the middle of the word.

3.1.4. Triconsonantal word-medial clusters

In the final section devoted to the presentation of the relevant data connected with the possible combinations of consonants, sequences of three non-vocalic segments found in the middle of the word will be exemplified. It should be stressed that none of these combinations can be found in any other position. Let us recall (3.1.1.) that word-initially only *s*+voiceless stop+lax liquid sequences are allowed, while word-finally no ternary clusters occur in Old Irish. Consider the selection of data below.

(23)

- | | | |
|---|-------------------|--|
| a. [taskni] | : <i>taschnai</i> | – ‘approach’ (3sg. dependent form of <i>do:aschnai</i>) |
| [m ⁱ eskvəð ⁱ] | <i>mescbaid</i> | – ‘quarrel’ or <i>mesbaid</i> |
| b. [s ⁱ k ^r i ^v Nd ⁱ ð ⁱ] | <i>scribndid</i> | – ‘scribe’ or <i>scribdid</i> |
| [f ^r egNdər ^g] | <i>frendairc</i> | – ‘present’ or <i>frendairc</i> |
| c. [kodəRsNe] | <i>cotarsnae</i> | – ‘contrary’ |
| [taθ ⁱ χ ⁱ rək] | <i>taitchrecc</i> | – ‘redeeming’ (verbal noun of <i>do:aithchren</i>) |

All the cases above contain peculiar sequences of consonants, many of which resulting from morphological complexity, and any attempt at discovering any type of regularity seems pointless at first glance. Nonetheless, some classification can

be made. Thus, the first two examples (23a) display *s*+voiceless stop clusters, which occur in all positions in a word, followed by another consonant, i.e. [sk]+[n] or [v]. Another two (23b) contain typical medial and final [Nd] preceded by [v] or [g]. The final two (23c) display [sN] and [χr], which are found word-initially and medially and which are preceded by another consonant, i.e. [R] and [θ], respectively. The list above is not exhaustive because triconsonantal clusters are anything but peculiar in Old Irish. However, what this selection shows is that in ternary clusters typical binary sequences are either preceded or followed by a single consonant and that no triconsonantal group violating this pattern occurs in the system, i.e. we do not discover sequences such as [bχs] or [sgm] for example. It is also noteworthy that some of the words above have simplified doubles, which may indicate that some sequences were perceived as less acceptable by the system than those which never display simplification.

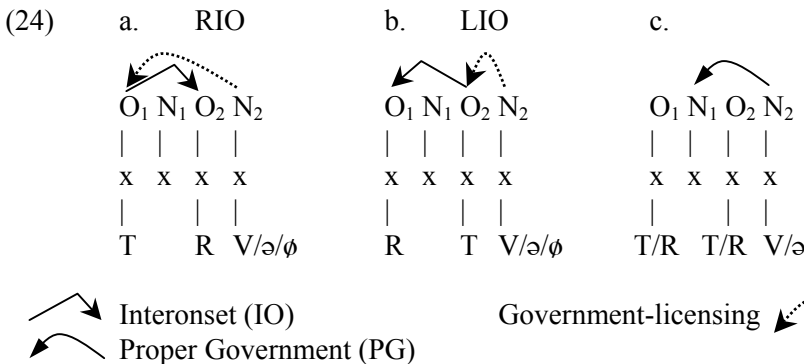
In the remainder of this chapter a phonological analysis of clusters occurring in Old Irish as well as in the prehistory will be provided.

3.2. A GP analysis of consonant clusters

3.2.1. Introduction

In this part of the present chapter an attempt will be made to analyze the consonant clusters of Old Irish from the viewpoint of GP. Let us recall that our analysis is based on the assumption that all constituents, i.e. onsets and nuclei, are non-branching. Therefore, every binary consonant cluster is a sequence of two onsets separated by an empty nucleus while every ternary combination equals three onsets split by two intervening empty nuclei.

In formal terms, we distinguish three possible phonological representations of surface consonant clusters sketched in (3), and fully illustrated below. T stands for ‘true consonants’, R represents ‘resonants’, while V is a ‘full vowel’:



Following Cyran (2003), the structure represented in (24a), that is an interonset governing relation traditionally interpreted as a branching onset, will be referred to as RIO – rightward interonset relation, while the relationship shown in (24b), viewed as a coda-onset sequence in the mainstream GP, will be termed LIO – leftward interonset governing domain. In both cases the IO relations need to be licensed by the nucleus following the clusters, that is (N₂). In (24a) we also see indirect prosodic licensing, i.e. the licensing nucleus (N₂) does not immediately follow the governing onset (O₁), while in (24b) the licensing is direct because the licenser (N₂) is in the immediate neighbourhood of the IO governor (O₂). It must also be noted that both LIO and RIO license the intervening nucleus (N₁) to remain phonetically mute. The structure in (24c) illustrates the absence of an IO relation between the consecutive onsets and the intervening nucleus (N₁) is properly governed by (N₂). It is taken for granted that every onset is licensed by the following nucleus. This licensing is not marked in diagrams unless necessary.

The three configurations in (24) produce surface clusters of two consonants. However, it is possible that neither IO nor PG can be contracted. Let us recollect that, for IO to be held, two conditions must be met. First, there must be a complexity slope between the governor and the governee, i.e. the governor must be more complex (or, at least, not less complex) than the governee. Cross-linguistically, obstruents (T) are typical governors, while sonorants (R) and [s] are classic governees. Second, the nucleus which follows IO must be able to license this relation (Charette 1990; Cyran 2003). Depending on the phonological system, the government-licensing nucleus may be a full vowel (V), a schwa [ə] or an empty nuclear slot (ϕ). If either of these conditions is not fulfilled, an epenthetic vowel splits the cluster, i.e. the nucleus unlicensed by IO must be phonetically realized unless it can be properly governed. As regards Proper Government, the properly governing nucleus must contain a vowel. If this condition is not met, also an epenthetic vowel must surface between the cluster members.

3.2.2. The element representations of Old Irish consonants

Let us first consider the element structures of Old Irish consonantal segments, both radical and lenited, repeated below for convenience. The primes employed are: U – labial, H – voiceless, ? – stop, A-I – dental, N – nasal, @ – velar.

(25)	Fortis stop	→	Fricative		Lenis stop	→	Fricative
	p (U, ?, H)	→	f (U, H)		b (U, ?)	→	v (U)
	t (A-I, ?, H)	→	θ (A-I, H)		d (A-I, ?)	→	ð (A-I)
	k (@, ?, H)	→	χ (@, H)		g (@, ?)	→	ɣ (@)
					m (U, ?, N)	→	ṽ (U, N)

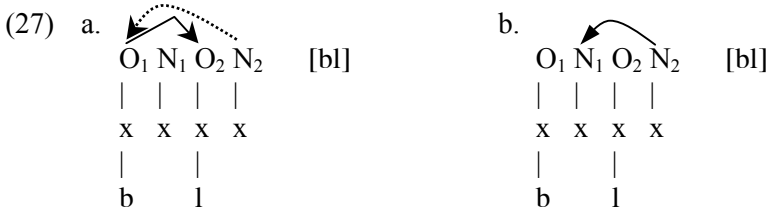
It is clear from the table above that the stops become corresponding fricatives and lose the stopness element when lenited. The other segments which can display strong or weak variants are as follows (the prime (A) stands for ‘alveolar’):

(26)	<i>Fricatives</i>		<i>Sonorants</i>
	s (<u>A</u> , H) → h (H)		N (<u>A</u> -I, N) vs. n (A-I, N)
	f (<u>U</u> , H) → φ		L (<u>A</u> , ?) vs. l (A, ?)
			R (<u>A</u>) vs. r (A)

For reasons specified in Chapter Two, only the spirants, that is [s] and [f], can be said to take part in the process of lenition. The sonorants do not undergo weakening. When in clusters, they simply display tense variants before coronal obstruents or after [s], while they surface as lax in the vicinity of other consonants. Therefore, there are no arrows (→) indicating the process of lenition in the case of resonants in (26). In the ensuing sections we will be using these element complexities with a view to discovering the presence or absence of interonset governing relations between segments.

3.2.3. Word-initial stop+sonorant sequences

This section deals with stop+sonorant clusters found in word-initial position in Old Irish. Given that stops are classic governors while sonorants are typical governees, we may suspect that the relation of either type (24a) or (24c) is present here. In other words, that either RIO operates in these clusters or there is no IO. Hence, theoretically, any sequence such as [bl, tr, gn] etc. may have the following structures:



In the representation (27a) the governor [b] under (O₁) is indirectly licensed to govern the sonorant [l] under (O₂) by the nucleus (N₂). The nucleus (N₁), locked by the RIO relation (O₁O₂), is licensed by this relation to remain mute. In terms of the element make-up, the governor [b] is composed of (U, ?), while the governee is made out of (A, ?). This means that both the segments involved in the RIO relation are of equal complexity (2 elements each), which does not favour this

governing relation. In (27b) an alternative view is presented, namely that there is no IO between [b] and [l], and that Proper Government licenses (N_1).

If we opt for (27a), we must bear in mind that in all the stop+sonorant clusters the stops can be lenited to fricatives in weakening contexts. After lenition, the cluster [bl] surfaces as [vʎ], where the element structures of the cluster members are (\underline{U}) vs. (A, ?), respectively. This means that the potential governor [v] is less complex than the governee by one element. At this juncture, a few obvious questions arise. First, is such a situation theoretically possible? Second, can a governing relation be suspended due to the fact that the governor's element potential is depleted? Third, can a nominal governing segment undergo weakening?

From the theoretical point of view, the first two questions must be answered in the negative. The third one is of a more general nature in that it queries the possibility of weakening under government. In other words, it seems peculiar that a governing segment in an interonset relation may be weakened because (i) its governing abilities worsen, and (ii) its status within the relation should protect it from lenition.

In terms of logic, the answer to the third question must be 'no' as well because if weakening could affect a relation, this relation would need to cease to exist. It seems more likely that no governing relation existed when lenition took place and that this process applied to the left-hand cluster member in the same way as it did to single obstruents. In order to support the view that no government was present between segments in clusters like [bl] at the time of phonological lenition, we will go back to that prehistoric period. We will see which stop+sonorant sequences were the first to undergo weakening.

3.2.4. The chronology of lenition

The process of phonologically motivated lenition in the prehistory of Irish, as shown in Chapter Two, was not a simple and ephemeral phenomenon. Different consonantal segments underwent weakening at different periods of the language development. The following hypothetical chronology of events is based upon McCone (1996). The names of the relevant periods are repeated below:

(28)

PIE → PROTO-CELTIC → INSULAR CELTIC → PRIMITIVE IRISH → OLD IRISH

Briefly, during the Proto-Celtic (PC) period all the Celtic languages were one proto-language. Within the Insular Celtic (IC) epoch the Brittonic (e.g. Welsh) and Goidelic (e.g. Irish) languages spoken in the British Isles seem to have had much in common with each other, while during the Primitive Irish (PI) phase

Irish was already clearly different from Proto-Welsh. Each of these stages is important with respect to lenition, the details of which are presented below. In what follows, C=consonant, V=vowel, while R=resonant.

The first lenition, or Lenition I, occurred in Proto-Celtic and affected the voiced series of stops inherited from Proto-Indo-European. In particular, [b, d, g] were weakened to the corresponding fricatives [v, ð, ɣ] in word-medial position between vowels, i.e. ...VCV..., or after a vowel and before resonants such as [r, l, n, w, j], i.e. ...VCRV..., e.g.

(29) <i>PIE</i>	<i>PC</i>	<i>IC</i>	<i>PI</i>	<i>Old Irish</i>
*tegos	*teɣos	*teɣah	*teɣə	[tʰeɣ] <i>teg</i> – ‘house’
*ognos	*oɣnos	*oɣnah	*o:nə	[uan] <i>úan</i> – ‘lamb’

In Proto-Celtic the IE stop [g] is lenited to the fricative [ɣ] both intervocalically, e.g. *tegos → *teɣos, and between a vowel and the resonant [n], e.g. *ognos → *oɣnos. The subsequent developments do not concern us here although it is worth noting that the resulting Proto-Celtic cluster [ɣn] in *oɣnos did not survive into Old Irish, similarly to the majority of such sequences. It is also worth noting that, on the basis of indirect (Celtiberian) evidence, McCone (1996:86ff.) assumes that “Proto-Celtic probably did not tolerate postvocalic final stops”. This statement cannot be verified because no word in Proto-Celtic seems to have ended in a stop, but the possibility of lenition of word-final voiced stops should not be excluded at this stage. More doubtfully, the nasal [m] was lenited to the nasal fricative [ṽ] in this period too.

The second weakening, or Lenition II, occurred between Proto-Celtic and Insular Celtic. This process affected the voiced stops, that is [b, d, g] → [v, ð, ɣ], and [m] → [ṽ]. These stops were either single or followed by resonants. The difference between this lenition and that shown in (29) is that now the voiced stops are weakened across the word boundary as well. In other words, the context ...VCV... equals ...V#CV..., while ...VCRV... is now treated on a par with ...V#CRV..., e.g.

(30) <i>PIE</i>	<i>PC</i>	<i>IC</i>	<i>Old Irish</i>
*esjo g ^w re:hwo-	*esjo bra:wu-	*ehja vra:wu-	[ə 'vro:] <i>a bró</i> – ‘his quern’

In (30) above, the Proto-Celtic voiced stop [b], which originated from the IE [g^w], is weakened to the fricative [v] in *esjo bra:wu- → *ehja vra:wu- across the word boundary. During this stage of lenition, as illustrated by *esjo → *ehja, also the spirant [s] was weakened to [h] before a resonant (as well as

intervocally and word-finally). We will return to the lenition of this fricative later in this chapter.

Lenition III took place in Primitive Irish, that is, when the Irish and Welsh branches of Insular Celtic constituted separate primitive languages. During this phase the voiceless stops [t, k]⁴ underwent weakening to [θ, χ] in all the contexts already mentioned, and also word-finally, e.g.

(31) <i>PC</i>	<i>IC</i>	<i>PI</i>	<i>Old Irish</i>
*esjo tɛγos	*ehja tɛyah	*eja θeɣa	[ə 'θi'eɣ] <i>a theg</i> – ‘his house’
*esjo sk ^w etlom	*ehja sk ^w etlan	*eja skeθla	[ə 's ⁱ k ⁱ e:l] <i>a scél</i> – ‘his story’
*bereti	*beret	*bereθ	[b ⁱ er ⁱ] <i>:beir</i> – ‘(he) bears’ (3sg.conj.)

In Primitive Irish the Insular Celtic stop [t] is lenited to the spirant [θ] word-initially in *ehja tɛyah → *eja θeɣa, word-finally in *beret → *bereθ, and medially before the sonorant [l] in *sk^wetlan → *skeθla. It is worth noting that in the last two examples the resulting fricative did not survive into Old Irish, i.e. *bereθ → *bereh → *berə → [bⁱerⁱ], and *skeθla → *ske:l → [sⁱkⁱe:l]. In the case of *skeθla → *skehla → *ske:l, the change involved compensatory lengthening. Before Old Irish, [θ] was further lenited to [h] and dropped. In terms of the element make-up, we can see the decomposition of (A-I, H) into (H) and, later, (H) to (_).

To sum up, lenition had three major stages in the prehistory of Irish. During the first phase, medial voiced stops were weakened, before both vowels and resonants. During the second wave, word boundaries ceased to matter to this phonological process, while the third stage led to the spirantization of voiceless stops. The following table shows the chronologically ordered leniting contexts.

(32)

I. ...VC _(voiced) V...	and ...VC _(voiced) RV...	and possibly ...VC _(voiced) #
II. ...V#C _(voiced) V...	and ...V#C _(voiced) RV...	
III. ...V(#)C _(voiceless) V...	and ...V(#)C _(voiceless) RV...	and ...VC _(voiceless) #

We can see above that during the first two stages the initial obstruents in clusters composed of voiced stops followed by sonorants underwent lenition, e.g. [dr] → [ðr], while their voiceless counterparts were still perceived as stop+sonorant clusters, e.g. [tr] even in weakening contexts. This may mean that, during Leni-

⁴ Let us recall that at that time there voiceless labial [p], lost in Proto-Celtic, had not yet been reintroduced into the system of Irish.

tion I and Lenition II, [tr] was still a governing relation, while [dr] was not, which allowed the weakening process to affect only [dr].

While describing Lenition II above, it was mentioned that at that stage the fricative [s] underwent weakening to [h] word-finally, intervocalically (also probably between vowels and resonants) and across the word boundary. On the other hand, no lenition ever affected [s] before voiceless stops, e.g. *esjo sk^wetlom → *ehja sk^wetlan → *eja skeθla → [ə 'sⁱkⁱe:l] *a scél* – ‘his story’.

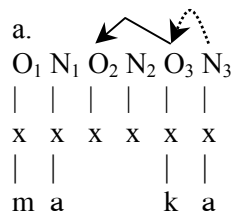
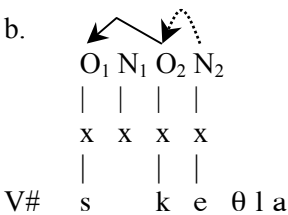
Apart from *s*+voiceless stop clusters, the other noticeable group which never underwent weakening were geminates, both voiced and voiceless, e.g.

(33) <i>PC</i>	<i>IC</i>	<i>PI</i>	<i>Old Irish</i>
*mak ^w k ^w os	*mak ^w k ^w ah	*makka	[mak] <i>macc</i> – ‘boy’
*biggos	*biggah	*beggā	[b ⁱ eg] <i>becc</i> – ‘small’

The fact that these two groups, that is geminates and *s*+voiceless stop sequences, preserved their shape despite omnipresent lenition may suggest that they displayed phonological structures which protected them against weakening. We will consider the possibilities of representing these structures below.

3.2.5. Structures for geminates and *s*+stop clusters

As mentioned in the introduction to the present GP analysis, sequences of consonants can be represented as ones displaying governing relations such as RIO and LIO, or ones contracting no relation. It is typically assumed in GP that both geminates and *s*+consonant groups belong to the same type (Kaye 1996), which in CV versions of the theory (e.g. Cyran 2003) is referred to as LIO. Consider the following representations of the pre-Old Irish forms containing geminates (34a) and *s*+consonant clusters (34b), based on the assumption that they represent the LIO type. The forms *makka – ‘boy’ and *eja skeθla – ‘his story’ will serve as examples.

(34) a.		b.	
	O ₁ N ₁ O ₂ N ₂ O ₃ N ₃		O ₁ N ₁ O ₂ N ₂
	x x x x x x		x x x x
	m a k a		V# s k e θ l a

In (34a) the onset (O₃), licensed by (N₃), governs the slot (O₂). By the same token, the onset (O₂), licensed by (N₂), governs (O₁) in (34b). The LIO relation

licenses the intervening nuclei, that is (N_2) in (34a) and (N_1) in (34b), and ensures that neither the first part of the geminate in (34a), nor the fricative [s] in (34b) undergo lenition and that we do not obtain the incorrect **mayka* and **eja hkeθla*, respectively.⁵ To put it briefly, the governing relations shown above ‘protect’ their members against lenition. Let us recall that earlier we reached a similar conclusion on logical grounds.

Taking into account the fact that *s*+consonant sequences, whose phonological structure is formally similar to that of geminates, are the only word-initial clusters which resist weakening, we may suppose that the structure of all the other consonant groups occurring in this position must considerably differ from those in (34). In particular, all the other consonant clusters word-initially must not be governing relations. This possibility will be entertained in the following section.

3.2.6. Structures for stop+sonorant clusters

3.2.6.1. Decomposition of RIO in voiced stop+sonorant sequences

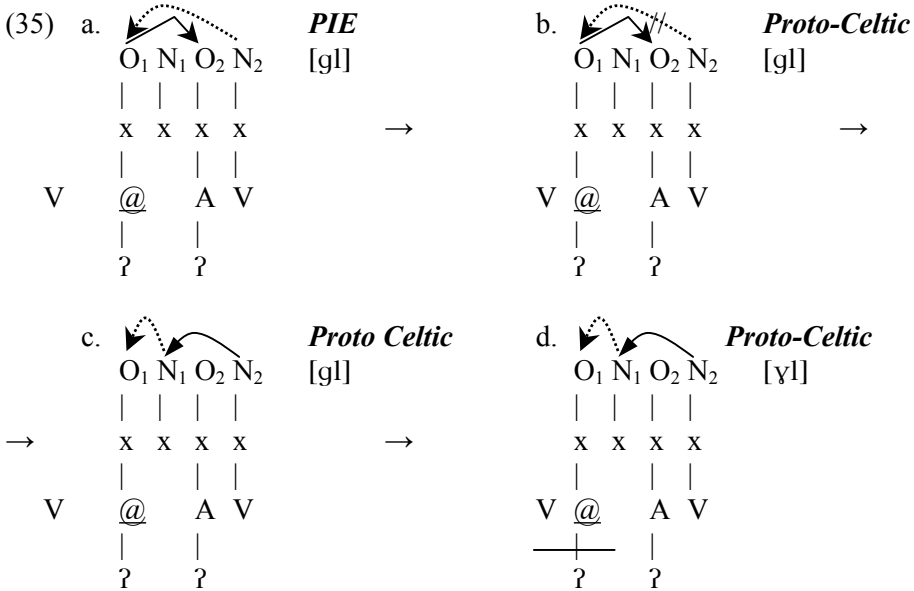
In the preceding section we concluded that a LIO governing relation protects consonants participating in it from weakening. We also assumed that any governing relation should have the same effect. Now, bearing this assumption in mind, we will turn to voiced stop+sonorant sequences, which underwent lenition at different stages, as sketched in (3.2.4.).

The historical development of lenition shown in (3.2.4.) sheds much light on this issue. In particular, the first segments to undergo lenition in stop+sonorant clusters were the voiced stops, which are weaker than their voiceless congeners by one prime, namely (H), as proposed in (3.2.2.). These voiced segments were by and large equal to the sonorants in terms of elements, e.g. in the cluster [gl] the structures are (@, ?) and (A, ?), respectively. Taking it for granted that every consonant must be licensed by the following nucleus and every consonant cluster must be government-licensed by a sufficiently strong nucleus, and that the licensing abilities of nuclei are language-specific, the following interpretation of the reason why lenition ever took place in Proto-Celtic may be proposed.

Although the Proto-Indo-European cluster [gl] *may* have entered the period of Proto-Celtic as a RIO relation, we may assume that the decomposition of this structure took place due to the fact that in the new system the governor was not viewed as complex enough. In other words, the PIE nuclei which licensed IO governing relations were capable of granting government-licensing to shallow complexity clusters. When these clusters entered a new phonological system, the

⁵ Hayes (1986) argues that true geminates are inalterable because the same melodic material is linked to two positions.

nuclei in that system had different government-licensing abilities. As a result, some of the previous RIO relations were reinterpreted as sequences of independent onsets. This is illustrated below:



In (35a) the governor (O_1), sanctioned by (N_2), governs (O_2) via RIO. Both the governor [g] and the governee [l] have two elements, but in this PIE phonological system such relations seem to be licit. In other words, the nucleus following such a cluster is able to indirectly license a RIO relation contracted between the segments of equal complexity.⁶ Additionally, the RIO relation sanctions the nucleus (N_1) to remain mute.

The Proto-Celtic situation, shown in (35b), is different. The licensing properties of nuclei sanctioning RIO relations have changed in the new system.⁷ The nucleus (N_2) is now unable to license indirectly the potential governor (O_1) if this segment is not more complex than the potential governee (O_2). As a result, a break-up of RIO takes place and the nucleus (N_1) remains unlicensed. Now, in order to remain silent, it must be sanctioned in a different way. This ‘predicament’ must not last long and soon Proper Government takes over the licensing of

⁶ It is not unlikely that the element (h) defining ‘noise’ was present in PIE, in which case RIO relations would have been more tenable in that system.

⁷ Later in this chapter we will see that the government-licensing power of nuclei in Irish was growing weaker since PIE until Old Irish (and even later).

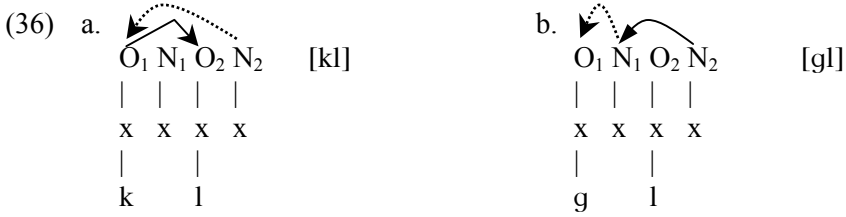
the empty position (N_1), which is shown in (35c). The position (O_1) is licensed by the empty (N_1). Now the left-hand member of the previous cluster is ready for lenition, which takes place in (35d). The weakening consists in the suppression of the stopness element (?).

It is worth recalling that the clusters like [gl] first started to decompose as RIO structures in word-medial position (Lenition I), e.g. *ognos → *oγnos – ‘lamb’. Later on (Lenition II), the same word-initial clusters followed suit and began to be perceived as sequences of independent onsets. In other words, the context ...VC(R)V... influenced the context ...V#C(R)V... . This development must have occurred due to the reinterpretation of phonological phrases. Close syntactic groups began to constitute phonological phrases, e.g. in *esjo bra:wu- → *ehja vra:wu- → [ə vro:] a bró – ‘his quern’ the phrase *esjo bra:wu- was initially composed of two phonological words, i.e. *esjo and *bra:wu-, which were subsequently reinterpreted as one phrase (or one ‘syntagm’ as Oftedal (1985) calls it). At the same time, clusters composed of sonorants preceded by voiceless stops were still RIO structures because the nuclei following these sequences were able to license steep complexity relations, e.g. the structure of [kl] equals (@, ?, H) vs. (A, ?).

3.2.6.2. Lenition of intervocalic voiced stops

What also needs to be discussed here is the reason why single (i.e. intervocalic) voiced stops were weakened as a result of Lenition I and Lenition II (3.2.4), e.g. (PIE) *tegos → (Proto-Celtic) *teγos → [t¹eγ] teg – ‘house’ while the single voiceless stops remained intact at those stages, e.g. *to:teH → *to:ta: → [tuaθ] túath – ‘tribe’.⁸ There may be at least two logical hypotheses connected with this issue. First, that the voiced stops were elementally weak as compared to their voiceless congeners, e.g. [g] = (@, ?), while [k] = (@, ?, H). Thus, the weaker segment (voiced) is more prone to weakening than the stronger one (voiceless). Second, that the lenition of voiced stops did not begin in single stops, e.g. [g], but in clusters, e.g. [gl]. Strange as it may seem, this assumption is not totally ad hoc because it can be structurally supported. In particular, the Proto-Celtic break-up of RIO relations in sequences like [gl] caused the situation shown in (36b), while the preservation of RIO in clusters like [kl] resulted in the state of affairs represented in (36a) below.

⁸ Here, the symbol *H stands for a PIE laryngeal.



In (36a) a RIO relation is contracted between (O_1) and (O_2), unlike in (36b). A major consequence of this difference is the licensing of the empty nucleus (N_1). In particular, in (36a) this empty slot is sandwiched between the RIO members and licensed by this relation, which, in turn, is government-licensed by (N_2). In other words, (N_1) is ‘locked’ or ‘buried’ by a governing relation. On the other hand, (N_1) in (36b) is not buried, it is properly governed by the following nuclear slot (N_2), and it is now the licenser for (O_1). As for the contexts in which the two stops occur, the consonant [k] in (36a) finds itself between a vowel and a buried empty nucleus, while [g] in (36b) is positioned between a vowel and an empty nucleus. Moreover, [k] receives licensing from the full vowel under (N_2). Thus, the contexts in which [k] and [g] find themselves are different.

Let us emphasize, then, that at this stage the Irish system began to recognize a difference between the (government)-licensing power of full vowels and empty nuclei.

3.2.6.3. Definition of a leniting context

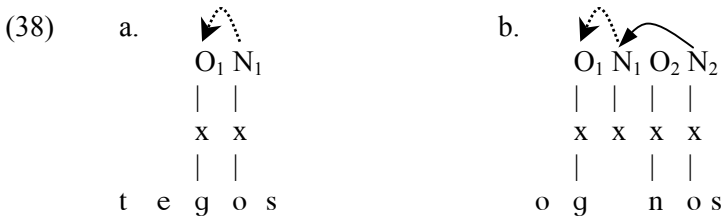
All this may lead us to the following working hypothesis which may facilitate our understanding of the nature of lenition. Given that (N_1) in (36a) is licensed by RIO just like the nucleus within *s*+consonant clusters and geminate consonants which do not undergo weakening is licensed by LIO, as proposed in (34), we may suppose that the empty slots licensed by IO relations are different from those which are sanctioned by Proper Government. Such an assumption is not revolutionary. Scheer (1998), Szigetvári (2000) and Cyran (2003), among others, also maintain that empty nuclei locked within interonset governing relations play no part in phonology, unlike word-final empty nuclei and word-internal empty nuclear slots licensed by Proper Government. If we follow this line of reasoning, we obtain the following contexts for lenition (listed chronologically):

- (37)
- a. V_ϕ between a vowel and an empty nucleus (where the empty nucleus is not locked by an IO governing relation, i.e. ‘unburied’)
- b. V_V between vowels

This (chrono)logical interpretation of the occurrence of leniting contexts is in accordance with McCone’s (1996) assumption that the lenition of voiced stops may have occurred in word-final position (i.e. before an empty nucleus) as early as in Proto-Celtic, although this system apparently did not inherit words ending in voiced stops. If the voiced stops were lenitable before an empty nucleus, then the decomposition of RIO structures which placed them in exactly that position caused their weakening to fricatives.

3.2.6.4. Detailed chronology of lenition

Given the two contexts for lenition in (37), one may wonder why the intervocalic context in (37b) should be treated on a par with the one in (37a), that is, between a vowel and an empty nucleus. The licenser for every onset is the following nucleus and the licensing abilities of vowels should naturally be greater than those of empty nuclear slots (Charette 1990; Cyran 2003). Consequently, the lenition of a segment followed by an empty nucleus should occur earlier than the weakening of a consonant preceding a vowel. Consider the following structures which show the licensing of a voiced stop by a vowel (38a), as in *tegos – ‘house’, contrasted with that where the stops is licensed by an empty nucleus (38b), as in *ognos – ‘lamb’.



In (38a) the segment [g] under (O₁) is licensed by a full vowel [o] under (N₁), while [g] under (O₁) in (38b) receives licensing from an empty nucleus (N₁), which is properly governed by (N₂). Given these structures, the vowel [o] under (N₁) in (38a) must be more capable of licensing the preceding stop than the empty nucleus (N₁) in (38b). Thus, it is only logical to imagine that the first lenition affected those voiced stops which preceded empty nuclei because the licensing potential of these nuclear positions was the smallest. The weakening of single intervocalic stops must have occurred later, when the licensing potential of vowels following these stops was reduced to the level represented by empty nuclei or, at least, smaller than that of stressed vowels. Given that stress was probably initial in Proto-Celtic, the vowels following single medial stops were unstressed. Later still, the stressed (left-hand) vowels also lost their power to license the

preceding voiced stops. Thus, the stages of lenition offered (3.2.4.) need to be made more detailed. Let us summarize this chronological hypothesis below (V stands for vowels, 'V for stressed vowels, R represents resonants, while \emptyset denotes 'unburied' empty nuclei):

(39)

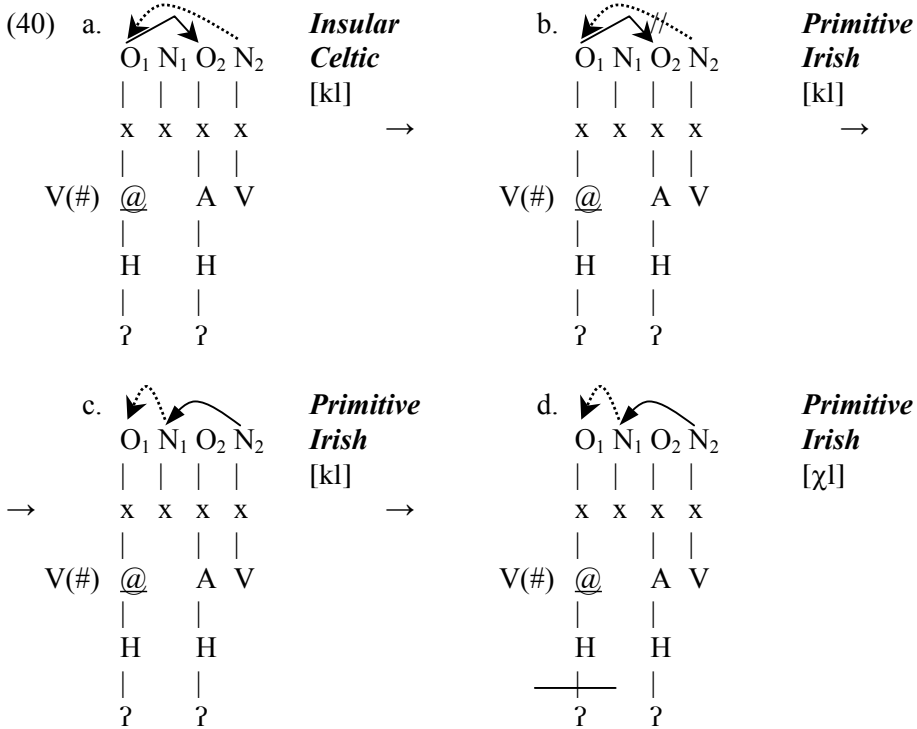
PROCESS	TARGET	CONTEXT	EXAMPLE
Lenition I. a.	<i>Voiced stops</i>	V \emptyset RV	*ognos → *oɣnos – 'lamb'
Lenition I. b.	<i>Voiced stops</i>	V \emptyset V	*tegos → *teɣos – 'house'
Lenition II. a.	<i>Voiced stops</i>	V# \emptyset R'V	*esjo bra:wu- → *ehja vra:wu- – 'his quern'
Lenition II. b.	<i>Voiced stops</i>	V# \emptyset 'V	*esjo bena → *ehja vena – 'his woman'

This chronology is more logical from the viewpoint of the licensing abilities of nuclei. Lenition first occurs before empty nuclei, then in front of unstressed vowels, and finally before stressed vowels. Obviously, here the term 'stressed vowel' refers to only those nuclei that occurred in lexical items which immediately followed other vowel-final items in close syntactic groups. Thus, the stressed nucleus in, say, *bra:tir → *bra:θir – 'brother', does not qualify as a stressed vowel which lost its licensing potential because both in this word alone and in the phrase *sindos bra:tir → *indah bra:θir – 'the brother' the context is not intervocalic, unlike in *esjo bra:tir → *ehja vra:θir – 'his brother'.

3.2.6.5. Lenition of voiceless stops

Now let us turn to the lenition of fortis stops, both single and in stop+sonorant clusters. It was shown in (3.2.4.) that Lenition III took place in Primitive Irish.

Before this lenition, all the clusters composed of voiced stops followed by resonants had not been RIO relations, which resulted in the weakening of these stops if they occurred between vowels and empty nuclei, both word-medially and initially. On the other hand, all the sequences of voiceless stops preceding sonorants had been well-formed RIO domains. At some point the phonological system started to view the latter sequences as incongruous, as a result of which they began to be treated on a par with the former group. Simultaneously, the single voiceless stops were also viewed as lenition targets. Apparently, these developments had much to do with the continually diminishing power of nuclei whose role was to license both RIO relations and single stops. Therefore, the previously well-formed RIO domains started to decompose. This is shown below:



The development in (40) above is a perfect reflection of the changes shown in (35). The nucleus (N₂) in (40a) is able to indirectly license the RIO relation (O₁O₂), which sanctions the nucleus (N₁) to remain inaudible. This is the state of affairs in Insular Celtic. In (40b), which illustrates the situation in Primitive Irish, the nuclear slot (N₂) cannot license RIO any longer, as a result of which the break-up of this relation takes place. This entails the need for Proper Government (40c) to take over the licensing of (N₁). As a consequence, (N₁) changes its status from a buried empty nucleus to an empty nuclear point which is the licensor for its onset [k]. However, it is unable to support all the elements, due to which the lenition of [k] to [χ] occurs, as shown in (40d).

The assumption that we should treat the word-medial unburied nuclei on a par with word-final empty nuclear slots can be confirmed by the way the latter behave with respect to lenition, which is exemplified by Insular Celtic *beret vs. Primitive Irish *bereθ – ‘(he) bears’. This validates the view that buried empty nuclei are invisible to the phonological structure, while those which are properly governed and those which are word-final perform the same phonological function. In particular, they both can license the preceding onsets and they both act in the same way in leniting contexts.

To sum up this section: the process of lenition, which was launched as early as the Proto-Celtic era, developed gradually all the way down to Primitive Irish. It has been argued above that the initial reason for the Proto-Celtic lenition of voiced stops was the decomposition of shallow complexity RIO structures, e.g. [gl]. Due to this, the voiced stops found themselves followed by empty nuclei whose licensing power was insufficient to support the stopness element in these stops (Lenition Ia). The successive stages of this process were closely connected with the licensing properties of nuclei. First, the unstressed vowels joined empty nuclei in their inability to license lenis stops (Lenition Ib). Then, stressed vowels became unable to license both shallow complexity clusters (Lenition IIa) and single voiced stops (Lenition IIb). A few centuries later even the clusters previously treated as well-formed RIO sequences (fortis stops+sonorants) followed suit and started decomposing. The resulting Primitive Irish weakening (Lenition III) was a consequence of the gradually diminishing licensing potential of nuclei.

3.2.7. *The development of s+sonorant clusters*

The fricative [s] underwent weakening to [h] in Insular Celtic. This lenition occurred intervocalically (also across word boundaries), word-finally (i.e. between a vowel and an empty nucleus), also most probably, before the sonorants [r, l, n] and, perhaps, in front of [m]. Let us first consider the developments which probably prefaced this lenition.

In Proto-Celtic the intervocalic sequences **-sm-* and **-sn-* were assimilated to **-mm-* and **-nn-*, respectively. The other two intervocalic clusters, that is **-sl-* and **-sr-* were also simplified to **-ll-* and **-rr-*, respectively, between Proto-Celtic and Insular Celtic (McCone 1996:45ff.). Word-initial clusters **sn-*, **sl-*, **sr-* and **sm-* remained unchanged until Insular Celtic. During this period two processes took place. In particular, the sonorants [r, l, n] were strengthened (tensed) to [R, L, N] in word-initial position and after the initial [s] in non-leniting contexts, while the clusters **sn-*, **sl-*, **sr-* and, much less obviously **sm-*, were weakened to **hn-*, **hl-*, **hr-* (and possibly **hm-*), respectively, in leniting environments. Let us recall that the leniting contexts were after vowels which terminated the preceding, closely connected words.

The Proto-Celtic simplification of the word-medial *s+sonorant* sequences indicates that no governing relation was present between [s] and the following sonorant, as a result of which the fricative found itself in a typical leniting context specified in (37a), namely between a vowel and an empty nucleus which was not locked by a governing domain. This development is exemplified below:

(41)	<i>PC/IC</i>	<i>Old Irish</i>
	IE *kosolo- → *koslo- → (*kohlo-)? → *kollo-	→ [koL] <i>coll</i> – ‘hazel’

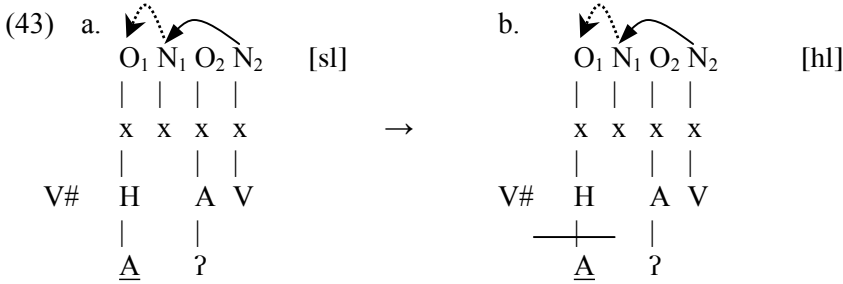
It is impossible to state exactly what the weakening of [s] between the forms such as *koslo- and *kollo- looked like but, given that the typical leniting context V_∅ was available, we may suspect that [s] was either deleted straightaway or transformed into [h] for some time before the assimilation into *-ll-. In any event, the cluster *-sl- gave way to the geminate *-ll-.

The subsequent Insular Celtic development was puzzling in the light of what we have just seen. The word-initial *sl- (and the remaining clusters of this type) were lenited to *-hl- when following a vowel of a closely connected preceding word. When not preceded by a such a vowel, *sl- was allegedly strengthened to *sL-. It should be noted that this transformation of *sl- into *sL- cannot be dated with certainty. Scholars of Old Irish assume that in non-weakening environments [s] preceded tense resonants (Thurneysen 1946; McCone 1996), which is also the case in some dialects of Modern Irish (Ó Siadhail 1989:92ff.). This tenseness may be due to the so-called homorganicity factor, since all the sonorants and [s] are coronals. Consider the reconstructed developments in leniting (42a) and non-leniting (42b) contexts based on the chronology proposed by McCone (1996). The prehistoric versions of [ə 'hlo:ɣ] *a slóg* – ‘his army’ and [ə 'sLo:ɣ] *a slóg* – ‘her army’ serve as examples.

(42)	<i>Stage I</i>	<i>Stage II</i>	<i>Stage III</i>	<i>Old Irish</i>
a.	*esjo slo:ɣos	*ehja hlo:ɣah	*eja hlo:ɣa	[ə 'hlo:ɣ] – ‘his army’
b.	*esja:s slo:ɣos	*ehja:h sLo:ɣah	*eja: sLo:ɣa	[ə 'sLo:ɣ] – ‘her army’

Stage I shows the state of affairs in Proto-Celtic. The word-initial cluster *sl- is the same in both the contexts. At Stage II we can observe the lenition of the cluster to *hl- in the leniting context in (42a). Simultaneously, the same cluster is transformed into *sL- in a no-mutation (i.e. *h*-prefixing) context in (42b). It should be emphasized again that the change into *sL- in (42b) is hypothetical. It is not unlikely to assume that this tensing occurred when the pronoun-final segment was still [s], i.e. *esja:s slo:ɣos → *esja:s sLo:ɣos.

The lenition of *sl- to *hl- can be accounted for as a regular development in a typical leniting context. This is illustrated below.



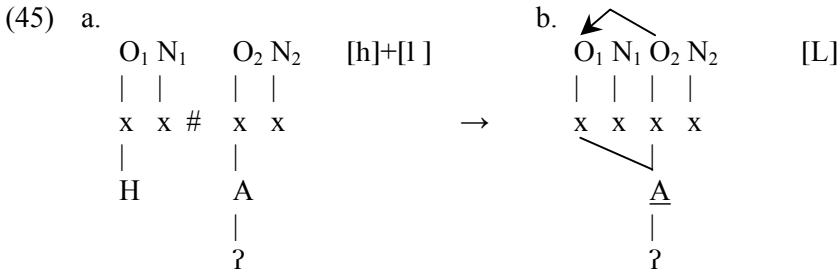
In (43a) there is no IO relation between (O₂) and (O₁). Thus, the fricative [s] under (O₁) finds itself in the leniting context V_ϕ, i.e. between a vowel and an unburied empty nucleus, as proposed in (37a). The lenition of this segment to [h], viewed as the delinking of (A), is represented in (43b).

If we now turn to the strengthening of the sonorant and the development of *sL- in non-weakening environments, as exemplified in (42b), it must be admitted that this change escapes straightforward explanation.

In Chapter Two it was argued that the tensing of word-initial resonants in non-leniting contexts took place in Primitive Irish when the previously lenited [s], that is [h], was dropped. When that happened, the deleting segment left an empty position which was taken over by the following sonorant. One relevant example is repeated below:

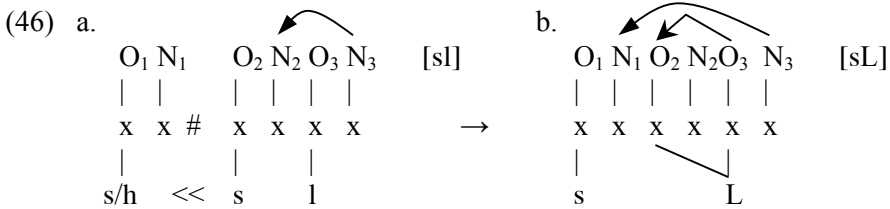
- (44) *Stage I* *Stage II* *Stage III* *Old Irish*
 *esja:s la:ma: *ehja:h la:~va: *eja: La:~va: [ə 'La:~v] a (l)lám – ‘her hand’

The most important in this sequence of events is the transition between Stage II and Stage III. At this point the pronoun-final [h] is dropped and the noun-initial sonorant is tensed or geminated at the expense of the deleting spirant. This interpretation is totally hypothetical because there is no evidence that the word-initial [l] was tensed between Stages II and III and not between Stages I and II. The only argument supporting this analysis is that in Old Irish the initial liquid was optionally doubled in writing, which may have denoted gemination. Now, the only conceivable period for gemination seems to be when the final segment of the closely connected preceding word is dropped. This development is repeated below for convenience.



In (45a) the pronoun-final [h] is linked to (O₁), while the lax [l] is associated with (O₂). In (45b) the fricative delinks and vacates the onset (O₁). The sonorant takes over this position, i.e. LIO is contracted, which results in gemination and tensing. Thus, this analysis works for the tensing of word-initial sonorants, but it does not seem very helpful if we wish to explain the tensing of sonorants after [s]. We cannot exclude that this tensing was not a truly phonological process.

In Chapter Two we particularly emphasized that the tensing of resonants is, in our analysis, very closely connected with gemination. Given the change of *esja:s slo:gos → *ehja:h sLo:yah – ‘her army’ in (42b), or perhaps even an earlier change of *esja:s slo:gos → *esja:s sLo:ryos, it is not impossible to assume that the resonant [l] was geminated to [L] indeed, and that the fricative [s], which was present before [L], was ‘pushed’ leftwards and joined the preceding pronoun, which also historically ended in [s]. This hypothesis is graphically represented below.



In (46a) lax liquid [l] is linked to the onset (O₃), the preceding [s] to (O₂), while the pronoun-final [s] or [h] (it is impossible to ascertain if lenition has already taken place) is associated with (O₁). The nucleus (N₃) properly governs (N₂). As a result of removing morphological boundaries, the liquid geminates at the expense of (O₂). The spirant [s], finding a mirror image segment in the preceding onset (O₁), joins it, thus making room for the liquid to geminate. The nucleus (N₂) is now buried by LIO, while (N₁) must be properly governed by (N₃).

To conclude, the lenition of [s] in s+resonant clusters indicates that no government was present between these segments. Note that [s] was weakened in a

regular lenition site specified in (37a), that is, between a vowel and an empty unburied nucleus. As regards the tensing of lax sonorants which followed [s] in non-leniting contexts, the option presented above leaves much to be desired. Unfortunately, no more plausible answer can be offered at this stage of research.

3.2.8. *f+liquid clusters in prehistory*

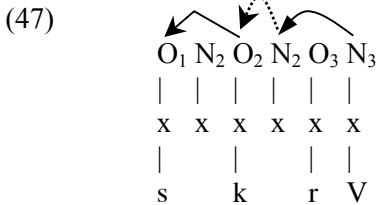
The Old Irish word-initial *f+liquid* clusters, that is [fl] and [fr], have a very short history. Before Primitive Irish, these sequences were composed of the glide [w] followed by liquids, e.g. *writgarijan → *wreggareja → *wregare → [fⁱrⁱegre] *frecae* – ‘answer’. Roughly in the middle of Primitive Irish, all the word-initial *w’s (including those which were context-free) started to be replaced by [f] under the influence of non-leniting contexts. For example, as described in detail in Chapter Two, the context-dependent change of [w] to [f] in the nominative singular preceded by a definite article, i.e. *iNdah werah → *iNda fera → [iNⁱfⁱer] *in fer* – ‘the man’ (where the fusion of [w] and [h] resulted in the appearance of [f]) influenced the context-independent nominative singular, i.e. *werah → *wera → *wer (but in Classical Old Irish [fⁱer]). Briefly, the change of [w] → [f] was only sometimes phonologically motivated and yet the replacement on a large scale occurred soon afterwards. Before this happened, the lenition of [w] to \emptyset was established, e.g. *iNdi: wiri: → *iNdi wiri → [iNⁱ’dⁱirⁱ] *ind fir* – ‘of the man’-gen.sg.

The situation in *w+liquid* sequences was exactly the same as in the cases just presented. The labial glide was lenited to \emptyset in weakening contexts. The liquid remained as the actual phonetic word beginning, which can be exemplified by the Old Irish [frayⁱ] *fraig* vs. [mə’raYⁱ] *mo fraig* – ‘wall’/‘my wall’. The fact that the word-initial glide was lenited, similarly to word-initial stops in stop+sonorant sequences, e.g. [kr] → [χr], indicates that no governing relation was present between [w] and the following liquid. Since such a relation was absent, the weakening of the glide took place and the phonetic zero resulted if [w] found itself in a lenition context V_ \emptyset , that is between a vowel and an empty nucleus. In non-leniting contexts, the sequence *w+liquid* remained until it was systemically replaced by the *f+liquid* cluster.

In this section we have seen that, although the clusters composed of *f+liquid* had different origins than stop+sonorant sequences, the phonological behaviour of these two groups was alike. In particular, the lack of a governing relation between the initial obstruent and the following resonant led to the possibility of lenition of the obstruent in weakening contexts.

3.2.9. *s+cluster combinations*

A word should also be said about the word-initial *s+stop+liquid* clusters, which are found in, e.g. [sⁱkⁱrⁱ:n] *scrín* – ‘shrine’. Items like these, except perhaps [skr], are almost exclusively loanwords borrowed when all the mutations had been lexicalized, i.e. no longer phonologically motivated. Nevertheless, given that *s+stop* sequences are viewed here as classic examples of LIO, while there is no relation between the stop and the following sonorant in binary combinations, we may propose that the structure of every *s+cluster* combination is represented as follows ([skr] serves as an example):



In this representation LIO is contracted between the governor (O₂) and the governee (O₁), where the whole relation is licensed by the unburied empty nucleus (N₂) which, in turn, is properly governed by (N₃). No relationship holds between (O₂) and (O₃), similarly to what can be seen in binary stop+sonorant sequences.

The assumption that a LIO relation contracted between [s] and a following voiceless stop is licensed by an empty nuclear position can be confirmed by the fact that clusters such as [sk] or [st], occur word-finally as well, e.g. [tⁱesⁱtⁱ] *teist* – ‘testimony’ and [Resk] *resc* – ‘talk’, where the domain-final empty nucleus can be treated as their LIO-licenser.

Therefore, the word-initial ternary combinations composed of *s+stop+liquid* are realizations of phonological structures occurring in binary clusters. In other words, every *s+stop+liquid* sequence is viewed as a cluster composed of *s+stop*, i.e. a LIO relation, the liquid being irrelevant to the structure.

3.2.10. *Word-initial clusters – summary*

Above it has been demonstrated that the behaviour of word-initial clusters with respect to lenition can be indicative of their phonological structure. Lenition has been viewed as a prehistoric phonological process affecting a single consonant between two melodically filled nuclei, i.e. V_V, or between a vowel and an unburied empty nucleus, i.e. V_∅. Theoretically, once two consecutive consonants (C₁) and (C₂) contract an interonset relation (IO) in either direction, neither (C₁) nor (C₂) find themselves in a leniting context. It is in this respect that we may

say that government ‘protects’ from lenition. What IO does, however, is merely an elimination of the phonological context for lenition. IO can be contracted only if the substantive complexity condition is met and if the following nucleus is able to prosodically license the preceding governing relation.

On the basis of the above assumptions we can propose a correlation between the element complexity of cluster members and the fact that lenis stop+sonorant sequences were the first to undergo weakening. In particular, it has been argued that shallow complexity rightward interonset relations (RIO), e.g. [gn], were broken-up in Proto-Celtic due to the diminishing government-licensing power of the following unstressed nuclei. As a result, the lenis stops found themselves in the lenition context $V_∅$. Under the influence of lenition in this context, these stops were weakened also in the other context, that is V_V . The gradually diminishing licensing capability of nuclei has been held responsible for the break-up of previously well-formed RIO structures, e.g. [tr], in Primitive Irish, which led to the lenition of the voiceless stops in these clusters. By analogy, single voiceless obstruents were lenited as well. The inevitable logical conclusion is that no RIO relation seems to be present in Old Irish.

s+obstruent clusters, e.g. [sk], were the only ones which resisted lenition. In the light of our assumptions, it should be proposed that these clusters are representatives of the leftward interonset relation (LIO). Being involved in LIO, neither of the cluster members finds itself in a lenition context and remains radical.

3.2.11. Rising-sonority word-medial clusters

Word-medial rising sonority clusters, that is, consonant sequences similar to those occurring word-initially, are few and far between in Old Irish. Let us recall that these clusters fall into two types: (a) stops+lax sonorants and (b) fricatives+lax liquids. Representative cases are repeated below for convenience:

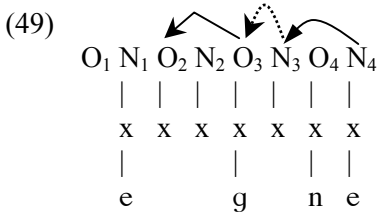
(48) a. STOP+SONORANT	b. FRICATIVE+LIQUID
[egne] <i>ecnae</i> – ‘wisdom’	[k ⁱ el ⁱ əvrəð ⁱ] <i>celebraid</i> – ‘bid farewell’
[oblu] <i>oblu</i> – ‘host’	[d ⁱ :θrəv] <i>dithrub</i> – ‘wilderness’

The clusters shown in (48b) resemble those which were formed after the lenition of original word-initial stop+sonorant sequences, e.g. *esjo bra:wu- → *esjo vra:wu- → [ə vro:] *a bró* – ‘his quern’. In prehistoric times, the Old Irish cluster [vr] in *celebraid* was also a stop+sonorant sequence, that is [br]. The fact that in Old Irish the liquid [r] is preceded by the fricative [v] indicates that the decomposition of RIO, if such a relation had ever existed in stop+sonorant sequences, took place in a regular fashion in the prehistory of Irish (most probably in Proto-

Celtic). In other words, the word-medial RIO relation was not present, as a result of which the original stop found itself in a classic lenition site: between a vowel and an empty nucleus, i.e. $V_ø$, and was lenited to the corresponding fricative, as shown in (3.2.6.).

More interestingly, the clusters in (48a) show no similarity to word-initial sequences undergoing lenition. It is impossible to find a stop+sonorant sequence like [gn] word-initially in a historical leniting context. Such a combination must be realized as a fricative+sonorant cluster [ɣn]. Quite unexpectedly, the word *ecnae* – ‘wisdom’ was pronounced with a stop, i.e. [egne], and not with a fricative, i.e. *[eɣne]. Thus, we are dealing either with an exception or with a form whose Old Irish shape is not indicative of its underlying phonological structure. In other words, the stop [g] may not be associated with one skeletal slot.

Thurneysen (1946:86ff.) argues that wherever prehistoric lenition of consonants did not take place in a regular way, gemination of these segments may have been one of the obstacles. In the case of *ecnae* – ‘wisdom’, Thurneysen proposes that its prehistoric version was *eg-gne, which means that the stop [g] was not single at the time of lenition. If this was the case, the governing relations in prehistoric times can be represented as follows:



The LIO relation between the governor (O₃) and the governee (O₂), both constituting a geminate, locks the nucleus (N₂) and ensures that the voiced stop is immune to lenition, i.e. that we do not obtain *[eɣne]. Let us recall that [g] would have undergone lenition only as a simplex onset. This LIO relation (O₃O₂) is licensed by (N₃) which is properly governed by (N₄). Moreover, no relation can be contracted between (O₃) and (O₄) because no RIO is present in the system.

Thus, the presence of word-medial clusters composed of stops followed by sonorants and fricatives preceding sonorants in Old Irish confirms the idea that every stop involved in a governing relation preserved its PIE shape, while it was lenited to a fricative when such a relation was missing.

3.2.12. Subsequent epenthesis in rising-sonority word-medial clusters

An interesting issue connected with rising-sonority word-medial clusters is their later behaviour. Their development after the period of Old Irish shows that they lost the status of clusters in some dialects (mainly in Munster). In other words, epenthetic vowels split consonant sequences in this position. This phenomenon, which is called secondary epenthesis,⁹ is exemplified below:

(50) <i>Old Irish</i>		<i>Modern Irish</i>
a. [egne] <i>ecnae</i>	– ‘wisdom’	[aɣənə] <i>eagna</i>
b. [aχrəN] <i>achrann</i>	– ‘thicket’	[aχərən] <i>achrann</i>

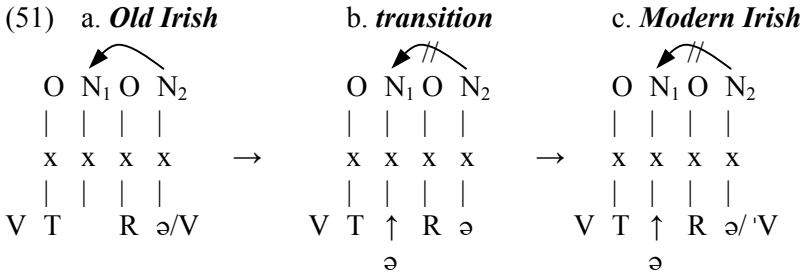
We remember from (3.2.11.) that in [egne] the velar stop survived lenition intact because it was a geminate during the weakening period, while the original [k] in the prehistoric version of [aχrəN] was lenited to [χ] due to a lack of IO between this stop and the following liquid. These two diverse prehistoric developments led to the difference between stop+liquid (50a) and fricative+liquid (50b) sequences in Old Irish. In some Modern Irish dialects, however, these two originally different structures behave in the same fashion with respect to epenthesis. Despite this word-internal epenthesis, word-initial clusters, both radical (stop+sonorant) and lenited (fricative+sonorant) by and large remain intact in Modern Irish, although there are a few exceptions, e.g. [dənu:s] *driús* – ‘lust’ (Ó Siadhail 1989:23).¹⁰ More interestingly, it does not seem to matter whether the clusters split by epenthetic vowels precede stressed or unstressed vowels, e.g. [madərə] *madra* – ‘dog’ (initial stress, i.e. before the split cluster [dr]) vs. [s¹aməro:g] *seamróg* – ‘shamrock’ (final stress, i.e. following the split cluster [mr]).

Without hypothesizing about the structure of these words in some dialects of Modern Irish, we can make the following observation concerning the nature of the historical development of obstruent+sonorant sequences. In Old Irish in both (50a) and (50b) the empty nucleus separating the obstruent from the following sonorant was properly governed by the next vowel. Afterwards, this unstressed nucleus apparently lost its power as a proper governor. Later still, stress ceased to be fixed to the initial syllable only and yet the majority of word-initial clusters resisted epenthesis. This may indicate that all the medial obstruent+sonorant clusters followed by unstressed vowels (i.e. schwas) were split by epenthetic vo-

⁹ The phenomenon of regular epenthesis in some dialects of Modern Irish is discussed below.

¹⁰ Apparently, such exceptions are typical of only some dialects. The example above comes from Ring, a variety of Munster Irish (Ó Siadhail 1989).

wels (i.e. schwas) and, when this phenomenon was generally established, also the non-initial clusters which preceded stressed vowels followed suit. This hypothesized development is proposed below (where V is a vowel, T stands for any obstruent and R for any sonorant):



In (51a) we can observe the non-initial stop/fricative+resonant cluster in Old Irish, where the empty nucleus (N₁) separating the cluster members is properly governed by the vowel under (N₂), e.g. [egne] *ecnae* – ‘wisdom’. At this point the stress is fixed to the initial syllable and the nucleus (N₂) is unstressed (V). After this stage the unstressed vowel (N₂) can no longer properly govern a preceding empty nucleus. This results from the gradually diminishing licensing power of nuclei in the Irish system since the Proto-Celtic period. As a consequence, an epenthetic vowel surfaces under (N₁) at the transition stage in (51b).¹¹ In Modern Irish in (51c), the status of the vowel following such a cluster is irrelevant: it can be stressed (‘V), e.g. [s¹amə’rɔ:g] *seamróg* – ‘shamrock’, or unstressed (V), e.g. [agənə] *eagna* – ‘wisdom’, because epenthesis has already been established between non-initial obstruent+sonorant sequences. As to Modern Irish epenthesis in word-initial clusters, e.g. [də’nu:s] *drúis* – ‘lust’, this exceptional phenomenon must be connected with the fact that clusters in some dialects (like in Ring above) are insensitive to which kind of vowel (i.e. stressed or unstressed) follows them because neither is a proper governor. In most dialects the stressed vowel can be a proper governor, while the phonetic schwa cannot.

To conclude, it has been hypothesized that Proper Government can be viewed as a phenomenon dependent on the prosodic strength of nuclei. In GP vowels can be proper governors while empty nuclei are not able to perform this task. The development of secondary epenthesis between the periods of Old Irish and Modern Irish indicates that schwas can be proper governors in some systems but not in others. This issue requires further investigation, however.

¹¹ The period between Old and Modern Irish is called ‘transition’ here because the exact dating of this phase cannot be offered at this stage.

3.2.13. The development of word-medial falling-sonority clusters

So far we have been following the assumption that governing relations must be contracted if they can. Thus, if certain segments are capable of governing others, they must do so, unless we discover the reasons why government can be questioned. In the case of word-initial and medial stop+sonorant clusters, which were deemed to be RIO relations at first, the main argument to disfavour RIO is the lenition of the potential governors. Now we will inspect the falling-sonority medial clusters which presumably display LIO governing relations.

To begin with, the Old Irish word-medial clusters fall into three types with respect to their subsequent development. This division can be schematized and exemplified as follows:

(52) CLUSTER TYPE	OLD IRISH	MODERN IRISH
a.		
(i) <i>Sonorant</i> +voiceless stop	[goRte] <i>gortae</i> – ‘famine’	– <i>no change</i> [gortə] <i>gorta</i>
(ii) <i>Voiceless spirant</i> +voiceless stop	[m ⁱ eske] <i>mescae</i> – ‘intoxication’ [s ⁱ N ⁱ eχte] <i>snechtae</i> – ‘snow’	– <i>no change</i> [m ⁱ es ⁱ k ⁱ ə] <i>meisce</i> [s ⁱ N ⁱ aχtə] <i>sneachta</i>
b.		
(i) <i>Sonorant</i> +voiced obstruent	[argəd] <i>argat</i> – ‘money’ [banv] <i>banb</i> – ‘piglet’	– <i>vowel epenthesis</i> [ar ⁱ g ⁱ əd] <i>airgead</i> [banəv] <i>banbh</i>
(ii) <i>Sonorant</i> +sonorant	[m ⁱ enme] <i>menmae</i> – ‘mind’	– <i>vowel epenthesis</i> [m ⁱ anəmə] <i>meanma</i>
c. <i>Tense sonorant</i> +homorganic voiced stop		
	[im(b) ⁱ e] <i>im(b)e</i> – ‘of butter’ [k ⁱ eN(d)a] <i>cen(d)a</i> – ‘heads’	– <i>simplification</i> [im ⁱ] <i>ime</i> [k ⁱ aNə] <i>ceanna</i>

The clusters included in (52a), which are composed of sonorants or fricatives followed by voiceless stops, e.g. [Rt] and [χt], have undergone no change up to the present. Their stability and unchangeability for over the past twelve centuries indicate that they can be viewed as LIO relations. If we look at the element complexity of Old Irish clusters from (52a), all these sequences are well-formed, e.g. [Rt] equals (A) vs. (A-I, ?, H), while the structure of [sk] is (A, H) vs. (@, ?, H).

What is more, it was proposed in (3.2.5.) that *s*+voiceless stop sequences occurring word-initially can be regarded as LIO structures. There is no reason, then, to treat identical sequences in word-medial position differently.

The collection in (52b) is much more complicated. Beside well-behaved sequences such as [rg], whose element representation is (A) vs. (@, ?), we also find clusters such as [nv], in which the structure (A-I, N) vs. (U) shows no element advantage of the potential governor over the governee and suggests that LIO is doubtful. Moreover, the development of an epenthetic vowel separating the cluster members is likely to have taken place in Old Irish (Greene 1952). This may also support the view that LIO should not be present in these clusters.

The clusters in (52c) seem to be uninteresting in that only their simplification from sonorant+voiced stop sequences to sonorants alone took place. The exact dating of this simplification cannot be offered, although it is likely, given that as early as in Old Irish the spelling fluctuated, e.g. *cenda* or *cenna* – ‘heads’, that the deletion of stops occurred during this period. From the viewpoint of governing relations, it is difficult to assume that a cluster like [mb] was a LIO relation if its simplification to [m] was about to take place. We will return to these clusters when analyzing final falling-sonority sequences in the following section.

To sum up, so far only the clusters shown in (52a), i.e. sonorants+voiceless stops and voiceless fricatives+voiceless stops, can be viewed as LIO relations. The two types from (52b), that is sonorants+voiced obstruents and sonorants+sonorants, do not always display sufficient element complexity slope between the potential governors and governees. The same is true about (52c).

3.2.14. The development of word-final falling-sonority clusters

Similarly to the word-medial clusters shown in (52), the final falling-sonority combinations developed in three ways, although their post-Old Irish history is not identical to that of word-medial sequences. Consider the examples below:

(53) CLUSTER TYPE	OLD IRISH	MODERN IRISH
a.		
(i) <i>Sonorant</i> <i>+voiceless obstruent</i>	[olk] <i>olc</i> – ‘bad’ [korp] <i>corp</i> – ‘body’ [goRt] <i>gort</i> – ‘field’	– <i>no change</i>
(ii) <i>Voiceless spirant</i> <i>+voiceless stop</i>	[Loχt] <i>locht</i> – ‘fault’ [tost] <i>tost</i> – ‘silence’	– <i>no change</i>

CLUSTER TYPE	OLD IRISH	MODERN IRISH
b.		
(i) <i>Sonorant</i> +voiced obstruent	[borb] <i>borb</i> – ‘rough’ [bolg] <i>bolg</i> – ‘belly’ [banv] <i>banb</i> – ‘piglet’	– <i>vowel epenthesis</i> [borəb] [boləg] [banəv]
(ii) <i>Sonorant</i> +sonorant	[doRN] <i>dornn</i> – ‘fist’ [an ⁱ m ⁱ] <i>ainm</i> – ‘name’	– <i>vowel epenthesis</i> [dorən] [an ⁱ im ⁱ]
(iii) <i>ð+voiced obstruent</i>		– <i>simplification and vocalization</i> ¹²
	[taðg] <i>Tadg</i> – a name	[taig] <i>Tadhg</i>
c. <i>Tense sonorant</i>		
+homorganic voiced stop	[im(b)] <i>im(b)</i> – ‘butter’ [k ⁱ eN(d)] <i>cen(d)</i> – ‘head’	– <i>vowel lengthening or diphthongization</i> [i:m] <i>im</i> [k ⁱ auN] <i>ceann</i>

Generally, the examples in (53) correspond to those in (52). This is hardly surprising since there is no major structural difference between a cluster followed by a vowel and a sequence preceding an empty nucleus. In both cases we are dealing with a sequence of two onsets (presumably connected via IO) followed by a government-licensing nucleus. The cases in (53a) are perfectly comparable to those in (52a) in that no change has ever affected them. They are also invariably well-behaved in terms of element complexity, e.g. [lk] can be represented by (A, ?) vs. (@, ?, H), while [χt] is (@, H) vs. (A-I, ?, H). Given this structural argument and taking into account our earlier ((3.2.5.) and (3.2.9.)) proposal concerning *s+voiceless stop* clusters, both [st] and [stør], where it was shown that these can be viewed as LIO relations which can be licensed by ‘unburied’ empty nuclei, we may conclude that all the clusters in (53a) belong to the LIO type.

The cases in (53b) parallel those in (52b) in that an epenthetic vowel separated the cluster members very early in the history, perhaps already in Old Irish, as proposed by Greene (1952). The element complexity slopes within these clusters are also frequently unsatisfactorily shallow. On the one hand, we can see well-

¹² These sequences are included here since, before simplification, epenthesis took place relatively early, e.g. [taðg] → [taðəg] → [tajəg] → [taig] (see Greene (1952) and Ó Siadhail (1989) for details).

formed combinations such as [rb], with the element structures of (A) vs. (U, ?), while on the other we encounter clusters like [nv] where the structure is (A-I, N) vs. (U), which must disfavour a LIO relationship straightaway.¹³ It is not ad hoc, then, to assume that vowel epenthesis split these clusters in Old Irish. Later in this chapter, we will take a closer look at this issue.

The examples in (53c) are also problematic. Given that we are dealing here with homorganic sonorant+voiced stop sequences, it is not obvious whether we should treat the element structures as separate, e.g. [mb] = (U, ?, N) + (U, ?), or as partial geminates (Harris 1994:166), where the prime responsible for the place of articulation is provided by the governor, in which case the element structure of [mb] should be (N, ?) + (U, ?). We could go even further, as we did in Chapter Two, and propose that the only prime distinctively lodged under the position occupied by the governee is the nasality component, which would result in the structure (N) in the governee vs. (U, ?) in the governor.

The cases in (53c) show another interesting property, however. If we compare the subsequent development of the Old Irish word-medial clusters from (52c), e.g. [mb] → [m], with a change of word-final sequences from (53c), e.g. [mb] → [m], we can conclude that these two seemingly identical changes are in fact different. Consider representative examples juxtaposed below:

(54) OLD IRISH	MODERN IRISH
a. [imb] or [im] <i>im(b)</i> – ‘butter’	[i:m] <i>im</i>
[k ⁱ eNd] or [k ⁱ eN] <i>cen(d)</i> – ‘head’	[k ⁱ auN] <i>ceann</i>
b. [imb ⁱ e] or [im ⁱ e] <i>im(b)e</i> – ‘butter’-gen.sg.	[im ⁱ] <i>ime</i>
[k ⁱ eNda] or [k ⁱ eNa] <i>cen(d)a</i> – ‘heads’	[k ⁱ aNə] <i>ceanna</i>

In (54a) the Old Irish cluster, or the tense sonorant alone, is word-final. In Modern Irish this fact results in vowel lengthening, frequently combined with diphthongization. On the other hand, the same cluster or the tense nasal is followed by a vowel in (54b). In Modern Irish no vowel lengthening takes place in this context.

Interestingly, the Modern Irish vowel lengthening occurs also before the Old Irish tense liquids which were not followed by stops. Consider the examples below (Cyran 1997:110; Bloch-Rozmej 1998:112):

¹³ Gussmann (1999) proposes that, apart from element complexity, segments are also characterized by ‘strength’. Thus, theoretically, an inherently ‘strong’ segment could govern a ‘weak’ one even if the former is not sufficiently complex.

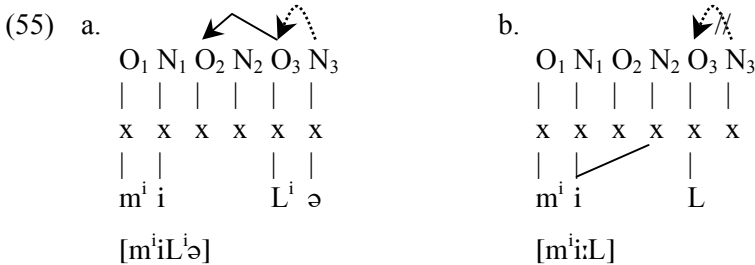
(55) a. CONNEMARA IRISH

[mⁱi:L] *mill* vs. [mⁱiLⁱə] *mille* – ‘destroy’/‘destruction’ (Old Irish [mⁱiL] *mill*)

b. MUNSTER IRISH

[bɑ:r] *barr* vs. [bɑrə] *barra* – ‘top’/pl. (Old Irish [bɑR] *barr*)

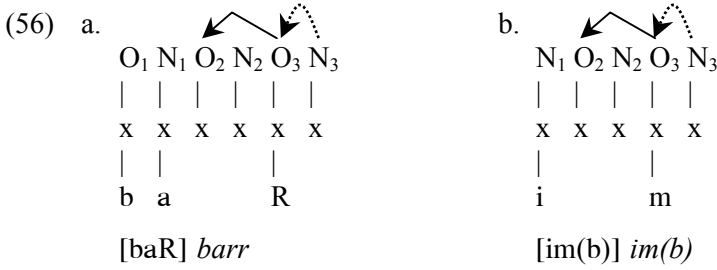
The cases above clearly exemplify short-long vowel alternations before resonants which used to be tense in the past and have mostly retained this property. Both the authors mentioned above account for these vocalic alternations in terms of underlying gemination. Following their line of reasoning, we can represent the Modern Irish quantity alternations as follows:



In (55a) we can see an interonset relation held between the onsets (O₃) and (O₂). This IO can be established because (O₃) is licensed to perform this operation by the following realized nucleus (N₃). Consequently, the sonorant occupies two skeletal positions although this fact does not always find phonetic manifestation in all the Irish dialects. In (55b) we can observe a long vowel in front of a tense sonorant when the final nucleus (N₃) is empty. This nucleus is thus too weak (//) to license the preceding onset (O₃) to establish an IO relation with (O₂). As a result, (N₁) spreads its melody to the following nucleus (N₂).

3.2.15. The structure of tense sonorants

Given that in Modern Irish all the previously tense sonorants can be said to have geminate structure, which can be decomposed only before a weak licenser, we may theoretically assume that in Old Irish the situation was similar. In particular, that all tense sonorants found in medial and final position were geminates. Consider the following representations:



The representation in (56a) is uncontroversial. A LIO relation licensed by the empty nucleus (N₃) obtains between (O₃) and (O₂) and the tense liquid [R] has a geminate structure. The situation in (56b) is much more complicated. If we assume that the nasal [m] is also a geminate, there is no straightforward way of explaining why the stop [b] may in any way remain in the phonological structure or, to be more precise, in the optional mediaeval spelling.

One argument in defence of (56b) can be formulated in the following way. McCone (1996:141) treats the orthographic word-final sequences such as [mb] or [Nd] as hypercorrect. This amounts to saying that there were probably no sonorant+homorganic voiced stop clusters in this position and the spelling may have reflected the state of affairs from before apocope which deleted all short final vowels (mostly schwas) in late Primitive Irish, i.e. *æmbə → *imbə → (apocope) → [im] *im(b)* – ‘butter’ and *LaNda → *LaNdə → [LaN(d)] *lan(d)* – ‘open space’.¹⁴ Thus, these clusters were probably simplified just after apocope. What is peculiar about the Old Irish spelling is that words which originally contained double sonorants and had no clusters composed of sonorants followed by voiced stops before Old Irish, displayed such combinations in optional variants in Old Irish, e.g. *k^wennom → *k^wennan → *kennə → [kⁱeN] or [kⁱeNd] *cen(d)* – ‘head’. Thus, there seem to be two sources of the tense sonorants in Old Irish. One is the development of the original geminates, e.g. *nn → [N] in *kennə → [kⁱeN], the other is the tensing of the original single sonorants before the homorganic obstruents, e.g. *nd → *Nd → [N(d)] in *landa → *LaNdə → [LaN(d)].

Bearing in mind the assumption that in Old Irish there were no word-final sonorant+homorganic lenis stop clusters, e.g. the sequences of [mb], [Nd], [ŋg], [Ld], were in fact [m], [N], [ŋ], [L], respectively, let us study the prehistoric developments of these segments in detail.

¹⁴ In Modern English we are dealing with a similar situation. In most varieties of English, words like *lamb* and *song* are pronounced as [læm] and [soŋ], respectively, while in Scots, a variety spoken in Scotland, words such as *land* are pronounced as [læn] (Harris 1994:85). See also Gussmann (1998) for an analysis of the English sound [ŋ].

3.2.16. The prehistoric development of sonorant+obstruent sequences

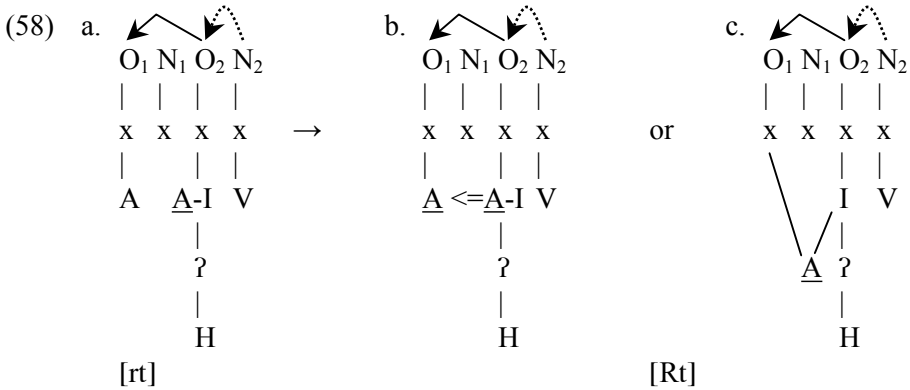
Let us now focus on regular prehistoric developments in which the original lax sonorants were tensed in front of homorganic stops, both voiced and voiceless. Consider the following reconstructed developments, based on McCone (1996), which illustrate this tensing:

(57) <i>PC</i>	<i>Tensing Stage</i>	<i>Old Irish</i>
*landa	→ *LaNda → *LaNdə	→ [LaN(d)] <i>lan(d)</i> – ‘open space’
*nertom	→ *NeRtan → *NeRtə	→ [N ⁱ eRt] <i>nert</i> – ‘strength’

It is clear from (57) that the Proto-Celtic lax sonorants, i.e. [n] in *landa and [r] in *nertom, were subsequently tensed to [N] and [R], respectively, in front of the homorganic stops. No similar tensing ever occurred before the heterorganic obstruents, e.g. *selga: → *selga → [sⁱelg] *selg* – ‘hunting’, where the original [l] remains lax.

Before we proceed to the further developments of these forms, let us note that in (57) also the initial sonorants [l] and [n], which used to be lax in Proto-Celtic, were tensed afterwards, probably between Insular Celtic and Primitive Irish. In Chapter Two it was proposed that this change did not take place in a linguistic vacuum but had much to do with reductions which occurred in the immediately preceding and closely connected (function) words, e.g. *eja:h nertan → *eja: NeRta → [ə NⁱeRt] *a nert* – ‘her strength’. After the deletion of the pronoun-final spirant [h], the nasal occupied its position, i.e. it became doubly linked (geminated) and tense. This gemination in the contextual variant had impact on the radical form, even in isolation. Thus, instead of *neRta, the word-initial tense resonant was used afterwards and the radical form was reinterpreted as *NeRta. Whether or not the initial sonorant in *NeRta was still a geminate in Old Irish is uncertain, but it was undoubtedly tense. This may mean that at some prehistoric stage gemination equalled tenseness. Afterwards, the geminate structure may have been simplified, but the property of tenseness remained.

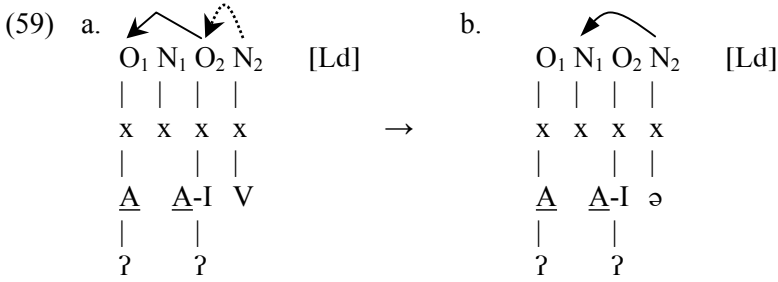
Returning to the tensing of resonants before the homorganic stops, we must state unequivocally that gemination understood as linking the same melody to two positions was unlikely in this context. Instead, we may propose that the homorganicity factor was decisive and that the originally lax sonorants became tense under government. This is represented below, with (58b) and (58c) illustrating two theoretical options of the final outcome:



In (58a) we can see the situation before the tensing of the liquid [r]. A LIO governing relation between (O₂) and (O₁) is licensed by the following vowel (V) under (N₂). As a result of LIO, in (58b) the headedness from the element (A) under (O₂) is spread to the same element under (O₁). A slightly different representation is shown in (58c), where the element (A) is simply doubly linked. Due to this, the liquid is tensed. Whichever solution is better, the homorganicity factor under a governing relation was crucial in the tensing of sonorants and the headedness of (A) in the sonorant seems justified in either way.

After this tensing, two developments occurred. First, the word-final short full vowels were reduced to schwas. Second, these schwas were dropped. Although from the theoretical viewpoint either of these two processes may have led to the break-up of LIO relations in the case of shallow complexity clusters, we will hypothesize that the first of these developments had immense impact on the nature of relationships between the consonants involved in these relations. The second step was just a consequence of the first.

Therefore, during the period of Primitive Irish, the word-final short vowels were reduced to schwas, e.g. *LaNda → *LaNdə, *selga → *selgə, *NeRta → *NeRtə. These weakened final nuclei were no longer able to license LIO relations in which the complexity slope between the governors and the governees was shallow. Clusters like [Lt], where the structure of the cluster members was (A, ?) + (A-I, ?, H), which means that the complexity ratio was (2:3), were relatively steep and easier to government-license. Sequences such as [Ld], whose structure was (A, ?) + (A-I, ?) and whose complexity ratio equalled (2:2), were difficult (since (A-I) represents only one property, i.e. the place of articulation, we count this combination as one prime). As a result, the break-up of shallow complexity slope clusters occurred. This is shown below:



In (59a) the cluster [Ld] is still a LIO relation in which the governor (O_2) is licensed by the vowel under (N_2) to govern (O_1). In (59b) the vowel under (N_2) has been reduced to schwa, a segment whose licensing potential is diminished. Due to this, the onset (O_2) is no longer able to perform a LIO government on (O_1) and the intervening nucleus (N_1) is now properly governed by (N_2). The same seems true of the other homorganic clusters such as [Nd], [mb], [ŋg] and heterorganic sequences such as [lg], [rb], etc. On the other hand, all the clusters composed of sonorants followed by voiceless stops, be they homorganic or not, e.g. [lk], [Rt], remained LIO relations because the schwas were capable of licensing steep complexity sequences.

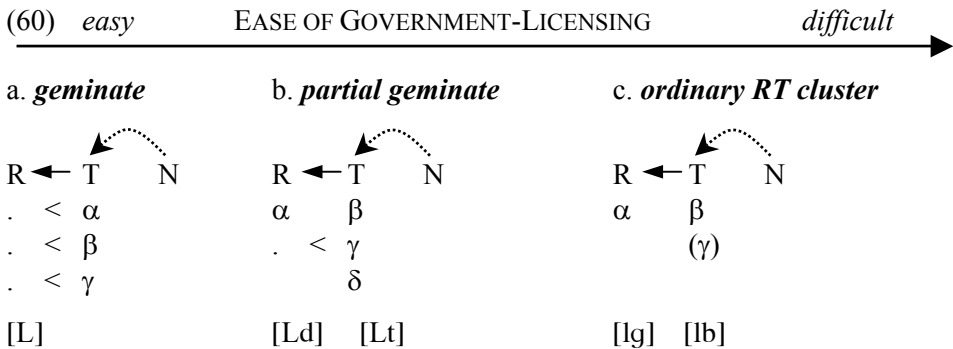
The only sonorant+voiced stop cluster which seems to have survived intact, even to the present day, was [Rd], e.g. Old Irish [aRd], Modern Irish [a:Rd] *ard* – ‘high’. Its preservation is indubitably connected with the fact that [R] is the weakest of sonorants. Thus, however depleted the licensing potential of the reduced vowel was, this schwa was still able to license LIO relations if the complexity slope was steep enough. In the case of [Rd], the element make-ups were (A) vs. (A-I, ?), so the element complexity ratio was (1:2). The homorganicity factor is important here as well because in the case of non-homorganic sonorant+stop clusters, e.g. [rg] or [rb], the steep complexity slope alone was apparently insufficient and, at some period, they developed epenthetic vowels, e.g. Modern Irish [bɔrəb] *borb* – ‘rough’.

The next historical step (still in Primitive Irish) was apocope which, according to Kortlandt (1979), McCone (1996), and many others, deleted the final schwa, e.g. *LaNdə → *LaNd, *selgə → *selg, *NeRtə → *NeRt, and left the previously medial clusters ‘unprotected’ by the following vowels. Thus, clusters such as [Nd], [lg], and [Rt] became word-final in Old Irish, the first of which was soon simplified to [N]. Only Greene (1952:217) tentatively proposes that, soon after this process, vowel epenthesis took place in heterorganic clusters, e.g. [lg], [rb] etc. Given that this vowel insertion is never indicated in the spelling, it must remain hypothetical (Russell 1995:79).

However, from the viewpoint of GP, the standpoint that apocope simply deleted the final schwa and left all the aforementioned clusters at the right-hand edge of the word is problematic. In particular, it was hypothesized above that the only sequences which were able to survive vowel reduction ($V \rightarrow [\text{ə}]$) as LIO relations were the steep complexity clusters, e.g. [lk], [Rt]. We also assumed that the shallow complexity groups, e.g. [lg], [rv], [Nd], [mb], were decomposed into sequences of independent onsets. In these sequences the intervening nuclei could survive only thanks to Proper Government, as proposed in (59b). If the final nucleus becomes empty ($[\text{ə}] \rightarrow [\emptyset]$) and cannot serve as a proper governor, the cluster must be split by an epenthetic vowel or altered otherwise.

Taking into account our assumption that, after vowel reduction ($V \rightarrow [\text{ə}]$), no LIO relations obtained between any clusters except for [Rd] and sonorant+voiceless stop groups, e.g. [lk], [Rt], [lp], [rk], etc., the following question must be answered with respect to apocope ($[\text{ə}] \rightarrow [\emptyset]$): why were the homorganic sonorant+voiced stop clusters, e.g. [Nd], [mb], simplified to sonorants alone, that is [N], [m], respectively, while nothing allegedly happened to heterorganic sequences of the same kind, e.g. [rg], [nv]?

Within the framework of GP, not all governing relations are said to be equally easily licensed. As mentioned above, LIO relations are considered to be universally easier to license than RIO domains (Charette 1990; Cyran 2003). Also within LIO relations, some clusters are easier to license by the following nuclei than others. Consider the following scale of licensing reproduced after Cyran (2003:112), where (T) stands for any governor, (R) for any governee, (N) for the licensing nucleus while the Greek letters for the phonological primes:



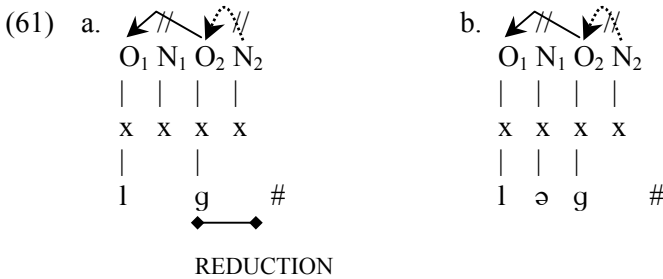
This scale shows that geminates (60a), in which the governor (T) is complex, while the governee (R) has zero complexity, are the easiest LIO structures to government-license. Partial geminates (60b) are slightly more difficult to license because only some primes are provided by the governor, while others may be

distinctively lodged under the governed position. The most difficult ones are ordinary clusters in (60c), where no element may be shared by the LIO members.

Now, mapping the pre-Old Irish sequences on this scale, we can see that clusters such as [Nd] or [mb], which belong to (60b), are not particularly difficult to government-license, (similarly to [Rt] or [Lt]), while clusters like [rg], [nv] or [lb], must be classified under (60c), which makes them most difficult to license. And yet the latter, e.g. [lb], allegedly survived long after apocope, in the same way as [Lt], while the former, e.g. [Ld], did not.

We must remember, however, that the licensing abilities of nuclei are strictly connected with element complexity, which means that [Ld], whose element ratio is (2:2), is more difficult to license than [Lt], where the ratio is (2:3). The same holds true for the non-homorganic sequences such as [lk], with the ratio of (2:3) vs. [lg], where the ratio is (2:2).

This mathematical calculation, combined with the licensing abilities of nuclei, indicates that, since non-homorganic clusters like [lk], which fit in (60c), survived into Old and Modern Irish, while sequences like [Ld], which are classified under (60b), did not, then the combinations like [lg] should not have remained intact after apocope. If they had survived as [lg], there is something wrong with the universal scale in (60). If they had not, they cannot have been clusters in Old Irish. Thus, there are two theoretical possibilities at our disposal: (a) the final stops were dropped, e.g. *selgə → *selg → *[sel], which does not seem to have been the case, or (b), the heterorganic final clusters like [lg], [nv] or [rb], were split by epenthetic vowels, i.e. *selgə → *selg → [seləg]. These two options are schematized below:

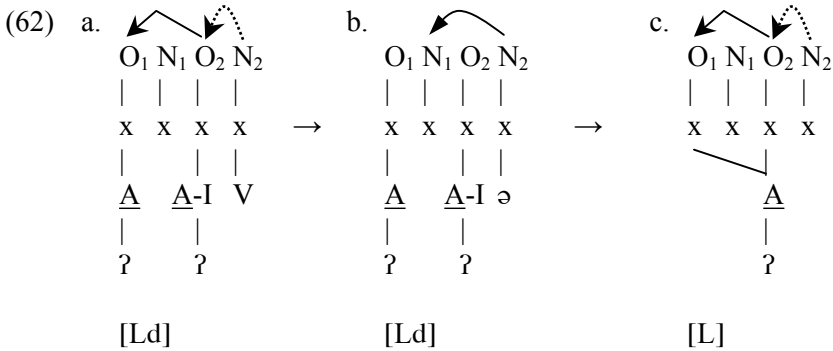


In (61a) we can see a hypothetical inability of (N₂) to license LIO between (O₂) and (O₁). As a consequence, both (N₁) and (N₂) surface as unlicensed empty nuclei, which violates one of the fundamental assumptions of GP: a sequence of two unlicensed empty nuclei is ruled out. The inevitable structural reduction means that both (N₂) and (O₂) are removed from the structure, while (N₁) remains as a domain-final empty nucleus capable of licensing the preceding liquid.

In (61b) we also see the absence of prosodic government-licensing from (N₂) to (O₂), due to which LIO between (O₂) and (O₁) is impossible. However, (O₂) is licensed by the empty (N₂) to remain in the structure provided that it has no LIO duties. Here the epenthetic vowel [ə] splits the cluster.

Now, taking into account the fact that the option shown in (61a) finds no confirmation in the subsequent development of the language, i.e. the pre-Old Irish *selgə → Modern Irish [sⁱelⁱgⁱ] *seilg* – ‘hunt’, the other (61b) possibility must be accepted for the time being. We will try to see whether our theoretical solution can find verification in the ensuing sections, where the behaviour of consonant clusters in the mediaeval Irish verse is presented. Before this is done, however, let us consider why the homorganic clusters, e.g. [Nd], were unable to survive intact after apocope.

Our theoretical considerations indicate that, after apocope, the structure of all shallow complexity clusters, both homorganic and heterorganic, must have been somewhat altered. In the case of heterorganic sequences, e.g. [lg], vowel epenthesis seems a plausible solution, as proposed in (61b). Unfortunately, in the case of homorganic sequences, e.g. [Ld], no epenthesis can be postulated for at least one reason. Knowing that combinations such as [mb], [Nd], [ŋg], [Ld], were simplified to [m], [N], [ŋ], [L], respectively, in or before Old Irish, and that the Old Irish tense resonants can be viewed as geminates, as suggested in (56), we may suspect that the simplification consisted in the gemination of the resonants. This hypothetical simplification is represented below (we repeat the earlier development, i.e. the break-up of LIO for convenience):



The representation in (62a) shows LIO between (O₂) and (O₁). This relation is absent in (62b) with no phonetic consequences for the cluster [Ld]. The intervening nucleus (N₁) is now properly governed by the schwa under (N₂). In (62c), after apocope, the final schwa under (N₂) is now an empty nucleus which cannot properly govern the preceding (N₁). Taking into account that there was no epen-

thesis under (N_1) and that the final dental was dropped, we can assume that the system chose gemination (progressive assimilation) instead of vowel insertion. The crucial factor seems to be the fact that we are dealing here with a sequence of homorganic coronal segments where relatively many elements are shared by the element make-ups of both [L] and [d].

This proposal has at least two advantages. First, it is in agreement with the universal scale shown in (60), according to which geminates are the easiest LIO relations to license by the following nuclei. Thus, the licensing nucleus can even be empty. Second, given the representation in (62c), it is now possible to interpret the Modern Irish lengthening before the tense sonorants in terms of geminate decomposition, as shown in (55). In particular, the prehistoric words ending in tense sonorants followed by homorganic voiced stops did not only lose the final stops, but also experienced the gemination of the tense sonorants at the expense of the disappearing stops. Thus, the tenseness of resonants, previously provided by LIO obtaining between sonorants and following homorganic stops, as proposed in (58b, c), was preserved due to the double linking, as suggested in (62c), and establishing new LIO relations.

To sum up, the adoption of the model of licensing and complexity leads us to assume that steep complexity clusters, e.g. [lk], [Rt], were still LIO relations in Old Irish. Besides, shallow complexity homorganic clusters, e.g. [mb], [Ld], were simplified to sonorant geminates [m], [L], respectively, as proposed in (62c). Considering that the heterorganic sequences like [lg] or [rb] cannot have survived as true clusters after apocope, it was suggested in (61b) that vowel epenthesis is theoretically the most plausible solution.

Now, let us see whether the relevant literature can in any way support these theoretical assumptions.

3.2.17. *The development of Irish vowel epenthesis*

The history of Irish vowel epenthesis, also referred to as svarabhakti or anaptyxis, is enshrouded in mystery. In particular, it cannot be ascertained beyond any doubt when exactly this phenomenon occurred in the development of the language. The Old Irish spelling suggests that consonantal sequences such as, say, [lk] and [Rt], e.g. *olc* – ‘bad’ and *gort* – ‘field’, were true clusters which can be treated on a par with combinations like [lg] or [rb], e.g. *selg* – ‘hunt’ and *borb* – ‘rough’. In Modern Irish, however, the spelling is almost identical as that in Old Irish, svarabhakti is never indicated, and yet it occurs only in the latter group, e.g. [sⁱelⁱgⁱ] *seilg* – ‘hunt’ and [borəb] *borb* – ‘rough’ (Ó Siadhail 1989; Ní Chiosáin 1997:371). This amounts to saying that the orthography, both past and present, may be misleading and anaptyxis may have been present in the language

much earlier than it is commonly assumed. In other words, there is no objective way of finding out when the insertion of schwas occurred in the heterorganic clusters composed of sonorants followed by voiced obstruents.

The first type of svarabhakti and, at the same time, the only one for which there is tangible evidence, is that which occurred immediately before Old Irish and just after apocope and syncope, the final developments of Primitive Irish. In particular, when these two processes gave rise to a structure where a word-final sonorant followed an obstruent, an anaptyctic vowel divided such a sequence (McCone 1996:127), e.g. *dõvna → (apocope) *dõvn → (svarabhakti) [dõvən] *domun* – ‘world’, *araθra → (apocope) *araθr → (svarabhakti) [arəθər] *arathar* – ‘plough’. This epenthesis is by all means logical given that RIO had not been part of the system at that time and the domain-final empty nucleus could not properly govern the empty slot between the obstruent and the sonorant.

No other type of epenthesis has ever found its reflection in the spelling, however, not even in Modern Irish, whose spelling conventions are said to be as close to the phonetic reality as possible. Thus, there is no real clue as to the time when the so-called Modern Irish epenthesis in words like [bərəb] *borb* – ‘rough’ first occurred. What we know for sure is that it does take place in Modern Irish.

There are a few opinions that svarabhakti was present in Irish since the earliest times. Green (1997:164) dates the phenomenon of svarabhakti in clusters of falling sonority between the periods of Old and Early Modern Irish, which is somewhat imprecise. Ó Baoill (1980:95ff.) claims that it was already present in Old Irish and that it developed as a result of simplifying geminate stops following the sonorants. Specifically, word-final voiced stops were historically geminates whose first part was later vocalized after resonants.

Much more convincingly, Greene (1952) argues that svarabhakti in heterorganic clusters, that is, in words such as [bolg] *bolg* – ‘belly’, occurred as early as after apocope and syncope, the processes which took place in late Primitive Irish. However, he claims that this svarabhakti cannot be comparable to that occurring in Modern Irish. Referring to O’Rahilly’s (1932:199ff.) description of a peculiar type of epenthesis which took place in Scottish Gaelic stressed verse, Greene proposes that the Old Irish epenthesis in these clusters can be referred to as ‘svarabhakti of the Scottish type’. Briefly, in a monosyllabic word like [boləg] *bolg* – ‘belly’, a vowel splits the final consonant sequence but the whole word is still treated as monosyllabic. On the other hand, the Modern Irish version of [boləg] is clearly disyllabic. Thus, it is likely that the Old Irish *bolg* – ‘belly’ was pronounced more or less as [bol^og]. This proposal makes it possible for Green to postulate the existence of three types of monosyllables in Old Irish. These will be presented in the following section.

3.2.18. Word-final clusters in Irish poetry

Greene (1952:212-218) observes that in Old Irish literature, and particularly in poetry, diverse consonantal groups were treated differently for rhyming purposes. In Irish poems, rhyming vowels had to agree with respect to quantity and (usually) quality. As for consonants, not every consonant or consonant group could rhyme with another one. Analyzing Thurneysen's (1949:37-38) account of Old Irish metrics, where the details of rhyming are presented, Greene observes that before certain types of clusters, that is, mainly before homorganic and heterorganic sonorant+voiced obstruent sequences, the length mark, e.g. *é*, frequently appears over vowels traditionally considered as short, e.g. *cénd* for the more common version *cen(d)* – 'head' or *férg* for the regular *ferg(g)* – 'anger'. This scribal practice was probably used to indicate that the syllable with such a vowel was considered to sound longer than that containing a short vowel, although it was not equal to one with a truly long vowel or diphthong. Greene discards the view that there was a three-way quantity distinction in Old Irish VOWELS. Instead he suggests that this scribal practice helped indicate SYLLABLES which were neither fully long (containing a true long vowel or a diphthong) nor short (containing a short vowel followed by clusters composed of resonants or voiceless fricatives followed by voiceless stops). Therefore, on the basis of metrical behaviour, Greene (1952:218) concludes that there were three types of monosyllables in Old Irish.

The first type, which will be referred to as type A, contains long syllables. These are composed of long vowels or diphthongs followed by one consonant, a geminate sonorant, or a 'light consonant group' (a voiceless fricative+voiceless stop sequence). Representative examples are given below:

(63) TYPE A

[k ^h iaL]	<i>cial(l)</i> – 'sense'	[es ^h k ^h]	<i>éisc</i> – 'fish'-gen.sg.
[sRo:n]	<i>srón</i> – 'nose'	[g ^h e:s ^h]	<i>géis</i> – 'swan'
[su:l ^h]	<i>súil</i> – 'eye'	[e:χt]	<i>écht</i> – 'slaughter'

Interestingly, words from the group in (63) above can rhyme only with members of their own set (obviously when the vowels and consonants are more or less the same and the consonantal cluster is the same quality as regards palatalization).

The second set, called group B here, comprises short syllables, that is, short vowels followed by one consonant or a 'light' consonant cluster. Consider the representative cases of this group:

(64) TYPE B

[f ⁱ er]	<i>fer</i>	– ‘man’	[eχ]	<i>ech</i>	– ‘horse’
[kat]	<i>cat(t)</i>	– ‘cat’	[d ⁱ erk]	<i>derc</i>	– ‘hole’
[olk]	<i>olc</i>	– ‘bad’	[korp]	<i>corp</i>	– ‘body’
[foLt]	<i>folt</i>	– ‘hair’	[l ⁱ esk]	<i>lesc</i>	– ‘lazy’
[t ⁱ eχt]	<i>techt</i>	– ‘going’	[N ⁱ eRt]	<i>nert</i>	– ‘strength’

Similarly to what can be seen in (63), the items included in (64) can rhyme only with members of the same group. In particular, a single consonant can rhyme with another single consonant or with a cluster, while a cluster can rhyme with another sequence or with one consonant (if the consonants agree with respect to palatalization or its absence and that the vowels are alike).

It is important to note that there are melodic restrictions on the rhyming consonants and not every cluster can rhyme with a single consonant. For example, [Rt], [Lt], [χt] can rhyme with [t] or [k], but it is unlikely for [r] to rhyme with [Rt] or any other cluster. A lax sonorant like [r] can rhyme with another lax sonorant, e.g. [l]. Therefore, the type of the final consonant matters for the rhyming abilities.

The next group, that is type C, contains the so-called half-long syllables. These are composed of a short vowel followed by a tense sonorant and, optionally, a homorganic voiced stop. Consider the following cases.

(65) TYPE C

[f ⁱ eR]	<i>ferr</i>	– ‘better’		
[baL]	<i>ball</i>	– ‘limb’		
[RaN]	<i>rann</i>	– ‘part’		
[tom]	<i>tom(m)</i>	– ‘bush’		
[aRd]	<i>ard</i>	– ‘high’		
[m ⁱ eLd]	<i>meld</i>	– ‘pleasant’	also	[m ⁱ eL] <i>mell</i>
[k ⁱ eNd]	<i>cend</i>	– ‘head’	also	[k ⁱ eN] <i>cenn</i>
[kamb]	<i>camb</i>	– ‘crooked’	also	[kam] <i>cam(m)</i>
[s ⁱ eŋg]?	<i>seng</i>	– ‘narrow’	or	[s ⁱ eŋ]?

There is also the other set of half-long syllables, whose members can rhyme with items from group C. This second set, referred to as type D, also contains short vowels, similarly to type C. The vocalic segments in type D are followed by ‘heavy consonant groups’, i.e. sequences of resonants or the voiced fricative [ð] preceding non-homorganic voiced obstruents (including [m] after a sonorant or [ð], and [N] after [R]).

(66) TYPE D

[borb]	<i>borb</i>	– ‘rough’	[b ⁱ eðg]	<i>bedg</i>	– ‘leap’
[d ⁱ elv]	<i>delb</i>	– ‘image’	[salm]	<i>salm</i>	– ‘psalm’
[f ⁱ eðv]	<i>fedb</i>	– ‘widow’	[an ⁱ m ⁱ]	<i>ainm</i>	– ‘name’
[d ⁱ erg]	<i>derg</i>	– ‘red’	[maðm]	<i>madm</i>	– ‘breaking’
[bolg]	<i>bolg</i>	– ‘belly’	[doRN]	<i>dornn</i>	– ‘fist’

Let us now consider a few representative examples of rhyming pairs taken from Stokes and Strachan (1903), Thurneysen (1949), Greene (1952), Murphy (1956), and Best and O’Brien (1954-67). In these cases (V) stands for ‘vowel’ while (V:) represents ‘long vowel’ or ‘diphthong’:

(67) TYPES	EXAMPLES	TYPES	EXAMPLES
A) V:L - V:n	<i>ciall – Brian</i>	B) VLt - Vχt	<i>folt – (in)nocht</i>
V:s - V:st	<i>tís – Christ</i>	VL ⁱ t ⁱ - Vk ⁱ	<i>nailt – maicc</i>
V:ð - V:θ	<i>rád – (co)bráth</i>	Vr ⁱ p ⁱ - Vl ⁱ k ⁱ	<i>cuirp – uilc</i>
		Vr ⁱ k ⁱ - Vk ⁱ	<i>uirc – bruic</i>
		Vt ⁱ - VR ⁱ t ⁱ	<i>duit – guirt</i>
C) VN - VNd	<i>Minn – (Loth)lind</i>	D) Vðv - Vrv	<i>Badb – marb</i>
VL ⁱ d ⁱ - VR ⁱ d ⁱ	<i>meild – (fo-)ceird</i>	Vr ⁱ m ⁱ - Vn ⁱ m ⁱ	<i>airm – ainm</i>
Vm - VNd	<i>(inda)limm – (barr)find</i>	Vð ⁱ m ⁱ - Vl ⁱ m ⁱ	<i>feidm – deilm</i>
VL ⁱ - Vng ⁱ	<i>chuill – druing</i>	Vðg - Vrg	<i>bedg – ferg</i>
C-D) VR ⁱ d ⁱ - Vl ⁱ g ⁱ	<i>(sain)cheird – seilg</i>		
VNd - Vlm	<i>cend – (Fe)delm</i>		
VRd - Vrv	<i>ard – borb</i>		
VR - Vlg	<i>corr – colg</i>		

The picture above is clear. The examples from (67A) rhyme only with the members of their own set. The same refers to the cases in (67B). On the other hand, the words from (67C) and (67D) can constitute rhyming pairs. From the metrical point of view, this indicates that the structures of items from (67C) and (67D) are perceived as identical, while the other two groups, that is (67A) and (67B), are dissimilar both to each other and to the remaining two groups.

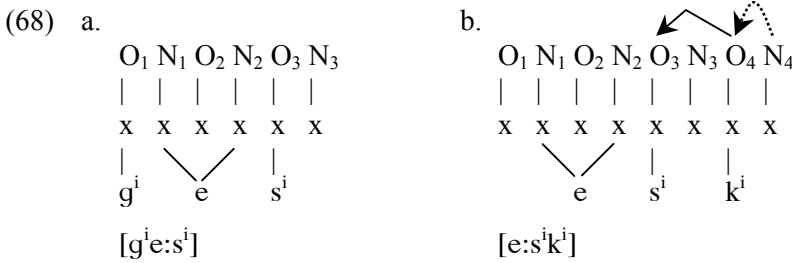
It should be emphasized that rhymes presented in (67) are by no means the most desired. Similarly to any type of verse, the mediaeval Irish poetry preferred rhymes like, e.g. *céin – féin* (type A), *cacht – acht* (type B), *lainn – clainn* (type C) or *ferg – derg* (type D). However, since words selected for artistic purposes

could not invariably rhyme perfectly, the rhyming of only certain combinations was allowed. In the next section we will see whether these metrical observations can contribute to the understanding of the nature of word-final clusters.

3.2.19. Phonological representations of rhyming groups

Now we can compare the rhyming patterns presented in the previous section with our analysis of the word-final consonant clusters in and before Old Irish advocated in (3.2.15.) and (3.2.16.) above.

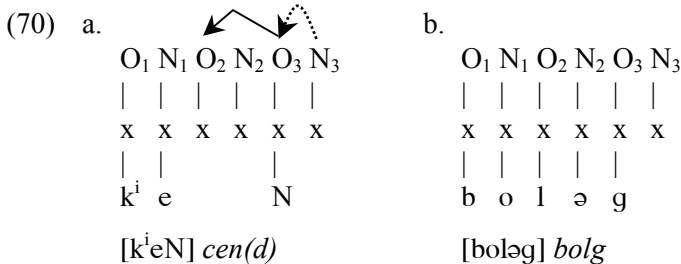
Words from group A, which contain long vowels or diphthongs, have not been analyzed yet. It is crucial to remember that the long vowels or diphthongs can be followed by single sonorants, e.g. [su:l^l] *súil* – ‘eye’, by obstruents, e.g. [gⁱe:sⁱ] *géis* – ‘swan’, by sonorant geminates, e.g. [kⁱiaL] *cial(l)* – ‘sense’, or by ‘light consonant groups’, e.g. [e:sⁱkⁱ] *éisc* – ‘fish’-gen.sg. So far we have been maintaining that both sonorant geminates and consonant clusters composed of voiceless spirants preceding voiceless stops should be viewed as LIO relations. Following this line of reasoning, consider the representations below:



In (68a) the long vowel [e:] is attached to two nuclei (N₁) and (N₂). The third nucleus (N₃) is a domain-final unburied nuclear position. In (68b) the long vowel [e:] is linked to two nuclei (N₁) and (N₂). Moreover, we can observe a LIO relation between (O₄) and (O₃), which is licensed by the domain-final empty nuclear slot (N₄). This LIO relation buries the intervening nucleus (N₃).

On the face of it, these two structures are totally dissimilar. However, if we adopt the view that what counts for the metrical pattern is the number of nuclei in a given word, these representations need no longer be viewed as different. In particular, the structures in (68a) and (68b) both contain three nuclei visible to phonology and, hence, to metrical count. In (68a) the first two nuclei are filled with melody, while the domain-final slot is empty but unburied. In (68b) the first two nuclei are also filled with melody, the third one is buried and invisible to the phonological structure, whereas the domain-final position is empty but unburied. Thus, the two structures in (68) are metrically identical and they can rhyme with

geminate, while combinations like [lg], [rb], [nv], etc. do not stand for true clusters but for ones split by svarabhakti vowels, the phonological structures of representative cases of groups C and D must be as follows.



These representations are by no means identical. In (70a) we can observe a LIO relation between (O₃) and (O₂), which is licensed by the domain-final unburied (N₃). The nucleus (N₂) is buried by this LIO domain. Thus, two nuclei, that is, (N₁) and (N₃) are visible to phonology. In (70b), on the other hand, there is an epenthetic vowel under (N₂) and, as a result, three nuclei are unburied and visible to the phonological structure.

Therefore, the structure in (70a) should be able to rhyme with those in (69), while that in (70b) ought to be different from both (70a) and (69). And yet the mediaeval verse perceived both the structures in (70) as rhyming.

At this juncture, we must ask and answer the following questions. First, is the assumption that epenthesis occurs in (70b) erroneous? Second, is the hypothesis that sequences such as [Nd] are geminate sonorants wrong? Third, is the mediaeval rhyming pattern based upon the state of affairs present in the system of Old Irish or does it follow other rules?

Firstly, let us compare the word *bolg* – ‘belly’, which we deem to have been pronounced as [boləg], with [bog] *boc* – ‘soft’. Given that these two words can never rhyme, which would be the case if *bolg* were pronounced as [bolg] (by analogy with the rhyming pair of [guRⁱtⁱ] *guirt* – ‘field’-gen.sg. and [dutⁱ] *duit* – ‘to you’ in (67), we can answer the first question in the negative.

Secondly, the formation of geminate sonorants which resulted from the simplification of clusters such as [Ld], [mb], [Nd], and [ŋg] (progressive assimilation) between Primitive Irish and Early Old Irish can hardly be questioned given that the phonological system at that period was unable to support shallow complexity clusters and that their subsequent development shows the survival of these resonants as geminates up to the present.

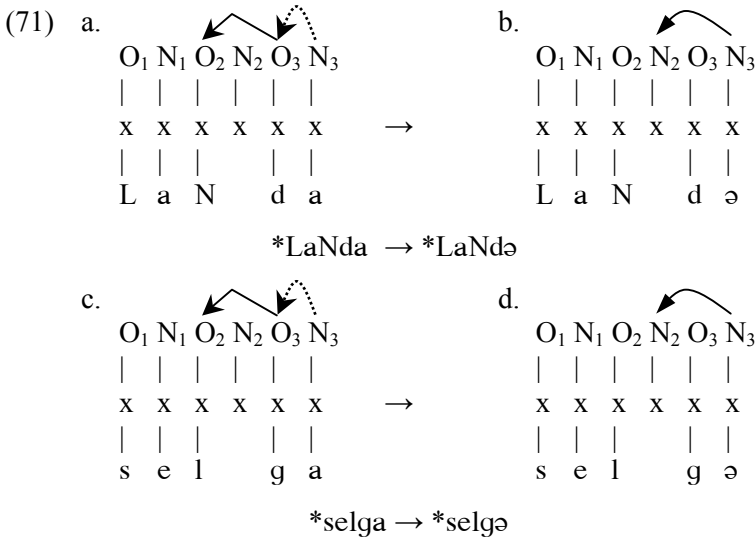
Thirdly, the question of what mattered for mediaeval poetry cannot be unequivocally answered on the basis of Old Irish alone. However, let us consider

Greene's (1952:217) remark concerning the nature of rhyming patterns discussed here: "As happens so often in Irish, the literary usage reflects the linguistic facts of many centuries before".

Pursuing this observation, let us return to late Primitive Irish developments described in detail in (3.2.16.) and look for rhyming patterns within that period.

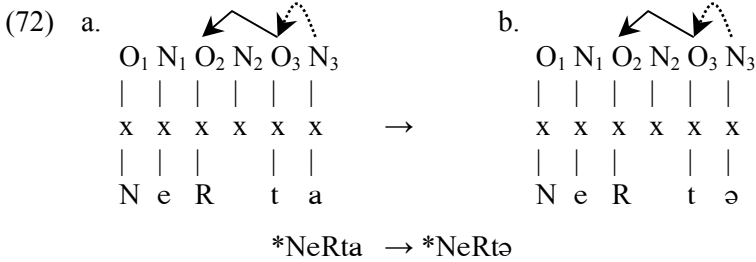
3.2.20. Prehistoric rhyming patterns at work

In (3.2.16.) we discussed the break-up of shallow complexity slope clusters, both homorganic, e.g. [Nd], and heterorganic, e.g. [lg]. We attributed this process to the fact that the word-final short vowels were reduced to schwas and the licensing potential of these weakened vowels was insufficient to license shallow complexity LIO relations. Let us now compare the structures of homorganic (71a, b) and heterorganic (71c, d) clusters from that period.



In (71a) and (71c) we can see that the relevant clusters, that is [Nd] and [lg], respectively, are followed by full vowels under (N₃) and they display LIO relations between (O₃) and (O₂). The structures in (71a) and (71c) are thus the same. In (71b) and (71d) we can see the situation after the reduction of the final vowel under (N₃) to schwa. This reduction results in the break-up of LIO in both cases, and the application of Proper Government between (N₃) and (N₂). The representations in (71b) and (71d) are also identical. We can claim, therefore, that these structures must have been taken into account while establishing the rhyming patterns of the verse. Note that in both these structures three nuclei are visible to

phonology, (N₂) being empty but unburied. The hypothesis that types C and D were identical and differed from type B only at this stage can be confirmed when we have considered the following development:



The representation in (72a) is identical to those in (71a) and (71c), which means that, before the reduction of final vowels to schwas, all the sonorant+stop clusters were LIO relations. This situation changed after the time when schwas replaced full vowels in word-final position. The shallow complexity clusters, as shown in (71b, d) ceased to be LIO relations, while steep complexity sequences, as proposed in (72b), remained intact. In both (72a) and (72b) the number of nuclei visible to phonology was two, (N₂) being locked by LIO. This must have been the crucial difference between type B on the one hand and types C and D on the other, where three nuclei were visible to phonology when the final vowels were reduced to schwas.

Since no other stage in the development of these three types of clusters can be regarded as one when the rhyming patterns were established, we can conclude that, if phonological structure had anything to do with rhymes, then, indeed, the mediaeval verse reflected the linguistic facts from many centuries before Old Irish, namely from late Primitive Irish.

A word or two should now be said about prehistoric double sonorants which had never preceded stops and which still belong to our type C, e.g. [koL] *coll* – ‘hazel’ (Proto-Celtic *koslo-), [bⁱeN] *benn* – ‘peak’ (PC *banno-), or [kaR] *carr* – ‘wagon’ (PC *karso-). In the light of our proposal as regards the time when the rhyming patterns were established, it is not clear why items like these can rhyme with words which contained prehistoric clusters, e.g. [LaN(d)] *lan(d)* – ‘open space’ (PC *landa). One reason may be that there was much confusion in the treatment of original clusters and that the original double resonants in words like [bⁱeN] *benn* – ‘peak’ were reinterpreted not as ones originating from the Proto-Celtic form *banno- but from the non-existent *bando-.

Another cause may be that words such as [koL] *coll* – ‘hazel’ were interpreted as ones in which there were no true geminates but simply sequences of two

identical sonorants. Given that the vast majority of Old Irish sonorant geminates originate from sequences of sonorants and other segments, e.g. the orthographic *nn* is derived from PIE **sn*, **ndn*, or **nd* (Thurneysen 1946: 95), we may suspect that the Primitive Irish system treated the double sonorants in, say, **bannə*, in the same way as it perceived **landə* and it was only after the dropping of final schwas that levelling occurred and both these sequences became LIO-geminates.

Finally, it might be assumed that words like [koL] *coll* – ‘hazel’ or [bⁱeN] *benn* – ‘peak’ joined the rhyming groups when these were already established and the original geminate sonorants were just identical with the ones resulting from the simplification of sonorant+stop clusters.

Be that as it may, the mediaeval verse viewed Primitive Irish double sonorants on a par with sequences of tense sonorants followed by homorganic stops and, at this stage, there is no way of knowing which of the causes presented above was the decisive factor.

To sum up, let us emphasize that the licensing model forces us to say that the rhyming system makes most sense if it was established at the stage when the words which displayed final sonorant+obstruent clusters in Old Irish ended in the vowel [ə]. Neither an earlier nor a later stage appears logical if we assume that the metrical count had something to do with the phonology of the language.

Now, given that svarabhakti seems tenable in the alleged word-final heterorganic clusters, e.g. [lg], while gemination appears justifiable in homorganic sequences which occur in final position, e.g. [N], we will see whether these two phenomena can be postulated in word-medial clusters belonging to these two types. Let us recall that the Old Irish heterorganic word-medial sequences, e.g. [argəd] *argat* – ‘money’, display epenthesis in Modern Irish, i.e. [arⁱgⁱəd] *airgead*), while the Old Irish medial homorganic clusters, e.g. [kⁱeN(d)a] *cen(d)a* – ‘heads’, show only simplification in Modern Irish, i.e. [kⁱaNə] *ceanna*.

3.2.21. Word-medial falling-sonority clusters – conclusion

It is time we concluded our discussion devoted to word-medial falling-sonority sequences. In (3.2.13.) above it was argued that steep complexity sequences occurring in the middle of the word, e.g. [Rt], should be viewed as LIO relations. Our findings confirm this view because if LIO can be postulated in word-final position, where the domain-final empty nucleus is able to license such sequences, a realized vowel in the middle of the word must be capable of performing the same job. This results from the theory-internal assumption that vowels are universally better and stronger licensors than empty nuclear positions. Thus, in both [goRte] *gortae* – ‘famine’ and [goRt] *gort* – ‘field’, LIO obtains between the voiceless stops and the preceding segments.

If we now turn to the gemination of sonorants, which we propose to have originated in word-final sequences such as **mb* → [m] or **Nd* → [N], we can assume that similar developments took place in identical word-medial clusters by analogy. So, once *im(b)* – ‘butter’ started to be pronounced as [im] in the nominative, the other cases followed suit although there was a vowel following the cluster, i.e. [imb^he] → [im^he] *im(b)e* – ‘butter’-gen.sg. Besides, given that there was some confusion between the original sonorant+stop sequences, e.g. **Nd*, and prehistoric double sonorants, e.g. **nn*, which led to fluctuation in Old Irish, e.g. Proto-Celtic **landa* → O.Ir. [LaN(d)] *lan(d)* – ‘open space’ vs. Proto-Celtic **k^wennom* → O.Ir. [k^heN(d)] *cen(d)* – ‘head’, it is likely that both medial and final orthographic sequences such as *nd*, *mb*, *ng* and *ld* represented the same phonological objects in Old Irish, that is [N], [m], [ŋ], and [L], respectively. This assumption cannot be proved or disproved, but it is logical.

Lastly, the word-final svarabhakti clusters like [rg], e.g. [d^herəg] *derg* – ‘red’, and their medial congeners, e.g. [argəd] *argat* – ‘money’, escape simple explanation. In (3.2.16.) it was proposed that in final heterorganic clusters of shallow complexity two prehistoric developments should be viewed as particularly important. First, there was a reduction of the prehistoric short vowel to schwa, i.e. **derga* → **dergə*. This reduction led to the break-up of a LIO relation between the sonorant and the following voiced stop and the Proper Government of the intervening nucleus by the final schwa. And second, there occurred the deletion of schwa, i.e. **dergə* → **derg*, which resulted in a cluster that could not be government-licensed by a domain-final empty nucleus. This situation caused the appearance of a svarabhakti vowel, i.e. **derg* → [d^herəg] *derg* – ‘red’. In the case of [argəd] *argat* – ‘money’, the cluster [rg] was also followed by an unstressed vowel (most probably a schwa), which must have resulted in the break-up of the prehistoric LIO and the application of Proper Government. Given that there were no final schwas in Old Irish, it is difficult to state whether the medial [ə] was a good proper governor in this system. In (3.2.12.), while discussing the so-called Modern Irish secondary epenthesis, e.g. O.I. [egne] *ecne* → Mod.Ir. [agənə] *eagna* – ‘wisdom’, we hypothesized that some schwas need not be proper governors. However vague this assumption may be, it seems that the epenthesis in the Mod.Ir. [ar^hig^həd] *airgead* – ‘money’ may be caused by the inability of the rightmost schwa to properly govern the preceding schwa. As regards establishing an earlier date, the above analysis of epenthesis does not allow us to state whether svarabhakti in words such as [ar^hig^həd] took place as early as in Old Irish or later.

3.2.22. Word-medial triconsonantal sequences

The remainder of this chapter will be devoted to an analysis of ternary consonantal combinations which occur in medial position in Old Irish words. We will try to discover whether any governing relations obtain in these sequences. The point of departure is the assumption that LIO takes place if it can, while RIO is absent from the system.

While describing ternary combinations in the introduction, we observed that they are difficult to capture in terms of regularity. However, given our findings concerning complexity profiles and governing relations in binary sequences from the previous sections, we could divide these triconsonantal clusters into five groups. In the division below, where the exemplary clusters from (23) are repeated along with a broader selection of data, (T) represents a governor in an interonset relation, while (R) stands for a governee.

(73) a. LIO + R/T

- [skn] :*tascnai* – ‘approach’ (3 sg. dependent verbal form of *do:ascnai*)
 [skv] *mescbaid*– ‘quarrel’ or *mesbaid*
 [Rtχ] *fortched* – ‘covering’
 [Ltr] *goltraige* – ‘a kind of music which moved those who heard it
 to sorrow and tears’

b. LIO-gemination + R

- [Ndn] *tindnacol*– ‘giving’ (verbal noun of *do:indnaig*) or *tinnacol*
 [mbr] *cuibre* – ‘brevity’ or *cuimre*

c. RəT + R/T

- [rgv] *turbáil* – ‘lifting’ (verbal noun of *do:furgaib*)
 [rmn] *formna* – ‘shoulder’
 [rmd] *formtech* – ‘envious’

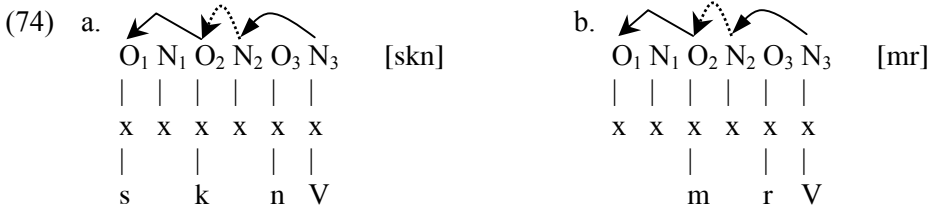
d. T/R + LIO-gemination

- [vNd] *scribndid* – ‘scribe’ or *scribdid* or *scribndid*
 [gNd] *frecndaire* – ‘present’ or *frecdaire* or *frecnaire*
 [Rŋg] *tairngire* – ‘promise’ (verbal noun of *do:airngir*) or *tairgire*

e. T/R + T/R + R

- [θχr] *taitchrecc* – ‘redeeming’ (verbal noun of *do:aithchren*)
 [χsL] *do:fochsla* – ‘seize’
 [RsN] *cotarsnae* – ‘contrary’

The ternary clusters above represent five different patterns. The sequences in (73a) display typical LIO relations, which are followed by one segment, be it an obstruent, e.g. [Rt+χ] or a resonant, e.g. [sk+n]. The combinations in (73b), e.g. [m+br], display a similar structure. Taking into account that the orthographic *mb* probably stood for a geminate labial sonorant, as proposed in (3.2.19.), we may assume the presence of LIO here as well. Consider the following structures:



In (74a) we can see that a LIO relation obtaining between the governor (O₂) and the governee (O₁), which is licensed by the empty unburied (N₂), buries the intervening nucleus (N₁), similarly to word-initial clusters, e.g. [ska:θ] *scáth* – ‘shadow’, [sⁱkⁱrⁱed] *scret* – ‘scream’, or word-final sequences of this type, e.g. [mⁱesk] *mesc* – ‘confusion’. The vowel under (N₃) properly governs (N₂). The same mechanisms can be observed in (74b). Thus, whether we are dealing with a geminate sonorant [m], or with an archaic cluster [mb] followed by another consonant in Old Irish does not matter. A LIO relation obtains between (O₂) and (O₁). The vowel under (N₃) properly governs (N₂), which is the licenser for LIO, similarly to the situation in [im] *im(b)* – ‘butter’.

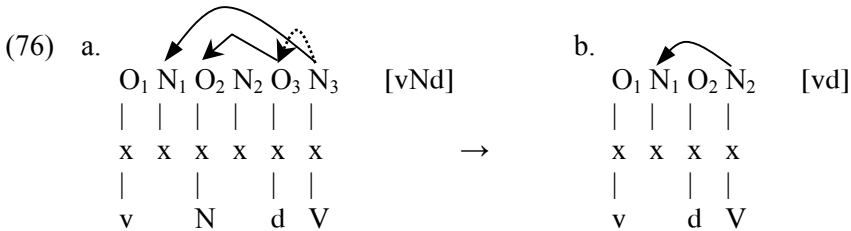
The combinations in (73c), e.g. [rgv], apparently represent svarabhakti clusters. Given that sequences such as [rg] must appear before an empty nucleus in [rg+v], the following representation can be offered:



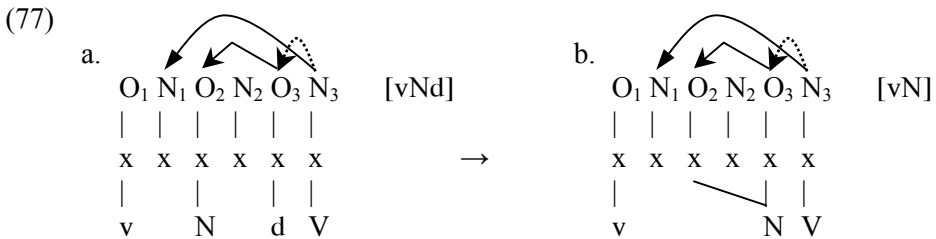
The vowel under (N₃) properly governs (N₂), which, by virtue of being empty, is unable to license a difficult type of LIO between (O₂) and (O₁). The absence of LIO causes the appearance of the svarabhakti vowel under (N₁). The situation in (75) resembles that in words like [boləg] *bolg* – ‘belly’ and [fⁱerəg] *ferg* – ‘anger’ in that the sonorant+voiced stop sequence occurs before an empty nucleus.

Both here and in word-final position, the empty nucleus is too weak a licenser to sanction a shallow complexity LIO relation between a non-homorganic voiced stop and the preceding resonant.

If we now turn to the exemplary clusters from (73d), e.g. [Rŋg] or [vNd], the fact that words in which they are contained have simplified doubles, e.g. [vd] or [vN] for [vNd], is puzzling. We may suspect that either the phonological system of Old Irish felt ‘uneasy’ about such sequences and deleted sonorants, i.e. [vNd] → [vd], or that the geminated sonorants were replacing the previous resonant +voiced stop clusters, i.e. [vNd] → [vN]. These two options are shown below:



Above we can see the simplification of the pre-Old Irish [vNd] to [vd]. In (76a) the vowel under (N₃) licenses LIO between (O₃) and (O₂), and properly governs (N₁). Taking into account that (N₂) is buried and invisible to phonology, Proper Government can apply here.¹⁵ When the sonorant is dropped in (76b), regular Proper Government obtains between (N₂) and (N₁). The other simplification is represented below:



In this development the only change is melodic. The LIO relation between (O₃) and (O₂) in (77a), that is, between a stop and the preceding sonorant, is replaced by LIO-gemination in (77b), where the geminate sonorant occupies two consecutive onsets. The other relations, i.e. the licensing of LIO by (N₃) and Proper Government between (N₃) and (N₂), remain unchanged.

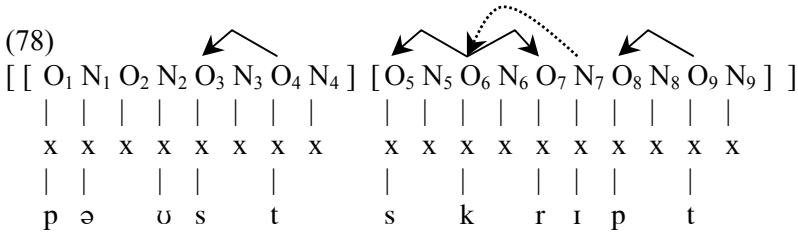
¹⁵ Such an application of Proper Government has been proposed for ternary sequences in Polish by Gussmann and Kaye (1993) as well as Gussmann and Cyran (1998).

Lastly, the triconsonantal clusters belonging to the group in (73e), namely $[\theta\chi r]$, $[\chi sL]$ and $[R sN]$, look like word-initial binary sequences, i.e. $[sL]$, $[sN]$ or $[\chi r]$ (historically lenited $[kr]$), preceded by single consonants. This observation suggests that we may be dealing with morphologically complex structures, i.e. compounds. Most examples in (73) seem to be composed of more than one morpheme, but we have been able to analyze the first four groups without resorting to the concept of morphological complexity because the governing relations which occur within these words are comparable to those which obtain in binary sequences. Now, given that so far we have not discovered any governing relations in any word-initial obstruent+sonorant sequences, e.g. $[\chi r]$, we cannot propose representations of these clusters which would be comparable to those in (74-77) above. What we need is an analysis which takes into account morphological complexity. This will be done in the ensuing section.

3.2.23. *Morphological boundaries and ternary clusters*

Kaye (1995) discusses the importance of morphological structure in phonology. He argues that some morphological boundaries are invisible to phonology and that phonological processes can apply across them. These processes can include place assimilation, vowel reduction, syncope and a few others. This type of morphology is referred to as non-analytic. For example, the English word *parental*, although it consists of the noun *parent* and the adjectival suffix *-al*, is viewed as non-analytic for at least two reasons. Above all, the stress moves from the initial syllable of *parent* to the second syllable in *parental*. Secondly, the diphthong $[eə]$ in the noun is reduced to schwa in the adjective. Therefore, although we are dealing with a complex morphological structure like *parent#al*, phonology recognizes this item as one domain, that is $[\text{pərentəl}]$.

The other type of morphology, in which phonology sees the junctures, is called analytic. In such cases morphemes constitute separate phonological domains. Among other things, Kaye postulates that if certain lexical items cannot conform to the pattern of syllabic structure and violate the governing relations typical of a given system, then their morphological structure is likely to be much more complex than it might appear. In other words, such items belong to the analytic type. A good example of analytic morphology is the English compound $[\text{pəʊstskript}]$ *postscript*. This word, including the cluster $[\text{stskr}]$, which is anything but typical of the English phonological system, must be viewed as consisting of two phonological domains: $[[\text{pəʊst}\emptyset][\text{skript}\emptyset]]$. The governing relations and the licensing of empty slots can be represented as follows:



Above we see two domains. In both the domain-final empty nuclei (N₄) and (N₉) are licensed by parameter. The remaining empty slots, i.e. (N₃), (N₅), (N₆) and (N₈) are sanctioned by the four IO relations. In particular, in the left-hand domain LIO is contracted between (O₄O₃), a relationship licensed by the empty nuclear position (N₄). In the right-hand domain LIO is held between (O₆O₅) and RIO is established between and (O₆O₇). These two IO relations are licensed by the vowel under (N₇). Moreover, another LIO, sanctioned by (N₉), is contracted between (O₉O₈) In terms adopted in the present analysis, the empty slots (N₃), (N₅), (N₆) and (N₈) are all buried.

Another interesting instance of analytic morphology in phonology is the English word *sixths* which, according to Kaye (1995), has the bracketed structure of [[siksø][θø][sø]], where the last three members of the final cluster [ksθs] are licensed by parameter as domain-final.

To sum up, a phonological domain is one which includes the regularities of a given phonological system. If an item which belongs to this system violates the commonly occurring regularities, it should be viewed as one composed of more phonological domains than one.¹⁶

Given this theoretical background, let us now return to the ternary clusters occurring in the middle of Old Irish words. As already mentioned, all the cases in (73) including ternary combinations are morphologically complex. However, the group in (73e) containing typical word-initial sequences, i.e. [χr], [sL] and [sN], preceded by single consonants, which ultimately surface as [θχr], [χsL] and [RsN], cannot be analyzed in terms of regular governing relations proposed for binary consonant combinations. The main problem lies in the licensing of empty positions separating the consonants because no LIO relation, which is the only type of interonset government detected in the system, can be proposed between any of the cluster members in these sequences.

Thus, the only logical solution to accounting for the sequence of empty nuclei separating the cluster members, i.e. [θøχør], [χø[sø]L] and [Rø[sø]N] is that we are dealing with at least two domains in each case. This is represented below:

¹⁶ A lucid description of phonological domains can also be found in Gussmann (2002).

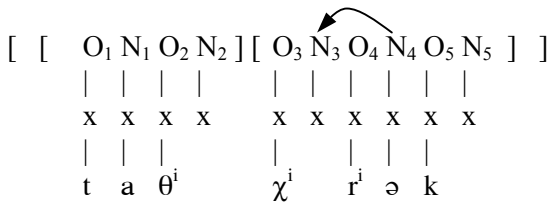
(79)

- [[foχϕ][sϕLa]] :foχsla – ‘seize’
 [[taθⁱϕ][χⁱϕrⁱəkϕ]] taithchrecc – ‘redeeming’
 [[kodəRϕ][sϕNe]] cotarsnae – ‘contrary’

Given that these items derive from prehistoric complex structures such as *fo-kom-sel-, *to-ait-kre- and *kom-tarsna, respectively, solutions such as these in (79) seem plausible. It should be emphasized again that all the items in (73) originate from ancestral forms which show morphological complexity, but only the ones in (79) force us to adopt the view that they are not single domains. This is because only these items violate the governing relations detected in the phonological system to which they belong.

Thus, in (79) we can see final empty nuclei licensed as domain-final, which are followed by typical word-initial clusters where the empty nuclei separating the cluster members are properly governed by the following vowels. By way of illustration, consider the following structure:

(80)



Under such an analysis, the muteness of all the empty nuclei can be accounted for. The empty nucleus (N₂) following [θ] is domain-final and thus empty without any consequences. The nucleus (N₃), which separates the cluster [χr] is properly governed by (N₄).

Although the notion of phonological domains is very helpful in explaining otherwise inexplicable consonant combinations, the idea that we should divide words into domains may be frowned upon because of what has been advocated so far. In particular, it has been claimed that in prehistory phonological processes could easily operate across word-boundaries, while here they cannot do so even within words. However, it must be emphasized that ancient consonant mutations do not seem to operate synchronically in Old Irish and, in order to derive e.g. *taithchrecc* from *to-ait-kre-, one has to enumerate prehistoric processes such as the weakening of [t] → [θ] and [k] → [χ], which must have occurred within phonological words, the possible shift of stress to the initial syllable of the noun from the second in the verb *do:aithchrenn* (*to-ait-kren), the vocalic fusion of [o]+[a] → [a], as well as a few minor adjustments. Such a number of

operations must have taken place over a long period of time and it is by all means possible that between the era of phonologically motivated mutations and Old Irish new phonological do-mains replaced the old ones. The fact that triconsonantal combinations surfacing in Old Irish had not been present in the system beforehand seems to support the view that the morphological complexity of Irish words had been changing before Old Irish. In other words, what may have been one phonological domain in Insular Celtic was no longer the same domain in Primitive Irish. On the other hand, the occurrence of empty nuclei in every phonological system must be accounted for on a synchronic basis.

Therefore, at the present state of research, the solution proposed above seems the only possibility of explaining why unusual triconsonantal clusters can surface word-medially in Old Irish and why so many empty nuclear positions can be included in word forms such as those in (79).

3.2.24. Word-final sequences – conclusion

Word-final sequences in Old Irish words are all characterized by falling sonority, i.e. RT. The analysis above indicates that this fact should have no impact on the perception of their phonological structure. Using the notion of phonological licensing, it can be proposed that the seemingly similar clusters can be divided into three groups. The only LIO-clusters are those composed of voiceless stops preceded by either sonorants, e.g. [lk], or voiceless fricatives, e.g. [χt]. It can also be claimed that non-homorganic sonorant+voiced stop sequences, e.g. [rg], should be viewed as spurious clusters which developed svarabhakti vowels very early, i.e. [rəg]. This proposal suggests that the so-called Modern Irish epenthesis was in fact an Old Irish development (it is not unlikely that it was even older). An argument in support of this stance is that the mediaeval poetry did not treat combinations like [rg] as comparable to clusters such as [rk], i.e. [rg] never rhymed with [g], while [rk] could rhyme with [k]. Finally, it has been proposed that homorganic sonorant+voiced stop sequences, e.g. [mb], were simplified to sonorant geminates within or just before Old Irish and it was only then when they established LIO-gemination. It should also be emphasized that the recognition of three types of word-final clusters is helpful in analyzing the structures of many word-medial triconsonantal sequences.

3.3. Chapter summary

The foregoing analysis of Old Irish clusters has sought to demonstrate that the sonority profiles and a priori interpretations of consonant sequences should have no influence on phonological analysis. The important factors are: the licensing capability of nuclei and the element complexity of cluster members. The above

analysis was divided into two main parts: one embraced word-initial, while the other word-final clusters. Word-medial sequences were treated as combinations which occur on either edge of the word.

Consonants in word-initial sequences, which are by and large defined by rising sonority TR, were deemed to display no IO relations between the cluster members. Such a conclusion resulted from a diachronic analysis of lenition phenomena in consonant sequences which indicated that the nuclei in the phonological system of Irish were gradually losing the potential to license rightward interonset relations (RIO). In particular, RIO was first broken-up word-medially in shallow complexity clusters, e.g. [gn], which ultimately led to the decomposition of RIO in the other, previously well-formed RIO structures, e.g. [tr], in all positions in the word. *s*+voiceless stop clusters constitute a conspicuous exception to the absence of government in word-initial position. In these combinations IO government does obtain but it is contracted in the direction typical of word-final sequences (i.e. leftward). Word-medial consonant clusters displaying the same sonority profile, i.e. TR, have been found to conform to the pattern established for word-initial combinations. In other words, they contract no IO relations.

Word-final consonant sequences, which invariably display falling sonority, i.e. RT, cannot automatically be viewed as governing relations either. Also here the constantly diminishing licensing power of nuclei can provide the key to interpreting the structure of clusters. It has been shown that leftward interonset relations (LIO) can be contracted only between steep complexity clusters, e.g. [Rt], while all the other combinations must have different structures. A diachronic analysis of the behaviour of word-final clusters, their development after the period of Old Irish, as well as their employment in the mediaeval rhyming patterns, suggest that non-homorganic sonorant+voiced stop sequences, e.g. [rg], should be regarded as epenthetic, i.e. [rəg], while the homorganic sonorant+voiced stop combinations, e.g. [mb], are in fact tense sonorants in which LIO (gemination) also operates. The reason why these two groups can rhyme in the mediaeval verse has to be sought in prehistory when they displayed identical phonological structures.

Triconsonantal combinations of consonants usually contain the binary clusters occurring at either end of the word. These are either preceded or followed by a single consonant. When typical word-final clusters are combined with a single consonant, the structures of ternary sequences can be explained using the mechanisms employed in determining the structures of the final clusters. When classic word-initial groups stand side by side with one consonant, we need to resort to the notion of morphological boundaries visible to phonology. Specifically, in such cases the presence of two phonological domains must be proposed.

A side-effect of this analysis has been an omnipresent need to distinguish between two types of empty nuclei. Nuclei of the first type, named ‘unburied’ here, occur word-finally and can be properly governed in word-medial position. These empty slots can be licensors for the preceding onsets and some IO relations. The other kind, referred to as ‘buried’, are present between true clusters and play no role in phonology. In other words, such nuclei cannot serve as licensors for the onsets they follow. This differentiation has made it possible to define the leniting environment, which has never been presented in a similar fashion in the relevant literature. In traditional analyses the prehistoric contexts of VCV and VCRV are perceived as leniting. Here, however, it has been proposed that the presence of resonants did not contribute to the creation of a leniting environment in ancient times. What mattered was the nature of empty nuclei. In particular, consonants were weakened between a vowel and an unburied empty nucleus, whereas they resisted lenition between a vowel and an empty nucleus buried by an interonset relation. Therefore, unburied empty nuclei behaved like vowels with respect to lenition. Or, to be more precise from the diachronic viewpoint, vowels started to behave like unburied empty nuclei at some point in the prehistory of Irish.

4 Old Irish short vowels and consonant qualities

4.1. Introduction

In this chapter the system of short vowels of Old Irish will be examined. The most commonly accepted view is that the phonological system of this language consists of five short nuclei: [i], [e], [a], [o], [u], which are orthographically represented by the letters *i*, *e*, *a*, *o* and *u*, respectively. These vocalic expressions, if they occur in stressed position, that is, in the first syllable of the word, at times alternate with others, e.g. [e – i] in the pair [fⁱer]/ [fⁱirⁱ] *fer/fir* – ‘man’/gen.sg., under conditions to be discussed below. None of them ever alternates with zero. The same five letters stand for short unstressed vowels which may alternate with zero, e.g. [u – ø] in [dⁱe[~]vun]/[dⁱe[~]vne] *demun/demnae* – ‘devil’/gen.pl., or with other vowels, e.g. [dⁱiⁱγⁱidⁱ]/[dⁱiⁱγⁱuð] *dligid/dligud* – ‘law’-gen.sg./dat.sg.

Unlike in contemporary languages, where we can be certain of the exact pronunciation of lexical items, in Old Irish the actual quality of some sounds, especially those which undergo reduction as a result of being unstressed, is unlikely to be established even through a thorough phonological analysis. Thus, the goal of the ensuing discussion is not to discover the precise details of ancient phonetics but, rather, to try to understand the general workings of the vocalic system.

It is the aim of any phonological study to approach a given system in a synchronic way but in the case of Old Irish this is not always possible. We saw in Chapter Two that word-initial consonant mutations present in Old Irish cannot be viewed as phonological since their occurrence was not triggered by the synchronically available phonological environment. Old Irish vocalic alternations are also frequently unaccountable for if approached synchronically. Thus, a diachronic analysis of these alternations will be advocated.

An essential fact about Old Irish short vowels is that their actual quality is considered to be by and large dependent on the qualities of the flanking consonants. Moreover, consonants have to be taken into consideration while discussing the problem of short vocalic nuclei because no short vowel in a stressed syllable is allowed to occur word-finally in Old Irish, which means that a word like **cu* [ku] is a non-permissible construction. In such a case the vowel must be long, i.e. *cú* [ku:] – ‘hound’. In order to capture the nature of the relationships between consonants and vowels and decide whether consonants determine the

vocalic expressions, we will discuss the quality specification of consonants paying particular attention to consonant-vowel interaction. Also in this respect a synchronic analysis of the problem may appear insufficient and a historical inspection of the data may turn out inevitable. In particular, it will be argued that the shape of Old Irish short vowels to a great extent reflects the prehistoric interactions of elements.

The present chapter is organized as follows. First, a selection of relevant data illustrating context-sensitive vowel alternations in Old Irish will be given. Additionally, prehistoric versions of words participating in alternating pairs will be provided with a view to identifying the reasons behind the raising and lowering of vowels in stressed syllables and accounting for these phenomena in terms of GP. Subsequently, traditional and modern approaches to the problem of consonant qualities in Old Irish will be presented and discussed. This will be followed by a discussion of the non-alternating vowels, the vowels in unstressed syllables and the context-sensitive long vowels. Finally, conclusions concerning vocalic alternations and consonant qualities in Old Irish will be drawn.

4.2. Vowels in stressed syllables and vocalic alternations

The first issue to be discussed here is the behaviour of simplex nuclei in stressed syllables. These vowels are graphically represented by *i*, *e*, *a*, *o*, *u*. It is generally assumed that the above symbols, if written single, represented the actual vocalic expressions. Sometimes, however, more than one vocalic symbol is employed to represent a vowel and in such cases additional factors have to be considered while deciding on the actual phonetic shape of this vowel. For example, in the word *leith* – ‘half’-gen.sg. the symbol *e* gives the quality of the vowel, while the letter *i* indicates the palatalization of the final spirant. Thus, the word is pronounced as [Lⁱeθⁱ], where the superscript symbol (ⁱ) denotes palatalization. The nominative singular of this word, which is [Lⁱeθ] *leth*, shows no palatalization of the final segment. In another example, namely *cinaid* – ‘fault’-nom.pl., the vocalic symbol *a* is used to indicate that the word-medial nasal is non-palatalized although it occurs between two front vowels, and the word is pronounced as [kⁱiniðⁱ]. These orthographic factors, one of them being the need to indicate whether a given consonant is palatalized or not, will be mentioned whenever necessary. Palatalization and its functions in Old Irish will be discussed soon. First, let us concentrate on these short vowels in accented syllables which alternate with other ones.

Old Irish short vowels fall into four types according to the way they behave with respect to the phenomenon of alternation. Some short vowels in closed syllables alternate with those in the open syllables. We will call these ‘alternating vowels in open syllables’. Consider the examples below:

- (1) a. [u – o] [guθ] [goθo] *guth/gotho* – ‘voice’/gen.sg.
 [oγ] [uγe] *og/ugae* – ‘egg’/gen.sg.
- b. [i – e] [fⁱið] [fⁱeðo] *fid/fedo* – ‘wood’/gen.sg.
 [gⁱiⁱeN] [gⁱiⁱNⁱe] *glenn/glinne* – ‘valley’/gen.sg.

We are dealing here with the most typical Old Irish alternations, that is [u – o] in (1a) and [i – e] in (1b). What seems responsible for the vocalic changes in these cases is the presence of the vowel in the genitive.

The same changes occur in another group of words. Here, however, the alternations occur without the presence of vocalic endings. These are shown below:

- (2) a. [e – i] [bⁱeg] [bⁱigⁱ] *becc/bicc* – ‘small’/gen.sg.
 [fⁱer] [fⁱirⁱ] *fer/fir* – ‘man’/gen.sg.
- b. [o – u] [kloθ] [kluθ] *cloth/cluth* – ‘fame’/dat.sg.
 [son] [sun] *son/sun* – ‘sound’/dat.sg.

Here the alternations cannot be accounted for by taking into consideration any vocalic environment because no endings are available. These vowels will be termed ‘alternating vowels in closed syllables’.

Another alternation taking place without the participation of vocalic endings is that of [a – u]. Words illustrating this alternation are slightly less numerous.

- (3) [a – u] [brat] [brut] *bratt/brutt* – ‘cloak’/dat.sg.
 [kraN] [kruN] *crann/crunn* – ‘tree’/dat.sg.

Yet another alternating type occurring in Old Irish is [a – e]. Similarly to the cases in (1), vocalic endings appear to have much in common with these changes too. Consider the examples below:

- (4) [a – e] [daγⁱ] [dⁱeγo] *daig/dego* – ‘fire’/gen.sg.
 [talⁱmⁱ] [tⁱelmo] *tailm/telmo* – ‘sling’/gen.sg.

All these vocalic alternations in stressed syllables will be tackled in the ensuing sections. We will commence the survey with [i – e] and [u – o] changes in open syllables.

4.3. A GP analysis of vocalic alternations in stressed syllables

4.3.1. Vocalic alternations [i – e] and [u – o] in open syllables

As mentioned in the previous section, some short vocalic expressions enter into alternations with other short vowels under clearly determined circumstances. Consider the following examples illustrating the most typical alternations occurring in Old Irish, which are [i – e] and [u – o] in open syllables:

(5) a. [i – e]				
[m ⁱ il ⁱ]	[m ⁱ elo]	[m ⁱ il ⁱ i]	<i>mil/melo/mili</i>	– ‘honey’/gen.sg./acc.pl. ¹
[R ⁱ iNd]	[R ⁱ eNdo]	[R ⁱ eNde]	<i>rind/rendo/rendae</i>	– ‘star’/gen.sg./gen.pl.
[f ⁱ is]	[f ⁱ eso]		<i>fi(u)s/feso</i>	– ‘knowledge’/gen.sg.
[b ⁱ ig]	[b ⁱ ega]		<i>bi(u)cc/becca</i>	– ‘small’-gen.sg./nom.pl.nt.
b. [u – o]				
[muɣ]	moɣo]	[muɣu]	<i>mug/mogo/mugu</i>	– ‘serf’/gen.sg./acc.pl.
[kruɣe]	[kroχ]		<i>cruchae/croch</i>	– ‘cross’-gen.sg./nom.sg.
[mur ⁱ]	[moro]	[mur ⁱ e]	<i>muir/moro/muire</i>	– ‘sea’/gen.sg./nom.pl.
[trume]	[trom]		<i>trummae/tromm</i>	– ‘heaviness’/‘heavy’

A certain regularity can be observed in many of the cases above. Specifically, the vowels [i] and [u] are present in the stressed syllables if there is no mid or low vowel in the following syllable, e.g. [moɣo] *mogo* vs. [muɣu] *mugu* – ‘serf’-gen.sg./acc.pl. Seeing this, we may propose the following working hypothesis: high vowels go with other high vowels while non-high vowels accompany other non-high vowels. In other words, some kind of vowel harmony with respect to the height of the vowels can be detected.

However, there are a few problems with this observation. Above all, a few cases have no vocalic endings and the reasons why the stem vowel may be either mid or high are unclear. In particular, it is uncertain what determines the quality of the stem vowel if there is no ending. Another question refers to items such as [murⁱe] *muire* – ‘sea’-nom.pl. vs. [RⁱeNde] *rendae* – ‘star’-gen.pl. In both these examples the final vowel is [e]. This vowel follows the high vowel in the stem in the former case, while it does not in the latter.

The fact that certain incongruities occur in a system may mean a few things. First, aberrations simply occur because there are no perfectly symmetrical systems. Second, the irregularities are superficial and the reason for them may still be undiscovered. Third, this reason may not be synchronic.

¹ The genitive frequently displays the ending *-a* instead of *-o*.

In point of fact, the Old Irish alternations exemplified in (5) above occurred in the prehistory of Irish and they had a clearly determined phonological cause (Thurneysen 1946:46ff.; Kortlandt 1979:43ff.; McCone 1996:110). Specifically, the presence of the vocalic ending frequently contributed to the quality of the stem vowel. When the ending contained a high vowel, the stem vowel was normally raised. If the ending consisted of a low vocalic segment, the stem vowel was most often lowered. Thus, the circumstances under which alternations occurred must not be neglected. Taking this into account, we need to go back in time to find out more about the contexts favouring vocalic changes.

4.3.1.1. Historical causes of [i – e] and [u – o] alternations

Although the examples in (5) illustrate most prominent alternations found in Old Irish, these changes have their source back in the prehistory of Irish. In particular, some original high vowels [i] and [u] were lowered to [e] and [o], respectively, when the following syllable contained a non-high back vowel, that is either [a] or [o] (Thurneysen 1946:46; McCone 1996:110ff.). This is illustrated below:

(6)	<i>Stage I</i>	<i>Stage II</i>	<i>Old Irish</i>
i → e	*wis(s)o: → *weso	→ [f ⁱ eso]	<i>feso</i> – ‘knowledge’/gen.sg.
u → o	*trumba → *tromba	→ [trom]	<i>tromm</i> – ‘heavy’

In both cases we can observe the lowering of the original high vowels in the stressed syllables to mid ones under the influence of non-high vowels in the following syllables at Stage II. However, a reverse process also took place in prehistory, as a result of which the original mid vowels [e] and [o] were raised to [i] and [u] if the following syllable included the high vowels [u] or [i].

(7)	<i>Stage I</i>	<i>Stage II</i>	<i>Old Irish</i>
e → i	*melis → *mili	→ [m ⁱ il ⁱ]	<i>mil</i> – ‘honey’
o → u	*mori → *muri	→ [mur ⁱ]	<i>muir</i> – ‘sea’

The developments in (6) and (7) above show the phenomenon of vowel-harmony which was present in Primitive Irish. The effect of this process in the form of different shapes of the stressed stem vowels remained until Old Irish (and later on), even if the following vowels were dropped. In other words, the cause (the umlaut-triggering vowels) appeared in Stage I, the result of raising/lowering was observable at Stage II, while it remained put even if the trigger was no longer

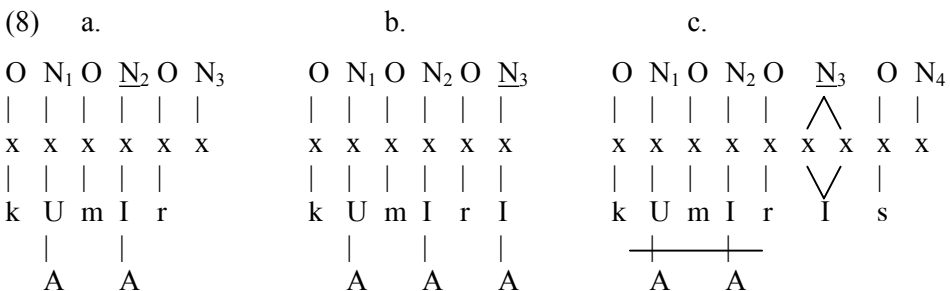
present, which can be seen in Old Irish. Thus the absence of the vowel in the following syllable did not cause the retreat of the process, which in the case of, say, [murⁱ] would produce the incorrect *[morⁱ]. At his juncture we should reformulate our working hypothesis in the following way: if the word-final vowel is mid or low, the stem vowel should not be high.

In the following section an attempt will be made to explain the prehistoric alternations in open syllables from the viewpoint of Government Phonology.

4.3.1.2. A GP account of [i – e] and [u – o] alternations

Having identified the source of the vocalic alternations as the presence of the vowel of the ending, we may now try and account for these prehistoric changes in terms of interactions between phonological elements from the viewpoint of Government Phonology. Let us recall that GP recognizes three resonance elements responsible for the shape of all vocalic expressions, namely (I), (A), and (U). It is commonly held that these elements, when used in isolation, represent the vowels [i], [a] and [u], respectively. They can also combine with others, e.g. (I, A) stands for [e] while (U, A) represents [o]. Since we have not discovered any other vowels apart from the canonical five in either Primitive Irish or Old Irish as yet, we may adhere to this standard interpretation of vocalic structure.

Before a GP analysis of the pre-Old Irish vocalic alternations is offered, let us consider instances of vowel harmony in Pasiego Spanish (Harris and Lindsey 1995:42ff.) with a view to discovering if these cases resemble the vocalic phenomena in the ancient Irish words. Pasiego Spanish displays the height harmony. In other words, high vowels cannot occur with mid or low vowels in one word. The responsibility for the height of vowels in lexical items is not accidentally granted: the underlined licensing nucleus (the stress-bearing head of the domain) determines the melodic content of the unstressed nuclei. This is shown below:



[komer] – ‘eat’ (inf.)

[komere] – (1sg.fut.)

[kumiri:s] – (2pl.fut.)

In (8a) the head of the domain (N₂) contains the element (A) which is also licensed by the other nucleus in the domain, that is (N₁). As a result, we find only mid vowels in this word. In (8b) the main licenser (N₃) also possesses the prime (A) and this element appears in the remaining nuclei. This fact is responsible for the presence of only mid vowels in this item. In (8c), though, the licenser (N₃) displays only the element (I) which is realized as the high vowel [i:] and the licensee also disfavours the element (A).² This results in the suppression of (A), the unstressed vowels are high as well and they surface as [u] and [i].

Let us now return to the pre-Old Irish changes [i – e] and [u – o]. Similarly to the vocalic alternations in Pasiego Spanish, we are dealing here with height vowel harmony as well. The archaic versions of *feso* – ‘knowledge’-gen.sg. and *mil* – ‘honey’ serve as examples. Consider the following developments, where the vowels are represented by the appropriate phonological primes (certain segments are left unsyllabified for the sake of clarity):

(9)

<i>Stage I</i>	→	<i>Stage II</i>	
a. *wiso:	→	*weso ³	
O N ₁ O N ₂		O N ₁ O N ₂	i → e LOWERING
x x x x	→	x x x x	
w I s U		w I s U	
A		A << A	
b. *melis	→	*mili	
O N ₁ O N ₂		O N ₁ O N ₂	e → i RAISING
x x x x	→	x x x x	
m I l I s		m I l I	
		—	
A		A	

² In the representation in (8c) we disregard the fact that the stressed long vowel is viewed by Harris and Lindsey as a branching nucleus and not as a sequence of two nuclei. Their different interpretation of the skeletal structure of long vowels has no impact on the present discussion.

³ See section (2.3.4.) to find out about the development of [w] to [f].

These representations are roughly parallel to those illustrating the alternations in Pasiego Spanish above. Stage I shows the state of affairs before the alternation. In Stage II in (9a) the nucleus (N_1) licenses the element (A) because this prime has been attached also to the nucleus (N_2). The element spreading from (N_2) for (N_1) is marked by (<<) because the element (A) ‘moves’ from the end of the word to the left. As a result, two mid vowels occur in the word *weso.

The fact that the element (A) is now present in two consecutive nuclei may be understood in terms of spreading. What is peculiar and different from the situation in Pasiego Spanish is that the nucleus from which the element spreads is not the stressed head of the domain, as we would expect. However, the notion of spreading, as discussed by Harris (1994:167), need not be viewed as a dynamic phenomenon. In other words, a skeletal position may be phonetically interpreted as one which contains a prime which is distinctively lodged under another position. Thus, the original [i] under (N_1) may have been interpreted as [e] before a back non-high vowel in the following syllable. In other words, we may be witnessing an interpretative (phonetic) effect which was later lexicalized.

In Stage II of (9b) the original vowel [e] in (N_1) no longer licenses the element (A) because this prime is absent from the nucleus (N_2). Deprived of (A), the vowels are high and the form surfaces as *mili. This element decomposition can hardly be treated as a phonetic effect, though. It is clear that when the vowel of the ending lacks (A), the stem vowel does not license it either. Thus, we must conclude that we are dealing with umlaut (regressive vowel harmony).

Since the phenomenon of vowel harmony occurs at the melodic level, it is likely that at some point in prehistory the high vowels were lowered while the mid ones were raised due to the same melodic constraint: the element (A) had to be doubly linked to survive in the structure. To put it differently, once this element was linked to the final vowel, it had to be licensed by the stem vowel as well. If this prime was absent from the ending, it was automatically suppressed under the other nucleus in the harmonic span.

The reason why it is the ending and not the stem vowel that determines the quality of the harmonic span is not clear and, under the above analysis, unimportant. Note that umlaut which took place in, for example, Old Icelandic (e.g. Anderson and Ewen 1987:215ff.) and other languages is also frequently difficult to account for. What is clear is that the phonological context for these pre-Old Irish changes was present and the local source for element spreading was identifiable.

The diagrams in (9a, b) suggest why the alternation of [i – e] occurred in Primitive Irish. Exactly the same conditions had to be met in the [u – o] alternation. As a matter of fact, some of these alternations retain the phonological context in Old Irish, e.g. [f^heso] *feso* – ‘knowledge’-gen.sg. vs. [mu^hy^hu] *mugu* – ‘serf’-acc. pl. etc., because the final vowels have not been dropped.

What still calls for explanation is the different behaviour of the stem vowels before the mid vowel [e], which is exemplified by [murⁱe] *muire* – ‘sea’-nom.pl. vs. [RⁱeNde] *rendae* – ‘star’-gen.pl. Let us recall that the constraint proposed for vowel harmony is that the element (A) must be doubly linked. Looking at these Old Irish forms alone does not help to answer the question of why the word [RⁱeNde] fulfils this condition, while [murⁱe] does not. At first sight, one might suspect that the palatalization factor has something to do with this incongruity. In particular, the cluster [Nd] in [RⁱeNde] is broad (that is, it does not favour height), while the liquid [r] in [murⁱe] is slender (which may support height). However, if we also consider cases such as [trume] *trummae* – ‘heaviness’, where the nasal [m] is broad and the form should behave like [RⁱeNde], but it does not, it is clear that the palatalization factor is not at work here. Thus, we need to consult the prehistoric variants once again and see if any clues can be found in the relevant literature.

Let us begin with [murⁱe] *muire* – ‘sea’-nom.pl. We remember from (6) and (7) above that the original stem vowel in the word for ‘sea’ was [o], e.g. in the prehistoric nominative singular *mori. Thurneysen (1946:193) notes that the nominative plural ending *-e* in the declension to which [murⁱe] belongs (the so-called *i*-stems) goes back to *-ia. Pokorny (1914:62) transcribes this primitive ending as *-ijə. Whatever the phonetic interpretation and syllabic structure of this ending was, that is, either a diphthong (two nuclei with an intervening empty onset) or two vowels separated by a semi-vowel (nucleus-onset-nucleus), one thing seems obvious: there was a high vowel immediately following the stem and the stem vowel could not possibly be mid in this particular paradigmatic case. The development of the nominative plural must have been *moriyə → *muriyə → [murⁱe]. In terms of elements, we can conclude that, when the raising occurred, there was no element (A) under the nucleus immediately following the liquid [r] and, consequently, this element could not survive in the left-hand nucleus.

If we now turn to the form [RⁱeNde] *rendae* – ‘star’-gen.pl., we find the following descriptions. Both Thurneysen (1946:198) and Pokorny (1914:64) agree that the genitive plural ending *-e* is not typical of the declension to which this word belongs (the so-called *u*-stems) and that it was borrowed from the declension under which [murⁱe] is classified (in fact, the nominative and genitive plural in the case of [murⁱe] are identical in Old Irish). Pokorny additionally observes that the genitive plural primitive ending in *u*-stems was *-o, which originated from the earlier *-owom. Thus, we are faced with the following state of affairs.

The original stem vowel in the word for ‘star’ was [e], the ancient nominative being *rendu. This vowel was raised to [i] in the nominative [RⁱiNd] *rind* according to our constraint on the double linking of (A), i.e. *rendu → *riNdu → [RⁱiNd]. The genitive singular [RⁱeNdo] *rendo* is perfectly regular: the original

[e] in the stressed syllable is simply preserved since the following vowel contains the prime (A), that is *rendo: → *reNdo → [RⁱeNdo]. Consequently, the development of genitive plural [RⁱeNde] *rendae* must have been *rendowom → *reNdo. The conditions mentioned above are met here as well because the mid vowel remains intact if followed by another mid vowel. Afterwards, as Pokorny and Thurneysen suggest, the replacement of the original ending took place and the final *-e* was substituted for the original regular final *-o*. This substitution had nothing to do with phonological development and the vocalic ending, which was attached to the consonant-final stem, apparently exerted no influence on the stem vowel. We cannot be absolutely certain about the lack of impact of this ending because both [o] and [e] contain the element (A). Thus, either vowel was theoretically capable of supporting the element (A) in the stem vowel. However, the fact that the new palatalizing ending *-e* did not transform the stem-final cluster into a palatalized sequence of consonants may indicate that *-e* was added to the stem when the vowel harmony, which triggered the alternations, was no longer in force. To conclude, the ending [e] in [RⁱeNde] *rendae* – ‘star’-gen.pl. is not a result of a phonological development, while the stem vowel was not raised to [i] because it was followed by [o] when vowel harmony was operative.

A word or two should now be said about the form [trume] *trummae* – ‘heaviness’, which has been used as a counterexample to the possible claim that the quality of the consonant preceding the ending may have had some impact on the stem vowel. This word belongs to the so-called *iá*-stems, and the primitive palatalizing ending *-ija (Thurneysen 1946:165) indicates that, at the time of alternations, the stem *trumb was followed by a high vowel, which did not cause the lowering of the original high vowel [u] to [o]. Afterwards, the ending was simplified to the palatalizing [e], but the stem-final cluster resisted palatalization, which may result from the inherent properties of this cluster (Thurneysen 1946:103). Thus, the preservation of [u] in the stem was regular and the fact that this vowel was later followed by the ending [e] is irrelevant.

To sum up the analysis of ancient element interactions which caused the vocalic alternations [i – e] and [u – o], it needs to be said that the processes of raising and lowering were perfectly regular and predictable in prehistory. Since all words contained stressed vowels which were followed by other vocalic segments in recessive syllables, we may safely speak of vowel harmony with respect to height. In GP terms, the occurrence of the element (A) in the vocalic ending, i.e. in either [o] or [a], triggered the presence of the same prime in the stem vowel, while the absence of (A) in the final vocalic expression invariably resulted in the raising of the whole harmonic span. The subsequent (Early) Old Irish ending shifts and confusions between different declensions frequently obscured the true cause of the abovementioned alternations.

Since the prehistoric regular vocalic alternations still take place in Old Irish without a visible cause, we may tentatively call them morphophonological. In other words, the ancient phonological pattern (alternation) is preserved although the trigger (vocalic ending) is frequently no longer available.

In the following section we will inspect another stressed-vowel alternation, namely [a – e], which seems to be triggered by the synchronic presence of the vowel in the final syllable. Also in this analysis we will need to resort to prehistoric forms of lexical items to find out whether any regularities can be detected.

4.3.2. *Vocalic alternation* [a – e]

Let us now turn to [a – e], another alternation occurring in stressed syllables. Although it affected a relatively small number of lexical items, this alternation is fairly regular and must be treated on a par with the ones discussed above.

One major difference between the alternations analyzed in the previous sections and this one is as follows. In the case of both changes [i – e] and [u – o], the presence of the vowel in the final syllable in Old Irish caused the lowering (e.g. *fis/feso* – ‘knowledge’/gen.sg.) while its absence triggered the raising (e.g. *mil/melo* – ‘honey’/gen.sg.) of the original stressed nucleus. On the other hand, in the alternation of [a – e], the synchronically available ending invariably raises the stem vowel. Consider the following examples illustrating this pattern.

(10)	[a – e]		
[aɣ ⁱ]	[eɣo]	<i>aig/ego</i>	– ‘ice’/gen.sg. ⁴
[daɣ ⁱ]	[d ⁱ eɣo]	<i>daig/dego</i>	– ‘flame’/gen.sg.
[fraɣ ⁱ]	[fr ⁱ eɣo]	<i>fraig/frego</i>	– ‘wall’/gen.sg.
[talm ⁱ]	[t ⁱ elmo]	<i>tailm/telmo</i>	– ‘sling’/gen.sg.

The alternation exemplified above appears regular in that the stem vowel [a] of the nominative is always raised to [e] if the following genitive ending contains the vowel [o]. The cases from (5) above, e.g. [fⁱis]/[fⁱeso] *fī(u)s/feso* – ‘knowledge’/gen.sg., may indicate that we are dealing with the same height harmony in the genitive, but the low vowel [a] in the nominative remains unaccounted for. In other words, we would expect the vowel [i] in this context.

We remember from (4.3.1.2.) that the presence of the element (A) in the final syllable can be held responsible for the preservation of the mid vowel [e] in the stressed syllable, e.g. *rendo → [RⁱeNdo] *rendo* – ‘star’-gen.sg., and for the change of [i] to [e], e.g. *wisso: → *wesō → [fⁱeso] *feso* – ‘knowledge’-gen.sg.

⁴ Similarly to words such as *feso* and *moro*, the genitive singular of these items also frequently displays the final *-a* instead of *-o* in Old Irish.

However, so far the vowel alternating with [e] has been [i] and not [a]. What should also be noted about the cases in (10) is that the final consonant of the nominative is always palatalized, while the consonant preceding the final vowel of the genitive is not. Moreover, palatalization is present in the initial consonant of the genitive only, which tallies with the view that only the front vowels, i.e. [i] and [e], can follow a slender consonant.

Before we inspect the prehistoric versions of the relevant examples, we may hypothesize about the nature of this alternation using GP terminology. We know that in terms of elements the vowel [a] is a realization of the prime (A), the vowel [e] is normally a mixture of (I, A), while [o] is a combination of (U, A). Looking at the data in (10) we are confronted with the following situation. The left-hand nucleus contains the element (A) alone in the nominative. This prime, when apparently influenced by the combination of (A, U) in the genitive, produces the blend of (I, A). Such a process is definitely out of the question because it has no local source and we need to find a far more plausible solution.

One logical possibility is that the nominative and the genitive originate from different stems and are, in fact, phonologically distant from each other. Another option may be that there is a mechanism which has not yet been discovered, for example the merger of the nuclear (A) with the element (I), possibly somehow defining the final palatalized consonant of the nominative, in order to satisfy the vowel harmony requirements of the genitive case, i.e. those present in [f^heso] – ‘knowledge’-gen.sg., for instance. Finally, in prehistory something may have happened which caused the discrepancy between the stem vowel in these two paradigmatic cases. In pursuit of the reasons behind this change, let us go back in time again and inspect the situation in the ancient version of Irish.

4.3.2.1 Historical causes of the alternation [a – e]

First, let us analyze the descriptions of the alternation [a – e] in the relevant literature. Thurneysen (1946:53ff.) remarks that the original [e] was often replaced by [a] before palatalized consonants, the reason being “to differentiate *e* more sharply from the following palatal sound”. Before broad consonants the fluctuation between *a* and *e* originated due to analogy with other lexical items. Pokorny (1914:47) describes the conditions under which the original *e* was replaced as not quite clear. McCone (1996:111, 118) offers the following derivations of both the paradigmatic cases of the pair [daɣⁱ]/[dⁱeɣo] *daig/dego* – ‘flame’/gen.sg.:

- (11) a. *deɣ^{wi}ih → *dæɣ^{wi}i → [daɣⁱ]
 b. *deɣ^wo:h → *dⁱeɣ^wo: → [dⁱeɣo]

He argues that the stressed [e] was lowered to [æ] before the velar fricative [ɣ] and the front vowel [i] or [e] in the following syllable (11a). He also adds that this change was chronologically prior to the expected raising of [e] before high vowels in the following syllables, e.g. *melis → *mili → [mⁱilⁱ] *mil* – ‘honey’, which was shown in (7) above. If the chronology had been different, the nominative would have displayed the vowel [i], and surfaced as *[dⁱɣⁱ], which was not the case. Subsequently, the ancient [æ] was retracted to [a] and, as a result, in Old Irish we witness the spurious alternation of [a – e]. The case of *tailm*, which does not contain the final [ɣ], must be a form coined by analogy.

By all means (chrono)logical and plausible, this interpretation reveals that the exchange of [a – e] differs from the changes discussed in the previous sections. This one is simply not phonological in either synchronic or diachronic terms. Thus, a GP analysis is redundant here since [dⁱeɣo] *dego* – ‘flame’-gen.sg. behaves exactly in the same way as *rendo → [RⁱeNdo] *rendo* – ‘star’-gen.sg. in that the original vowel [e] is not raised to [i] because of the vowel [o] in the final syllable, whereas the original [e] of [daɣⁱ] *daig* – ‘flame’ is lowered for reasons which cannot be named phonological *sensu stricto*.

The fact that this lowering was not phonologically motivated does not mean that this process itself cannot be accounted for phonologically. In terms of elements, the original combination (A, I) has been assumed to represent [e]. When this segment underwent lowering, its structure did not change considerably. In GP differences between segments having identical element structures is normally rendered by using the concept of headedness, which is connected with asymmetric relations between the primes involved. Therefore, the original [e] of the nominative *deɣ^wih possibly contained the element (I) as the head,⁵ so it was actually (A, I). The lowering of [e] to [æ] must have resulted in the shift of status between these two elements, that is, the other element acquired headship and the blend was (A, I). Later on, this group was broken up, the prime (A) alone remained and surfaced as [a] in Old Irish.⁶ Whether or not this [a] was a headed vowel in the Old Irish period cannot be answered at this stage.

What needs to be explained is the reason why the lowering of the original [e] took place. Although the result is unexpected, i.e. we witness the lowering of the original [e] to [a] instead of its raising to [i], Thurneysen as well as McCone imply that the palatalized quality of the following consonant played an important

⁵ See Harris (1994:105-126) for more details concerning the role and status of phonological primes in GP.

⁶ Since vowel harmony was no longer operative in Old Irish, perhaps the stem vowel [a] did not need any support from the recessive nuclei to remain unchanged. We will return to the structure of [a] below.

part in this process. Therefore, in the following section we will take a closer look at the issue of palatalization in the prehistory of Irish.

4.3.2.2. Palatalization in the prehistory of Irish

One of the most prominent features of the Irish language, both past and present, is the phenomenon of palatalization of consonants.⁷ Palatalization occurs in many world languages as a phonetic effect, e.g. the English [k] in the word [ki:n] *keen* is palatalized due to the presence of the following front high vowel, while it is not in the word [kʌm] *come*. In other tongues, such as Polish, it may play a distinctive role, e.g. [mⁱetʃ] *miecz* vs. [metʃ] *mecz* – ‘sword’/‘match’ (palatalized vs. neutral initial [m]). In Modern Irish consonants may be palatalized lexically, e.g. [kⁱuːʃ] *ciumhais* vs. [kuːʃ] *cúis* – ‘edge’/‘reason’ in Munster Irish (Cyrán 1997:29). Palatalization may also have a grammatical function of determining, for example, paradigmatic cases of nouns, e.g. [gasuːr] *gasúr* vs. [gasuːrⁱ] *gasúir* – ‘child’/gen.sg. (Ó Siadhail 1989:135).

In Old Irish the situation was slightly different in that the palatalization of word-initial consonants was accompanied by the physical phonetic presence of a front vowel. Thus, initial consonants followed by the front *i* or *e*, both long and short, were automatically palatalized and it was unlikely for a word-initial slender consonant to precede a non-front vowel, e.g. words such as the Munster Irish [bⁱaləχ] *bealach* – ‘way’ were impossible.⁸ The reverse situation, that is, a front vowel following a broad consonant was also unfeasible. In other words, there was a strict correlation between the palatalization of the initial consonant and the quality of the following vowel. In other positions palatalization was an exponent of case, gender, number, tense, etc., e.g. [bⁱerⁱidⁱ] *be(i)rid* vs. [bⁱeridⁱ] *ber(a)id* – ‘carry’-3sg./subjunctive (the only difference between these two forms is the palatalized vs. non-palatalized liquid [r]).

Palatalization as a property of Irish consonants began to play a distinguishing role in the period when vocalic endings were lost (apocope) and word-medial vowel deletion (syncope) resulted in vowel-zero alternations and the emergence of new consonant clusters. McCone (1994:80ff.; 1996:115ff., 125, 136ff.) draws a dividing line between palatalization as a phonetic effect and palatalization as a privative property of consonants which plays a grammatical function roughly in Early Old Irish. Before that period, that is in Primitive Irish, palatalization was sometimes phonologically distinctive, while in other instances it was still basi-

⁷ The issue of palatalization versus other consonant qualities in Old Irish will be dealt with in later parts of this chapter.

⁸ The occasional non-palatalization of the word-initial [R] was apparently exceptional, e.g. [Riː] *rí* – ‘king’.

cally a property provided to consonants by the following front vowels [i] and [e], both long and short. Greene (1973) remarks that palatalization was a gradual process, which explains why it became distinctive in different words and word-forms in different periods of time.

Thus, returning to our problem with the development of $*dey^{wih} \rightarrow *dæy^{wi} \rightarrow [day^i]$ *daig* – ‘flame’, in Primitive Irish the initial [d] in both the nominative $*dey^{wih}$ and the genitive $*dey^{wo:h}$ was still non-palatalized in the distinctive sense, although the front vowel [e] clearly had a palatalizing effect on it. This situation changed when the typically palatalizing vowels, that is *i* and *e*, began to exert dissimilar influence on the preceding consonants in unstressed syllables. For example, the vowel [e] in $*taveri$ did not palatalize the preceding consonant [v], as a result of which the Old Irish version [tavərⁱ] :*tabair* – ‘(he)gives’-prot., displays a non-palatalized [v]. On the other hand, the vowel [i] in $*tavirod$, even if it was subsequently lost, did provide the preceding [v] with a palatalized property, and in the Old Irish [tav^riəd] :*taibret* – ‘(they)give’ this fricative is slender (the palatalization of [r] was a later change). Although this is a very simplified picture of the origins of palatalization, it shows that the previous phonetic effects were transformed into privative properties of non-initial consonants.

In McCone’s (1994, 1996) account, which is a summary of all major works on this issue (chiefly Greene 1973), there were several phases of palatalization happening between Primitive and Middle Irish. The reason for dividing palatalization into stages is connected with the fact that certain phonological developments took place after while others before some consonantal segments acquired the palatalized property. Otherwise, no (chrono)logical order would be possible to establish. For our purposes, which involve the explanation of the unexpected lowering of the vowel [e] before a front vowel of the ending, i.e. $*dey^{wih} \rightarrow *dæy^{wi} \rightarrow [day^i]$ *daig* – ‘flame’, the first two stages, both taking place in Primitive Irish, will suffice since we are dealing with the pre-Old Irish period.

Roughly speaking, then, the first palatalization stage affected non-initial consonants or clusters between front vowels or before short or long *i*. The second wave palatalized the initial consonants followed by the front vowels [i] or [e] (long or short).⁹

Without going into the details of palatalization any further, we may state that in the word $*dey^{wih} \rightarrow *dæy^{wi} \rightarrow *day^{wi} \rightarrow [day^i]$ the lowering of the stem vowel [e] $\rightarrow [æ]$ happened more or less at the time of the first palatalization (or just before it), while the subsequent retraction to [a] occurred between the first and the second wave of palatalization. This is what transpires from McCone’s

⁹ In fact, it is difficult to understand why this should be treated as a distinctive property since all word-initial consonants followed by either *i* or *e* were palatalized anyway.

(1994, 1996) chronology. If the order of events had been different, the left-hand original front vowel [e] would have palatalized the initial dental [d], which was not the case, unlike in the genitive, e.g. *deγ^wo:h → *dⁱeγ^wo: → [dⁱeγo]. After that, apocope (loss of final vowel) came about and the velar [γ^{wi}], which had been palatalized by the following vowel, retained the property even though this vowel was lost. Later on it also lost the labial component [w] and surfaced as the plain (non-labialized) [γⁱ] in Old Irish.

Taking into account the view that palatalization was an active process resulting from a loss of previous (phonetic) distinctions between palatalizing and non-palatalizing vowels, we may suspect that the lowering of the original [e] to [æ] in *deγ^wih → *dæγ^{wi}ih had something to do with the system-internal need to distinguish between palatalizing and non-palatalizing vowels. As already suggested, the element structure (A, I) may have been reinterpreted as (A, I). Afterwards, when [æ] was lowered to [a] in *dæγ^{wi}ih → *daγ^{wi}i, we can hypothesize that the structure (A, I) decomposed into (A), while the element (I) either was deleted altogether or joined the following slender consonant. No other solution appears available at this stage.

In the ensuing sections we will inspect Old Irish vocalic alternations which took place without synchronically present vocalic endings.

4.3.3. *Vocalic alternations [i – e] and [u – o] in closed syllables*

Now we turn to the Old Irish alternations of [i – e] and [u – o] in so-called closed syllables. Unlike cases such as, for example, [moγo] *mogo* vs. [muγu] *mugu* – ‘serf’-gen.sg./acc.pl. in (5) above, these vocalic changes occurred in Old Irish without the synchronic presence of final vowels. Apart from the vocalic alternations in the data in (12), we should pay attention to the distinction between palatalized and non-palatalized final consonants. The phonetic transcription adopted here is based upon Thurneysen (1946:57), so the sequence of *iu* stands for [i], while *ui* represents [u] in the following examples:¹⁰

(12) NOMINATIVE SG. GENITIVE SG. DATIVE SG.

a. [i – e]

[f ⁱ er] <i>fer</i>	[f ⁱ ir ⁱ] <i>fir</i>	[f ⁱ ir] <i>fiur</i>	– ‘man’
[k ⁱ eN] <i>cenn</i>	[k ⁱ iN ⁱ] <i>cinn</i>	[k ⁱ iN] <i>ciunn</i>	– ‘head’
[b ⁱ eg] <i>becc</i>	[b ⁱ ig ⁱ] <i>bicc</i>	[b ⁱ ig] <i>biucc</i>	– ‘small’
[s ⁱ en] <i>sen</i>	[s ⁱ in ⁱ] <i>sin</i>	[s ⁱ in] <i>siun</i>	– ‘old’

¹⁰ In fact, Thurneysen (1946) postulates that the orthographic sequence *iu* should indicate the rounded quality (u) of the following consonant, e.g. [fⁱir^u] *fiur* – ‘man’. For details see (4.3.4.1.).

	NOMINATIVE SG.	GENITIVE SG.	DATIVE SG.	
b. [u – o]				
	[son] <i>son</i>	[sun ⁱ] <i>suin</i>	[sun] <i>sun</i>	– ‘sound’
	[kloθ] <i>cloth</i>	[kluθ ⁱ] <i>cluith</i>	[kluθ] <i>cluth</i>	– ‘fame’
	[kol] <i>col</i>	[kul ⁱ] <i>cuil</i>	[kul] <i>cul</i>	– ‘sin’
	[moð] <i>mod</i>	[muð ⁱ] <i>muid</i>	[muð] <i>mud</i>	– ‘mode’

In (12a) the nominative displays the mid vowel [e] and the final consonant is non-palatalized. In the genitive the vowel is the high [i] and the final consonant shows palatalization. In the dative the vowel is [i], like the one in the genitive, but the final consonant is non-palatalized, similarly to that in the nominative.

A similar pattern occurs in (12b). Before the broad final consonant we can observe the mid vowel [o]. In the genitive the high vowel [u] surfaces in front of the slender consonant. The dative, in turn, contains [u], like the genitive, but the final consonant is broad, like the one in the nominative.

As already said, these alternations bear resemblance to those in the so-called open syllables presented in (5). The only difference is that no ending can be held synchronically responsible for these vocalic changes. While discussing the vocalic changes in open syllables we found out that the synchronic Old Irish versions of words were not particularly useful in determining the phonological cause of the alternations. In the case of examples from (12), a diachronic inspection of word forms can turn out even more helpful.

4.3.3.1. Historical causes of [i – e] and [u – o] alternations

We will now take a look at the prehistoric developments of the words in (12). First, consider the following cases illustrating the alternation of [i – e]:

(13)	[i – e]			
a.	*wirah	→ *wera	→ [f ⁱ er]	<i>fer</i> NOMINATIVE SG.
b.	*wiri:	→ *wiri	→ [f ⁱ ir ⁱ]	<i>fir</i> GENITIVE SG.
c.	*wiru:	→ *wiru	→ [fir]	<i>fīur</i> DATIVE SG.

In (13) the developments of the ancient forms of the three paradigmatic cases of the word for ‘man’ are presented. In all the cases the original vowel [i] behaved according to the principles of vowel harmony established for the alternation of [i – e] in open syllables. There is nothing surprising about this fact because it is clear that in prehistory these forms were parallel to those in (6), e.g. *wisso: → *weso → [fⁱeso] *feso*. The only difference is that in the cases in (13) their Old Irish versions have lost the vocalic endings. So, in the nominative the original

high vowel [i] was lowered to [e] before a non-high vowel in the following syllable. In both the genitive and dative this high vowel was preserved because the vowels in the following syllable were also high. Therefore, we can state that the behaviour of these ancient forms confirms our constraint on the double linking of (A). What is interesting is that when the final vowels were dropped, the stem vowels retained the height they had acquired in the prehistoric process of vowel harmony. Since the prehistoric pattern of alternation was preserved even though the trigger was no longer present in the cases in (13), we can say that the alternation [i – e] was morphophonological in Old Irish.

Now let us consider the developments of word-forms in which the original stem vowel was not [i] but [e].

(14)

- | | | | | | |
|----|--------|---------|-------------------------------------|-------------|----------------|
| a. | *senah | → *sena | → [s ⁱ en] | <i>sen</i> | NOMINATIVE SG. |
| b. | *seni: | → *sini | → [s ⁱ in ⁱ] | <i>sin</i> | GENITIVE SG. |
| c. | *senu: | → *sinu | → [s ⁱ in] | <i>siun</i> | DATIVE SG. |

In the word for ‘old’ the original vowel [e] behaved according to the same principle in that the mid vowel was preserved in the nominative because the following vowel was not high, while it was raised to [i] before the high vowels in the genitive and dative endings.

Let us now turn to the other alternation, that is [u – o], so as to see if the ancient variants of the word for ‘fame’ will shed more light on our analysis.

(15) [u – o]

- | | | | | | |
|----|---------|----------|------------------------|---------------|----------------|
| a. | *kluθah | → *kloθa | → [kloθ] | <i>cloth</i> | NOMINATIVE SG. |
| b. | *kluθi: | → *kluθi | → [kluθ ⁱ] | <i>cluith</i> | GENITIVE SG. |
| c. | *kluθu: | → *kluθu | → [kluθ] | <i>cluth</i> | DATIVE SG. |

What can be observed in (15) is that the original stem vowel [u] behaves exactly as we have predicted: [u] is lowered to [o] before the low vowel in the nominative, while it remains intact in the other two cases due to the fact that they contain vocalic endings in the shape of high vowels.

Thus, these prehistoric developments show that the principle of vowel harmony was omnipresent in ancient times and the fact that in Old Irish some forms still display vocalic endings, while others do not, has no bearing on the shape of the stem vowels. These were shaped in Primitive Irish and remained unchanged after apocope (final vowel loss).

We can conclude that the ancient vowel harmony effects were still present in Old Irish, although the trigger, i.e. the vocalic ending, was no longer available.

Thus, we are dealing with a morphophonological phenomenon again. Since the vowel harmony observed here is exactly the same as that in (6) and (7) above, a GP analysis of the influence of the element (A) in the vocalic ending upon the preceding nucleus will not be repeated here. Instead, we will concentrate on the issue of consonant qualities in Old Irish and the different interpretations of the vocalic alternations discussed above.

4.3.3.2. *Different interpretations of [i – e] and [u – o] alternations*

It was indicated above (12) that the method of transcription adopted in describing the alternation of [i – e] was by and large based on Thurneysen (1946). The shape of short vowels in monosyllabic words in (12a, b) is not unequivocally interpreted, however, and the vocalic alternations may look different if another method is employed. Thurneysen's (1946) approach, although phonemic in nature, allows us to state that the Old Irish changes of [i – e] and [u – o] were morphophonological. McCone's (1996) interpretation of this particular alternation, although also phonemic, is at odds with that advocated by Thurneysen. McCone treats the vowels [i] of the dative as the short diphthongs [iu], e.g. [fⁱiur] *fiur* – 'man', [kⁱiuN] *ciunn* – 'head', and he does it for one basic reason: he has a different view of the shape and number of consonant qualities in Old Irish.

Roughly, Thurneysen (1946) interprets the contrast between the genitive, e.g. [fⁱirⁱ] *fir* – 'man' and the dative, e.g. [fⁱir] *fiur* – 'man', in terms of different qualities of the final consonant, which is palatalized in [fⁱirⁱ] but rounded in [fⁱir^u]. On the other hand, McCone (1996) argues that there was no such thing as the rounded quality in Old Irish and the presence of the orthographic *u* in the dative indicates the occurrence of the short diphthong in forms like [fⁱiur] *fiur*. Thus, the genitive is differentiated from the dative not only by the palatalization vs. non-palatalization of the final consonant, but also by the difference in the vocalic expression. Although these approaches are dissimilar, both the authors aim to prove that there were synchronic markers of phonemic contrast between different words or paradigmatic cases of the same lexical items in Old Irish. In the following sections we will take a closer look at the views on consonant qualities in Old Irish and the consequences of taking different positions in this respect.

4.3.4. *Quality of Consonants*

4.3.4.1. *Traditional views on Old Irish consonant qualities*

It is usually assumed that Old Irish consonants can be either palatalized or non-palatalized. We described the first developments of palatalization in Primitive Irish in (4.3.2.2.) above. For some scholars Old Irish consonants can have at

least two or at most three different qualities. The traditional view, represented by Pokorny (1914:13), Thurneysen (1946:96ff.), Lehmann and Lehmann (1975:8) and many others, is that the consonants in this system have three qualities:

- (16) *i-quality* – palatalized or slender
u-quality – rounded (or labialised or velarized?)
a-quality – neutral or broad

The palatalized consonants are pronounced with the tongue “tending towards the position for the vowel [i]” (Quin 1975:5), that is, the tongue is close to the palate. These consonants occur normally before front vowels, e.g. the stop [g] in the word [gⁱin] *gin* – ‘mouth’. In *u-quality* consonants, an off-glide resembling the vowel [u] can be heard after the consonant, and the rounding of lips can be expected (Thurneysen 1946:97). Actually, while describing *u-quality* the term ‘rounded’ is most frequently used, whereas the notion of ‘velarization’ is viewed as not particularly fortunate. This is so because, as distinct from Modern Irish which displays the two-way opposition between palatalized (*i-quality*) and velarized (*u-quality*) consonants, there is no evidence that the Old Irish *u-quality* consonants showed any signs of velarization comparable to that in the modern system. Thurneysen (1946:97) as well as Lewis and Pedersen (1974:96) state straightforwardly that the Old Irish *u-quality* and the Modern Irish velarization have not much in common. What is commonly held is that Old Irish consonants were simply rounded before a non-low back vowel, e.g. the spirant [s] in [s^uon] *son* – ‘sound’. Finally, neutral consonants show neither roundness nor palatalization. These consonants are followed by the vowel [a], e.g. [m^aak] *macc* – ‘son’.

In phonetic terms, this division appears perfectly justifiable with respect to *i-quality* and *u-quality*. However, as far as the neutral quality is concerned, one may wonder why neutrality should be defined by a low vowel symbol. Thurneysen (1946:97) observes that “neutral quality may be regarded as the normal quality; consonants which are uninfluenced by any vowel are neutral”. Before we cope with this question, let us realize that such a division is not popular with many other analysts of Irish.

Greene (1956) and McCone (1996) among others, find this threefold division untenable for typological and practical reasons (see 4.3.4.2.). They maintain that one non-palatalized quality, whether termed neutral or velarized, is sufficient as being indicative of contrast between the consonants and any further subdivisions should be abandoned.

Without taking sides in this argument yet, let us consider some Old Irish data illustrating the problem of qualities from the traditional perspective. This selection is presented with a view to deciding whether the threefold division has any

synchronic impact on the shape of vowels in stressed syllables. The qualities of Old Irish consonants will be marked as follows: (Cⁱ) for palatalized, (C^u) for rounded, and (C^a) for neutral ones. The possible contexts in which short vowels in stressed syllables (the first syllables of the word) occur are the following:

(17)	C ⁱ i C ⁱ	[f ⁱ ir ⁱ]	<i>fir</i>	– ‘man’-gen.sg.	
	C ⁱ i C ^u	[f ⁱ ir ^u]	<i>fiur</i>	– ‘man’-dat.sg.	
	C ⁱ i C ^a	[k ⁱ in ^a ið ⁱ]	<i>cinaid</i>	– ‘fault’-nom.pl.	(rare)
	C ⁱ e C ⁱ	[N ⁱ eRt ⁱ]	<i>neirt</i>	– ‘strength’-gen.sg.	
	C ⁱ e C ^u	[N ⁱ eRt ^u]	<i>neurt</i>	– ‘strength’-dat.sg.	
	C ⁱ e C ^a	[N ⁱ eRt ^a]	<i>nert</i>	– ‘strength’	
	C ^a a C ⁱ	[m ^a ak ⁱ]	<i>maicc</i>	– ‘boy’-gen.sg.	
	C ^a a C ^u	[b ^a aL ^u]	<i>baull</i>	– ‘limb’-dat.sg.	
	C ^a a C ^a	[m ^a ak ^a]	<i>macc</i>	– ‘boy’	
	C ^u o C ⁱ	[k ^u on ⁱ]	<i>coin</i>	– ‘hound’-dat.sg. ¹¹	
	C ^u o C ^a	[s ^u on ^a]	<i>son</i>	– ‘sound’	
	C ^u o C ^u	[R ^u oθ ^u]	<i>routh</i>	– ‘wheel’-dat.sg. (Early Old Irish)	
	C ^u u C ⁱ	[s ^u un ⁱ]	<i>suin</i>	– ‘sound’-gen.sg.	
	C ^u u C ^u	[g ^u uθ ^u]	<i>guth</i>	– ‘voice’	
	C ^u u C ^a	[d ^u uv ^a i]	<i>dubai</i>	– ‘black’-nom.pl.	(rare)

We can see clearly above that word-initial consonants in Old Irish always obtain their quality from the following vowel which is invariably present. Therefore, if a consonant is followed by either [i] or [e], it is automatically palatalized by this vocalic expression. The same goes for *u*-quality consonants, which precede [o] or [u], and for neutral ones, which occur in front of [a]. Thus, in this position there is no need to postulate any subdivision of the broad consonants into *u*-quality and *a*-quality or even any division into slender and broad qualities since every word-initial consonant is only equipped with the quality provided by the following vowel, and this may tentatively be treated as a phonetic effect.

When we turn to vowels, no melodic restrictions in the vocalic expressions can be seen above and all these stressed vowels can appear before consonants of any quality. What follows these consonants, be it a vowel or an empty nucleus, is apparently also irrelevant as regards the shape of the preceding vowel.

¹¹ Although Thurneysen (1946:97) claims that [o] followed neutral consonants, this observation concerns this vowel in unstressed syllables. Now, since the behaviour of the alternation [u – o] is perfectly parallel to that of [i – e], it is assumed here that under primary stress this vowel is preceded by *u*-quality consonantal segments. Another argument for postulating this is that the prehistoric form of this word was *kuni.

Only three instances are slightly dubious. First, the form [kⁱin^aiðⁱ] in which *a*-quality is assumed because it is marked in the spelling by the symbol *a*. The ancient version of this word is *kinuth (Thurneysen 1946:205), which suggests the *u*-quality of the nasal [n]. Second, the word [d^uuv^ai] also belongs to the so-called *u*-stems, which are words historically ending in *-u*. Also here the claim that the fricative [v] is neutral is based purely on the spelling. Third, the form [R^uoθ^u] is viewed as an archaic version of the Classical Old Irish [R^uoθ^a] *roth*, which is based on the assumption that *u*-quality was replaced by *a*-quality in some cases.

Thus, if we approach the examples of [kⁱin^aiðⁱ] and [d^uuv^ai] with suspicion and ask why there are no monosyllables with high vowels followed by *a*-quality consonants, e.g. no words such as, say, the hypothetical [kⁱin^a],¹² we may conclude that there is no convincing evidence that high vowels could ever occur in front of neutral consonants. The historical developments presented in (4.3.3.1.), e.g. *wirah → *wera → [fⁱer] *fer* – ‘man’ indicate that the original [i] was obligatorily lowered to [e] before the non-high vowel in the ending. Moreover, looking back at [R^uoθ^u] *routh* – ‘wheel’-dat.sg., the fact that examples of this sort are so rare suggests that they may be simply irregular developments.

The whole situation changes dramatically when we turn to the consonants which follow the stressed vowel. Here the quality of the consonant is of great importance. Not only does it determine the articulation of the consonant, but it also marks case and gender. Thus in the pair of [fⁱirⁱ] *fir* – ‘man’-gen.sg. and [fⁱir^u] *fiur* – dat.sg. the case is marked by the quality of the final consonant, which is palatalized or rounded, respectively. There is also a three-way contrast in words such as [NⁱeRt^a] *nert* – ‘strength’, [NⁱeRtⁱ] *neirt* – gen.sg. and [NⁱeRt^u] *neurt* – dat.sg., with neutral, *i*-quality or *u*-quality final consonants. Thus, three qualities seem salient as regards the marking of contrast. In the ensuing section a competitive view of the consonant qualities will be outlined, though.

4.3.4.2. Modern views on consonant qualities

The main, and perhaps the only advantage of the threefold division of consonants advocated by Thurneysen, is the ability to differentiate between grammatical forms of lexical items. As an example let us consider three paradigmatic cases of the three words below:

¹² In fact, there are few words like [fⁱiNd] *find* – ‘white’, whose Primitive Irish ending was *-a(h)*, but the quality of the final consonants is never marked in any way and hence it is impossible to establish what it was in Old Irish.

(18)	NOMINATIVE SG.	GENITIVE SG.	DATIVE SG.	
a.	[f ⁱ er ^a] <i>fer</i>	[f ⁱ ir ⁱ] <i>fír</i>	[f ⁱ ir ^u] <i>fíur</i>	– ‘man’
b.	[L ⁱ eθ ^a] <i>leth</i>	[L ⁱ eθ ⁱ] <i>leith</i>	[L ⁱ eθ ^u] <i>leuth</i>	– ‘half’
c.	[b ^a aL ^a] <i>ball</i>	[b ^a aL ⁱ] <i>baill</i>	[b ^a aL ^u] <i>baull</i>	– ‘member’ ¹³

In (18a) we can observe a vocalic alternation in the nucleus. The nominative displays the vowel [e], while the two remaining cases contain [i]. The only difference between the two latter cases is in the quality of the final [r], palatalized in the genitive [fⁱirⁱ] and rounded in the dative [fⁱir^u]. Thus, the phonemic contrast is rendered by the quality of the final segment: *i*-quality vs. *u*-quality.

From the logical viewpoint, if we wished to express contrast and said that the final consonant of the genitive is palatalized, while that of the dative is not, this would be a sufficient distinction: palatalized vs. non-palatalized (this is what we did in (12) above). The fact that the vowel of the nominative is lowered to [e] may theoretically be considered as an instance of the synchronic influence exerted on this nucleus by the *a*-quality of the following onset. However, we remember from (13), where the prehistoric developments of the word for ‘man’ were presented, that the occurrence of [e] is a result of the ancient vowel harmony, i.e. *wirah → *wera, and the fact that the prehistoric vocalic ending of *wera was dropped had no influence on the shape of the vowel in Old Irish. Thus, there is no need to maintain three qualities in the case of words like these from (18a) just for the sake of expressing contrast.

In (18b, c) the marking of contrast is more complicated as the only differentiating factor is the quality of the final consonant. The nominative is said to display *a*-quality, the genitive *i*-quality and the dative *u*-quality. The cases in (18a) and (18b) also exhibit an interesting discrepancy. Although the vowel in the nominative is the same in both examples, i.e. [e], this vowel does not alternate with [i] in the oblique cases in (18b). The vowel of the genitive [Lⁱeθⁱ] does not change into [i] even though the final consonant is slender. In the ensuing sections it will be proposed that the two superficially identical *e*’s in (18a) and (18b) are in fact dissimilar.

This partition of consonants into three groups is contested by some scholars who propose a division similar to that in Middle and Modern Irish, namely into slender (palatalized) and broad consonants (Middle Irish neutral and Modern Irish velarized). Kuryłowicz (1971:67ff.) claims that contrast between palatalized and non-palatalized consonants is privative, that is, the former possess a quality which the latter lack, and does not go into detail about the type of the

¹³ The genitive and dative have also such variants as *boill* and *bull*, respectively.

broad quality. One of the most constructive approaches to the issue of consonant qualities is that of Greene (1976:28ff.), which is adopted also by Kortlandt (1979:43ff.) and McCone (1996:26ff.), whose account appears to be most comprehensive. Thus, it will be referred to as ‘Greene’s and McCone’s proposal’.

McCone (1996:27) criticizes Thurneysen for postulating *u*-quality and claims that such a move would “produce a grand total of no less than eighty seven consonant phonemes”, which is a typologically incredible number also according to Greene (1956; 1962). Although in fact not every consonant would occur in every position in a word and in every environment, such an inventory may seem suspiciously great indeed, as long as the phonemic approach is adopted. Greene’s and McCone’s proposal is quite simple and obvious, namely not to recognize *u*-quality at all and to add “three short *u*-diphthongs to the inventory as an equally effective and eminently economical substitute for the twenty two velarized consonants otherwise required” (McCone’s 1996:27). The short diphthongs would be *iu*, *eu* and *au* (Greene (1976) proposes that there should be four, including *ou*, but McCone states that the occurrence of this diphthong was so short-lasting that in Early Old Irish there is no need to mention it).

Thus, Greene’s and McCone’s idea is to dispense with *u*-quality, treat all the vowels of the dative as short *u*-diphthongs and reduce the number of consonant qualities in Old Irish to two. What is worth noting is that Greene and McCone do not claim that the neutral segments should be labelled as possessing *a*-quality. In their approach the cases in (18) would be interpreted as follows:

(19)	NOMINATIVE SG.	GENITIVE SG.	DATIVE SG.	
a.	[f ⁱ er] <i>fer</i>	[f ⁱ ir ⁱ] <i>fir</i>	[f ⁱ iur] <i>fiur</i>	– ‘man’
b.	[L ⁱ eθ] <i>leth</i>	[L ⁱ eθ ⁱ] <i>leith</i>	[L ⁱ euθ] <i>leuth</i>	– ‘half’
c.	[baL] <i>ball</i>	[baL ⁱ] <i>baill</i>	[bauL] <i>baull</i>	– ‘member’

In (19a) there is no problem with differentiating between the paradigmatic cases as the nuclei are realized in three different ways. In (19b, c) the contrast between the nominative and the genitive is rendered by the quality of the final vowel, nominative – neutral, and genitive – palatalized. The nominative and the dative differ as regards the nucleus, the former displaying [e] and [a] while the latter the diphthongs [eu] and [au], respectively.

In an approach recognizing two consonant qualities, the possible contexts for the occurrence of short vowels slightly change. Below only the palatalized consonants are indicated by the symbol (Cⁱ), the neutral ones being left unmarked.

(20)	C ⁱ i	C ⁱ [f ⁱ i ^r ⁱ]	<i>fir</i>	– ‘man’-gen.sg.	
	C ⁱ e	C ⁱ [N ⁱ eRt ⁱ]	<i>neirt</i>	– ‘strength’-gen.sg.	
	C ⁱ i	C [k ⁱ inid ⁱ]	<i>cinaid</i>	– ‘fault’-nom.pl.	or C ⁱ iu C [f ⁱ iur]
	C ⁱ e	C [f ⁱ er]	<i>fer</i>	– ‘man’	or C ⁱ eu C [N ⁱ euRt]
	C a	C ⁱ [mak ⁱ]	<i>maicc</i>	– ‘boy’-gen.sg.	
	C o	C ⁱ [kon ⁱ]	<i>coin</i>	– ‘hound’-acc.sg.	
	C u	C ⁱ [sun ⁱ]	<i>suin</i>	– ‘sound’-gen.sg.	
	C a	C [baL]	<i>ball</i>	– ‘limb’	or C au C [bauL]
	C o	C [son]	<i>son</i>	– ‘sound’	
	C u	C [guθ]	<i>guth</i>	– ‘voice’	

After the elimination of *u*-quality, the number of possible contexts has decreased by five (fifteen contexts in (17), while ten here). These contexts show even more clearly that what matters for the quality of the short stressed vowel is the quality of the preceding consonant and what follows the vowel is much less important. In particular, no front vowel [i] or [e] can occur after initial broad consonants and vice versa. However, the vowels [a], [o] and [u] can precede slender consonants and the front vowels can be followed by neutral consonantal segments.

Despite the fact that this approach is impressive and economical, it is necessary to notice that there is a certain inconsistency in it. In particular, if contrast was so important, why was the number of diphthongs so painlessly reduced from four to three? As a consequence, in Old Irish there was no difference whatsoever between the paradigmatic cases of words such as [Roθ] *roth* – ‘wheel’ and [Roθ] *routh* – ‘wheel’-dat.sg. Moreover, we saw in some of the data in (18), e.g. [fⁱi^rⁱ]/[fⁱi^r^u] – ‘man’-gen.sg./dat.sg., that contrast can be sufficiently expressed by the quality of the final consonant even if the subdivision of the two broad qualities is not taken into account. In other words, the final [r] is palatalized in [fⁱi^rⁱ] but neutral (not necessarily rounded) in [fⁱi^r]. Thus, the idea that three qualities are an exaggeration seems a step in the right direction although it seems that it need not be combined with assuming the presence of any short diphthongs.

Looking at the data above, one may put forward an argument in favour of the hypothesis that the presence of only two qualities need not involve the concomitant change in the treatment of the vocalic system (by proposing the occurrence of new diphthongs). What is crucial is that the difference between paradigmatic cases can be usually guessed from the syntactic context. Specifically, the position of the nominative, e.g. *fer*, in the sentence (the subject) always differs from that of the oblique cases. The genitive *fir* cannot appear as the object or the locative, whereas the dative *fiur* is never found in possessive constructions. The accusative *fer* can theoretically be confused with the dative since their syntax is sometimes similar, but morphologically the accusative equals the nominative in

this particular declension, while in other declensions these alternations do not occur in closed syllables. Thus, the phonemic contrast did not need to exist at all.

These facts, although frequently overlooked by scholars attached to the idea of minimal pairs, seem quite important. What reinforces the view that phonological contrast between, say, *leth* and *leuth* – ‘half’/dat.sg. may not have been present is that there are many examples where there is absolutely no difference, either in the spelling or in pronunciation, between the paradigmatic cases of a given item. For example, the Old Irish word for ‘boy’ is [mak] *macc*, its genitive being [makⁱ] *maicc*, but the dative again [mak] *macc*. Thurneysen (1946:177) claims that in this and a few other instances the final consonant of the dative simply resists the change to *u*-quality. Nevertheless, if we look at the examples of words displaying *u*-infection confronted with exceptions, the latter seem to outnumber the former. Thus, it seems proper to conclude that, although eliminating *u*-quality is an important step, trying to maintain contrast at all costs, i.e. by introducing the new diphthongs, is not the most plausible approach.

Below we will carry out a historical analysis of the forms with the short diphthongs to see if their presence in Old Irish can be justified. Before this is done, however, let us consider briefly the phenomenon of consonant contrast in the history of Irish and the spelling conventions used in mediaeval times.

4.3.4.3. A note on history and orthography

In this section we shall try to find out whether the elimination of the consonants specified by a vocalic quality in the Old Irish phonological system is justifiable. Greene’s and McCone’s idea of postulating a system with one broad quality is by all means logical and one can hardly disagree with it. It is undoubtedly economical and effective. However, it is far from being obvious why, apart from *u*-quality, *a*-quality should be abolished as well.

Since the main function of the broad quality is rendering the contrast with palatalization, we cannot claim *a priori* which of the broad qualities should contribute to that opposition. Nor are we certain whether the broad quality should be defined by anything. Contemporary analyses of Modern Irish dialects such as Munster (Cyrán 1997) and Connemara (Bloch-Rozmej 1998) attempt to show that nowadays the phonological system of Irish displays an opposition between palatalized (*i*-quality) and velarized (*u*-quality) consonants. To use GP terminology, slender consonants are defined by the element (I), while broad ones by (U). Interestingly, these two primes cannot combine in one vocalic expression. Looking at Modern Irish we see that, although non-palatalized segments are defined by the element (U), the degree of velarization differs considerably depending on the context. In particular, velarization manifests itself strongly in front of front

vowels, e.g. [m^uikⁱ] *muic* – ‘pig-dat.sg.’, [s^uipⁱ] *soip* – ‘wisp-gen.sg.’, whereas it is hardly audible before back vowels, e.g. [muk] *muk* – ‘pig’, [sop] *sop* – ‘wisp’, [kat] *cat* – ‘cat’. Thus, were it not for the behaviour of the element (U) in the whole system of Irish, we could suppose that the element (A) is an equally good candidate for determining the broad quality. This does not seem to be the case, however, and although velarization is often inconspicuous, a thorough synchronic analysis indicates that it should be viewed as part of the system.

The properties of the system of Modern Irish cannot be directly mapped onto that of Old Irish because the lexicalization of certain alternations has undoubtedly occurred over the past fourteen centuries. For example, the typical Modern Munster Irish alternation of [a – i] in [fⁱar] *fear* vs. [fⁱirⁱ] *fir* – ‘man’/gen.sg. is a reflection of the lexicalized Old Irish exchange of [e – i] in [f^eer] *fer* vs. [fⁱirⁱ] *fir* – ‘man’/gen.sg., which results from the prehistoric phonological alternation of *wera vs. *wiri. Thus, a purely synchronic analysis of this alternation in Old (and Modern?) Irish can be carried out only as an intellectual exercise.¹⁴ Nonetheless, one may wonder why these two systems should be different with respect to consonant qualities since a number of words have changed little in the course of time and there is no clear evidence that the consonants have changed at all in those items, e.g. the final consonant in the genitive [fⁱirⁱ] *fir*.

One historical quasi-argument in favour of postulating *a*-quality instead of *u*-quality as broad is that traditional descriptions of Middle Irish use terms such as ‘neutral’ or ‘middle’ to depict the non-palatalized quality. Dottin (1913:3) claims that although in Old Irish there were three qualities, that is, anterior (*i*-quality), middle (*a*-quality) and posterior (*u*-quality), the Middle Irish system is different and we can observe ‘l’articulation antérieure’ and ‘l’articulation moyenne’. Such a division amounts to claiming that there were palatalized and non-palatalized consonants in Middle Irish and calling the broad consonants ‘middle’ or ‘neutral’ may reflect only too literal a treatment of spelling conventions used in Old and Middle Irish. One of the problems faced by a scholar is that both Old and Middle Irish texts were written by mediaeval scribes who spoke only Middle Irish and who may have neglected certain differences between the relevant periods. In Dottin’s approach the difference between middle (*a*-quality) and posterior (*u*-quality) Old Irish consonants consists in the ways lexical items were written. It might be the case, though, that there was no other way of representing a broad consonant preceding a front vowel except for inserting a low back vowel symbol, mostly *a*, between the two sounds in question. For example, in order to convey the correct pronunciation of the word *feruib*, which is [f^eirivⁱ] or [f^eirəvⁱ] – ‘man’-dat.pl., a medieval scribe had no other option but to insert the symbol *a*

¹⁴ See Jaskuła (1996) for a purely synchronic analysis of Old Irish vowel alternations.

between the broad consonant [r] and the actual vowel [i] or [ə]. Otherwise, if he had employed the symbol *u*, the word might have been incorrectly pronounced as [fⁱeruvⁱ] or misinterpreted. The same goes for the cases in (17) above, e.g. [kⁱiniðⁱ] *cinaid* – ‘fault’-nom.pl. and [d^uuvi] *dubai* – ‘black’-nom.pl. The symbol *a*, although it indicates the broadness of the preceding consonant, does not have to represent its *a*-quality. In the case of monosyllabic words, so as to mark the broad quality of the word-final consonant, the vocalic symbol *u* was employed. For example, for marking the broadness of the final [r] in the word *fiur* – ‘mandat.sg.’ the letter *u* was safely used. Any other symbol would indicate the presence of a back vowel or a diphthong. Besides, the vocalic symbol *u* was used as a case marker. For instance, if the scribe had written the letter *a* after the vowel [i] in the dative *fiur*, the whole utterance may have been interpreted as a disyllabic word. The interpretation of such orthographic sequences as two vowels separated by hiatus is commonplace, e.g. [bi-əð]/[bi-iðⁱ]/[bi-uð] *biad/biid/biud* – ‘food’/gen.sg./dat.sg. In any case, the two scribal conventions were to mark the broad quality of word-internal consonants by *a* and of word-final ones by *u*. Interestingly, these principles were very rarely confused and that occurred mainly in earlier manuscripts (Thurneysen 1946:107). Thus, the orthographic use of vocalic symbols does not help in deciding either how many consonant qualities were present in Old Irish or, if there were only two, what they actually were.

Although we have not found any clue as to which vocalic symbol should determine the broad quality, Greene’s and McCone’s proposal to recognize three short diphthongs remains to be analyzed because it helps to differentiate between paradigmatic cases of words, e.g. [Lⁱeθ] *leth* vs. [Lⁱeuθ] *leuth* – ‘half’/dat.pl. It has already been argued that the marking of contrast at all costs is not a fortunate idea, but we cannot *a priori* discard the view that in some cases opposition may have existed. Thus, the origins of *iu*, *eu*, and *au* will now be inspected in detail.

4.3.5. The hypothetical short diphthongs

4.3.5.1. The alternation [i – e] revisited – the short diphthong [iu]

As shown in (13c), *wiru: → *wiru → [fⁱir] *fiur* – ‘man’-dat.sg., the original [i] was preserved in both Primitive and Old Irish if the vowel in the following syllable was the high [u]. (14c) revealed that the original [e] was raised in the same environment, e.g. *senu: → *sinu → [sⁱin] *siun* – ‘old’-dat.sg.

McCone (1996:112), following Greene (1976:29), offers an alternative interpretation of these changes and employs the notion of *u*-infection to explain the origin of three *u*-diphthongs. He proposes that the sequence of events was as follows: *wiru: → *wiru → (u-infection) *wiuru → [fⁱiur] *fiur* – ‘man’-dat.sg. and, therefore, *senu: → *sinu → (u-infection) *siunu → [sⁱiun] *siun* – ‘old’-dat. sg.

Briefly, before it disappeared from the ending, the prehistoric vowel [u] affected the non-back vocalic segment in the preceding syllable. By contrast, the long vowel [u:] which did not disappear had no impact on the preceding vowel, e.g. *wiru:h → *wiru: → [fⁱiru] *firu* – ‘man’-acc.pl.

Greene (1976:30) notes, however, that in cases such as *fi(u)ss* – ‘knowledge’-nom.sg. and dat.sg. (identical) the spelling with *-u-* is maintained in the dative, that is [fⁱius], while it is rather avoided in the nominative, where it probably represents [fⁱis]. Although in McCone’s approach this word undergoes the treatment similar to that of *fⁱur*, the relative consistency in writing only the dative with the symbol *u* may suggest that it was indeed a sort of case marker rather than an exponent of a prehistoric or synchronic phonological process. This view seems supported by the fact that the datives of [RⁱNd] *rind* – ‘star’ and [mⁱið] *mid* – ‘mead’ never display any orthographic *u*-infection (i.e. they are identical to the nominatives) even though they belong to the same declension as *fi(u)ss* – ‘knowledge’. Therefore, there is no convincing evidence to take for granted that the orthographic *iu* stood for the short diphthong.

4.3.5.2. The short diphthong [au] and the alternation [a – u]

Below we analyze the origins of the hypothetical short diphthong [au] which, in McCone’s proposal alternates with [a] in cases like [baL] *ball* vs. [bauL] *baull* – ‘member’/dat.sg. Since this diphthong is frequently in fluctuation with [u], e.g. [bauL] *baull* or [buL] *bull* – ‘member’-dat.sg., the rare alternation of [a – u] will be examined in detail as well.

Greene (1976:28) attributes the origin of all the three short *u*-diphthongs primarily to the *u*-infection of [a]. Here, unlike in the case of the diphthong [iu] described above, the disappearance of the prehistoric high back vowel in the vocalic ending was unimportant to the *u*-infection of the preceding vowel. Thus, in McCone (1996:111) we find: *baLu: → *baLu → *bauLu → [bauL] *baull* – ‘limb’-dat.sg., where the *u*-ending is lost before Old Irish, vs. *baLu:h → *baLu: → *bauLu → [bauLu] *baullu* – ‘limb’-acc.pl., where the *u*-ending remains. The alternative variant of the dat.sg. is [buL] *bull*, while that of the acc.pl. is [buLu] *bullu*. The development of the acc.pl. shows that in the cases with the stressed [i], e.g. *firu* – ‘man’, the retained [u] does not have any impact on the preceding high vowel. When the stressed stem vowel is [a], as in *baullu*, *u*-infection may be present. Even more interestingly, the gen.sg., apart from the regular *baill*, often surfaces as *boill*. Thus, deciding which variants are regular in the genitive and dative singular and in the accusative plural is one problem. What caused all these fluctuations is another.

Before we attempt to answer these questions, let us recall that words such as [mak] *macc* – ‘boy’, [marəv] *marb* – ‘dead’, [kaθ] *cath* – ‘battle’, [saləm] *salm* – ‘psalm’, and many others resist *u*-infection in the dative singular even though the declensions they belong to normally display the orthographic *u*, as noted by Thurneysen (1946:106). He states that, as a rule, after the original [a], the consonants [χ], [k], [θ], [ð], [s] do not display *u*-quality, but there are exceptions.

An interesting observation is made by Lewis and Pedersen (1974:103), who claim that in the original Proto-Celtic vowel [a] in syllables beginning in a labial, which must be [b, m, w], or a labiovelar [k^w, g^w] was rounded in Primitive Irish. What can be inferred from this remark is that this vowel may have occasionally been treated as a sort of [ɔ]. As an example, they provide the word [kraN] *crann* – ‘tree’, whose genitive singular is [kruNⁱ] *cruinn*, the dative singular being [kruN] *crunn*. This word was mentioned in (3) above as one illustrating the UNTYPICAL [a – u] alternation. Thurneysen (1946:50) notes that the initial [k] in this word derives from the labiovelar [k^w] and that the vowel of the nominative [kraN] is secondary. Indeed, otherwise this alternation resembles the pattern observed in [kloθ]/[kluθⁱ]/[kluθ] *cloth/cluith/cluth* – ‘fame’/gen.sg.dat.sg. in (12b), which represents the most TYPICAL [o – u] alternation.

Greene (1976:29) argues that the Old Irish [u] of the dative derives from the earlier short diphthong [au] via *u*-infection. This [au] survived in some items but was simplified to [u] in others. We may infer from this description that the development was *k^wrannu → *kraNu → [kruN]. This is perfectly justifiable provided that in Primitive Irish [u] really infected the preceding vowels in the dative of this particular declension. However, the vowel [u] of the genitive [kruNⁱ] cannot be accounted for in a similar fashion since the primitive ending was a high front vowel, as in *wiri: → *wiri → [fⁱirⁱ] *fir* – ‘man’-gen.sg. in (13b) above. Thus, we must assume that, according to the ‘vowel harmony principle’ proposed in the previous sections, the genitive of the word for ‘tree’ developed in the following way: *k^wrōnni: or *k^wrūnni: → *kruNi → [kruNⁱ], while the dative was *k^wrōnnu: or *k^wrūnnu: → *kraNu → [kruN]. Consequently, the nominative was *k^wrōnnan → *kraNa → [kraN]. Since the low [ɔ] was no longer part of the inventory in Primitive Irish, this vowel was reinterpreted as the closest possible relative, that is [a]. The discrepancy between the spelling of the dative, that is *crann* vs. *crunn*, may result from diverse interpretations of the original vocalic segment in different dialects. In other words, some speakers interpreted this [ɔ] as [o] and the regular [o – u] alternation was applied. Others treated it as [a] and the orthographic diphthongization to *au* occurred. The hesitation of the speakers seems confirmed by the fact that the (rare) alternative genitive is [kraNⁱ] *crainn*, which is based on the assumption that the stem vowel was really [a]. These stipulations cannot be either proved or disproved, however, because we have no

knowledge whatsoever of the dialects of Old Irish. We only know that in Middle Irish the regular genitive was [kraNⁱ] *crain(d)* (Quin *et al.* 1983:155), which may suggest that two competitive variants existed side by side until one triumphed.

In terms of elements, we may say that the vowel [a] is represented by (A), while the low [ɒ] should be regarded as a pair of (A, U). What must be added here is that, since we already represented one type of [o] by the same combination, this one must somehow differ, possibly with respect to headedness. In this section we assume that the vowel [ɒ] is reinterpreted either as [a] or as [o]. This may mean that the element (A) is more important than (U) for the shape of [ɒ]. Consequently, [ɒ] may be viewed as (A, U) with the more important element enjoying the status of a headed prime. As regards the vowel [o], it may be viewed as (A, U). The foregoing discussion is summarized below.

(21)

- a. *k^wrɒnna → [ɒ] = [a] → *kraNa → [kraN] *crann* – ‘tree’
- b. *k^wrɒnni:
 - [ɒ] = [o] → *kruNi → [kruNⁱ] *cruinn* – ‘tree’-gen.sg.
 - [ɒ] = [a] → *kraNi → [kraNⁱ] *crainn* – ‘tree’-gen.sg.
- c. *k^wrɒnnu:
 - [ɒ] = [o] → *kruNu → [kruN] *crunn* – ‘tree’-dat.sg.
 - [ɒ] = [a] → *krauNu → [krauN] *crann* – ‘tree’-dat.sg.

Thus, the original stem vowel [ɒ] was unrounded to [a] in the nominative, probably under the influence of the segment [a] in the ending, as shown in (21a). In the first version of the genitive (21b), i.e. [kruNⁱ] *cruinn*, the original [ɒ] was reinterpreted as [o] and, subsequently, raised to [u] because of the high vowel [i] in the ending. In terms of the element make-up, there was no element (A) in the ending to support the same prime in the stem vowel. The other variant, that is [kraNⁱ] *crainn*, must have involved the reinterpretation of the original [ɒ] as [a]. Given that [a] did not alternate (see the following sections), this vowel remained until Old Irish. The development of the dative is twofold as well. When the original [ɒ] was reinterpreted as [o], the raising to [u] occurred because there was nothing in the ending to support the prime (A) in the stem vowel. The Old Irish result was [kruN] *crunn*. When the prehistoric [ɒ] was reinterpreted as [a], the hypothetical (orthographic) *u*-infection followed and the Old Irish form *crann* surfaced in the spelling.

Similar developments must have taken place in [bauL] *baull* vs. [buL] *bull* – ‘limb’-dat.sg. and in [bauLu] *baullu* vs. [buLu] *bullu* – ‘limb’-acc.pl. Also in these examples only the occasional spelling suggests that *u*-infection may have

occurred as a phonological phenomenon. As regards the fluctuation of [baLⁱ] *baill* vs. [boLⁱ] *boill* – ‘limb’-gen.sg., the former form is regular, while the latter must have been a reinterpretation of the vowel [a] as [o] by some language users. This reanalysis was probably influenced by the dative form [buL] *bull* and the application of the regular alternation of [o – u].

To summarize, the developments presented in this section indicate that different reinterpretations of the original back vowel [ɔ] which took place between early Primitive Irish and Old Irish resulted in dissimilar variants of the same lexical items in Old Irish. However, no convincing evidence had been found to maintain that the digraph *au* represented a real phonological object, i.e. the short diphthong [au], in Old Irish. More importantly, we have not provided any reason why the vowel [a] did not change even if there was no prime (A) in the synchronically available vocalic ending, e.g. *kraNi → [kraNⁱ] *crainn* – ‘tree’-gen.sg.

In the ensuing section we will continue to look for evidence which would allow us to treat the spelling convention employing the letter *u* as a case marker in terms of phonetic reality. Since the third short diphthong, i.e. [eu], is said to occur on the basis of the vowel [e] which does not otherwise alternate, unlike the other [e] which alternates with [i] (see (12) above), the analysis of this opaque [e] will be combined with an examination of other non-alternating short vowels, including [a], [i], and [o].

4.3.5.3. *The short diphthong [eu] and the non-alternating vowels*

In this chapter we have been dealing with different vocalic alternations, among which [i – e] and [o – u] are the most regular. In the course of the discussion we found, however, that there are some vowels in Old Irish which do not alternate at all. One example was the segment [a] in, say, [kaθ] *cath* – ‘battle’, which does not change in any circumstances. We can also add the vowel [e], e.g. [eχ] *ech* – ‘horse’, whose genitive is [eχⁱ] *eich*, contrary to the expected *[iχⁱ], while the dative is [eχ] or [euχ] *euch* (if we recognize the diphthong [eu]), which appears instead of [iχ] or [iuχ], which we would expect on the basis of [fⁱer]/[fⁱirⁱ]/[fⁱir] – ‘man’/ gen.sg./dat.sg. Moreover, the Old Irish [o] sometimes refuses to alternate as well.

In (22) below the regular changes of [i – e] and [u – o] are contrasted with the absence of alternations in either [e] or [o]. Let us recall that the synchronic presence/absence of a vocalic ending in Old Irish has no impact on the alternations because these are based on the prehistoric ‘vowel harmony principle’.

(22)	NOMINATIVE	GENITIVE	DATIVE	
	a. regular		[i – e]	
	[f ⁱ er] <i>fer</i>	[f ⁱ ir ⁱ] <i>fir</i>	[f ⁱ ir]/[f ⁱ iur] <i>fiur</i>	– ‘man’
	[f ⁱ iRt]/[f ⁱ iuRt] <i>fi(u)rt</i>	[f ⁱ eRto] <i>ferto</i>	[f ⁱ iRt]/[f ⁱ iuRt] <i>fi(u)rt</i>	– ‘miracle’
	[f ⁱ is]/[f ⁱ ius] <i>fi(u)s(s)</i>	[f ⁱ eso] <i>feso</i>	[f ⁱ is]/[f ⁱ ius] <i>fi(u)s(s)</i>	– ‘knowledge’
	b. absence of		[i – e]	
	[N ⁱ eRt] <i>nert</i>	[N ⁱ eRt ⁱ] <i>neirt</i>	[N ⁱ eRt]/[N ⁱ euRt] <i>neurt</i>	– ‘strength’ ¹⁵
	[L ⁱ eθ] <i>leth</i>	[L ⁱ eθ ⁱ] <i>leith</i>	[L ⁱ eθ]/[L ⁱ euθ] <i>leuth</i>	– ‘half’
	[m ⁱ es] <i>mes(s)</i>	[m ⁱ eso] <i>mes(s)o</i>	[m ⁱ es] <i>mes(s)</i>	– ‘judgement’
	c. regular		[u – o]	
	[son] <i>son</i>	[sun ⁱ] <i>suin</i>	[sun] <i>sun</i>	– ‘sound’
	[kloθ] <i>cloth</i>	[kluθ ⁱ] <i>cluith</i>	[kluθ] <i>cluth</i>	– ‘fame’
	[guθ] <i>guth</i>	[goθo] <i>gotho</i>	[guθ] <i>guth</i>	– ‘voice’
	d. absence of		[u – o]	
	[korp] <i>corp</i>	[kor ⁱ p ⁱ] <i>coirp</i>	[korp] <i>corp</i>	– ‘body’ ¹⁶
	[foL ^t] <i>foIt</i>	[foL ^t] ⁱ <i>foilt</i>	[foL ^t] <i>foIt</i>	– ‘hair’ ¹⁷

In both (22a) and (22c) we can observe the regular [i – e] and [u – o] alternations, respectively, which were caused by vowel height harmony in Primitive Irish. Let us recall that whenever there was a prehistoric high vowel following the stem vowel in the next syllable, the stem vowel was also high. The presence of a mid or low back vowel in the vocalic ending meant that the stem vowel had to be mid as well. In (22b) the exceptions to the alternation [i – e] are shown, where the vowel *e* does not undergo raising irrespective of the environment, e.g. the genitive [NⁱeRtⁱ] *neirt* should regularly develop into *[NⁱiRtⁱ] because the primitive form was **nerti*, while both the nominative and dative of [mⁱes] *mes(s)* should surface as *[mⁱis] or *[mⁱius] since their earlier versions were **messu*. Finally, (22d) shows a relatively infrequent resistance of [o] to change to [u]. The further development of the paradigmatic cases of the word for ‘body’, that is *corp*, and a few similar ones (see notes below) indicate, however, that there must have existed doubles, that is both regular and irregular variants, some of which gave way to the others in the course of time.

¹⁵ Later, also [NⁱiRtⁱ] and [NⁱiuRt] for the genitive and dative, respectively.

¹⁶ Later, the oblique cases displayed the regular alternation, i.e. gen. [kurⁱpⁱ] *cuirp* and dat. [kurp] *curp*.

¹⁷ Later, also [fuL^t]ⁱ *fuilt* and [fuL^t] *fult* for the genitive and dative, respectively.

Thus, all the examples in (22) show a general tendency. In particular, exceptions to typical vocalic alternations are few and far between and sometimes the exceptional forms display the regular changes as well. If there are exceptions, though, it is never the case that the high vowel remains unaltered, it is invariably the mid one, either [e] or [o].¹⁸

The exceptions and fluctuating variants of some paradigmatic cases are not surprising given that certain segments may have been interpreted in different ways. If we recall the examples of *baill* vs. *boill* for the genitive singular of *ball* – ‘limb’ in the previous section, we may conclude that regularities prevail and the only problem occurs in the case of the non-alternating [e]. However, if we look closely at the data in different sources based on archaic material (e.g. in Quin *et al.* 1983), we find surprising spellings such as *ich* for ‘horse’-gen.sg. or *leithe* for ‘half’-gen.sg. These facts may mean at least two things.

Firstly, as implied above, the declensions to which the forms listed in (22) belong may have been mixed up in prehistoric times, which entailed the confusion of endings and subsequent apparent irregularities. We have already seen the cases (4.3.1.2.) where the endings of one declension were used for another.

Secondly, in prehistory there may have existed similar vocalic expressions with different phonological structures, which resulted in their either ability or inability to alternate. For example, the vowel *e* alternating with [i] was perhaps close [e], while the non-alternating one may have been [ɛ]. Unfortunately, there is no indication of these differences either in Ogam inscriptions or in mediaeval materials. Moreover, there are too few non-alternating *e*'s to suggest more general conclusions as yet.

Apart from the resistance to alternation of [e], [a], and [o], the other unsolved problem is that of orthographic or phonetic diphthongization of [i] to [iu] and [e] to [eu]. However attractive Greene's and McCone's proposal to recognize the orthographic sequences of *iu* and *eu* as short diphthongs may appear, the lack of convincing evidence seems to disfavour this idea. It is true that in many lexical items the letter *u* was used regularly, e.g. *fiur*, *euch*, but in others, e.g. *fi(u)ss*, it was anything but stable, while in words like *mess* it never occurred. It does not appear, then, that the occasional *u*-marking of certain paradigmatic cases had any phonetic importance, not to mention phonological significance. Therefore, so far the replacement of *u*-quality by the recognition of short *u*-diphthongs, as advocated by these scholars, seems as redundant as the acknowledgment of

¹⁸ The counterexamples are *find* – ‘white’, which should have developed [e], like *fer* – ‘man’, i.e. **fend*, and *mind* – ‘diadem’, whose dat.pl. should have been **mendaib* instead of *mindaib*, by analogy with *rind* vs. *rendo* – ‘star’/gen.sg. The ancient developments of these words are uncertain, though, and the scarcely attested versions may be unreliable.

Thurneysen's *u*-quality itself. The conclusion may be that contrast between the paradigmatic cases of lexical items was expressed either by the syntactic use of these cases or by the palatalization vs. non-palatalization of consonants.

Now let us return to the problem of [a], which appears to be the only truly non-alternating short vowel. Let us recall that some *a*'s allegedly diphthongize to [au], e.g. [baL]/[bauL] *ball/baull* – 'limb'/dat.sg., or alternate with [u], e.g. [baL]/[buL] *ball/bull*, depending on the interpretation. The developments in the previous section suggest that in the former pair we are actually dealing with an orthographic case marker which represents no phonological object, i.e. [baL] = [baL] *ball/baull* – 'limb'/dat.sg., while in the latter different reinterpretations of the stem vowel [ɔ] led to the occurrence of dissimilar stem vowels in Old Irish, i.e. *bolla → *balla vs. *bolla → *bolla → *bullu, which resulted in [baL]/[buL] *ball/bull* – 'limb'/dat.sg. Other *a*'s did not undergo any melodic modification or, in Thurneysen's terms, the consonants following them did not display *u*-quality, e.g. [kaθ] *cath* – 'battle', originating from the stem *kathu. The same goes for the dative of [mak] *macc* – 'boy', which does not differ from the nominative, although it should ideally be diphthongized to produce *[mauk] or alternate with [u] and surface as *[muk]. What is worth noting is that we are dealing here with a labial word-initial consonant, which should theoretically provide roundness to the vowel [a], as it does in, say, [maɣ] *mag* – 'field' from *mayah, whose dative is [maɣ¹] *maig*. This is a regular development before primitive palatalized endings, i.e. *mayih. The alternative dative is [muɣ¹] *muig*, which must have been formed according to the vowel height harmony and the treatment of the vowel [a] following a labial as [ɔ], which leads to the occurrence of the regular [o – u] alternation.

As shown in (4.3.5.2.), the vowel [a] is not sensitive to *u*-infection before [χ], [k], [θ], [ð], and [s]. At first glance, this set seems logically selected since it contains only obstruents (mostly spirants), none of which being a labial. This might mean that most non-labial obstruents simply resist *u*-quality. However, if we consider words such as *euch* – 'horse'-dat.sg., *leuth* – 'half'-dat.sg., *fī(u)ss* – 'knowledge' or even *routh* – 'wheel' (the only example of the ephemeral *ou* diphthong), all displaying *u*-quality or allowing the alleged diphthongization of the vowel, it is more than obvious that the problem is not in the consonant. Thus, there is something about the vowel [a] in certain items that immunizes it against *u*-infection, whatever this process phonologically means.

Moreover, in (4.3.1.2.) it was argued that the element (A) has to be doubly linked so as to survive in the structure, e.g. *wisso: → *weso – 'knowledge'-gen.sg. (lowering, A-support from the ending), and *melis → *mili – 'honey' (raising, absence of (A) in the ending). In the development of the genitive [mak¹] *maicc* – 'boy', we must distinguish phases in which the vowel [a], represented

by the prime (A), was followed by the vowel [i] in the vocalic ending, i.e. *mak^wk^wi: → *makki. Despite that, the vowel survived into Old Irish without any support from the element (A) in the ending.

It was mentioned above and in the introductory chapter that GP frequently employs the notion of headedness, an idea based on the assumption that asymmetric relations obtain between the elements constituting a given segment. This concept is also useful when phonological primes occur in given expressions alone. For example, in Polish the element (I) can stand for two phonetic objects (Cyrán 1997:33): if it is headed (**I**), it surfaces as [i], as in [mⁱina] *mina* – ‘face’, whereas the headless (I) stands for the phonetic [i̯], as in [tɨlko] *tylko* – ‘only’. The same solution may be proposed for the Old Irish dichotomy between the *u*-sensitive [a], and the non-alternating [a]. We will see whether this is a feasible proposal in the following sections. First, however, we will analyze a group of Old Irish vowels which do not display any synchronic alternations.

4.3.6. Other prehistoric harmony effects

Apart from easily noticeable prehistoric vowel harmony effects, which synchronically manifest themselves mostly in the Old Irish alternations of [i – e] and [o – u], in Primitive Irish there also occurred similar harmony processes which are not detectable if the Old Irish data are analyzed from an exclusively synchronic perspective. These harmony effects shed much light on the mechanisms operating in the prehistory of Irish and provide us with the appropriate background if we wish to comprehend what was behind the vocalic changes and what predictions can be made about the possible structure of the vocalic expressions. In other words, they can reveal what was regular and what was idiosyncratic about the pre-Old Irish short vowels.

Bearing in mind that the Old Irish changes such as [i – e] and [o – u] were triggered by the presence of different vocalic endings in Primitive Irish, e.g. *wira^h → *wera → [fⁱer] *fer* vs. *wiri: → *wiri → [fⁱirⁱ] *fir* – ‘man’/gen.sg., let us consider a few cases which do not involve any synchronic alternations in Old Irish, e.g. [laNd] *land* vs. [LaNⁱdⁱe] *lainde* – ‘area’/gen.sg. The reason why the stem vowel does not alternate here may be that some vocalic endings in Primitive Irish were apparently not responsible for triggering vocalic changes in these particular paradigmatic cases. If a change occurred, it affected the vowel in all the cases. If some cases displayed a different vowel, levelling took place and Old Irish does not show any alternations.

Below we can observe the Primitive Irish retraction of [æ] to [a] (McCone 1996:112) before consonant clusters and back non-high vowels in (23a), and the raising of [æ] to [ɪ] before the same clusters followed by a high vowel in (23b):

(23) a. RETRACTION OF [æ] TO [a] BEFORE BACK VOWELS

*lænda: → *laNda → [laNd] *land* – ‘area’
 *ændan → *aNdan → [aNd] *and* – ‘there’
 *kæmbah → *kamba → [kamb] *camb* – ‘crooked’

b. RAISING OF [æ] TO [ɪ] BEFORE HIGH VOWELS

*kæmbijaθih → *kɪmbijaθih → [kⁱimⁱbⁱɪθⁱ] *cimbid* – ‘prisoner’¹⁹
 *ængura: → *ɪŋgura → [ɪŋgər] *ingor* – ‘anchor’

In all these cases the stressed stem vowels are separated from the unstressed ones by nasal+obstruent clusters. These consonant groups have no impact on the process of vowel harmony, although it is interesting that these particular raisings and retractions occurred in the immediate vicinity of nasals followed by homorganic stops. The changes in (23a, b) can be graphically represented as follows:

(24) a. *lænda: → *laNda – ‘area’

O	N ₁	O	N ₂	O	N ₃		O	N ₁	O	N ₂	O	N ₃
						→						
x	x	x	x	x	x		x	x	x	x	x	x
l	ɪ	n		d			l		n		d	
	A			A			A	<<<<<<<<<<			A	

b. *ængura: → *ɪŋgura – ‘anchor’

N ₁	O	N ₂	O	N ₃		N ₁	O	N ₂	O	N ₃			
					→								
x	x	x	x	x		x	x	x	x	x			
ɪ	ŋ		g	u	r	a:	ɪ	ŋ		g	u	r	a
	A												

In (24b) when there is no prime (A) in the following realized nucleus (N₃) and, consequently, A-support is absent, the only element to survive under (N₁) is (ɪ), which is realized as the mid-high front vowel. This development resembles what

¹⁹ See McCone (1981) and Jaskuła (1998) for analyses of voicing of obstruents, e.g. [θ] to [ð] in [kⁱimⁱbⁱɪθⁱ].

we could see in *melis → *mili in (9b), where the raising of the original mid-vowel [e] was shown. When the vocalic ending had no prime (A) in its structure, this element was also withdrawn from the stem vowel. Let us assume that the element make-ups of [e] and [æ] are (A, I) and (A, I), respectively.

In (24a) the presence of the prime (A) in the vocalic ending (N₃) contributes to the strengthening of the same element in the stem vowel in (N₁). As a result, the element (I) is no longer licensed under (N₁). This case is to a certain extent parallel to that in (9a), that is *wisso: → *weso, where the presence of the prime (A) in the vocalic ending resulted in the occurrence of the same element in the stem nucleus. Here, however, we can see the total suppression of the prime (I), which resembles *deγ^wih → *dæγ^wi → [daγⁱ] *daig* – ‘flame’, as shown in (11).

The developments represented in (24) were regular. Now let us consider two cases which should have developed like the one in (24b) but they did not.

(25) **Raising Stage**

*lændija:s → *lɪNdija → *lɪNde → [LaNⁱdⁱe] *lainde* – ‘area’-gen.sg.
 *kæmbi: → *kɪmbi → *kɪmb → [kamⁱbⁱ] *caimb* – ‘crooked’-gen.sg.

In these cases the stressed stem vowel [æ] was regularly raised to [ɪ] before the high vowel in the ending. Contrary to what we would expect, taking into account the changes such as *æŋgura: → *ɪŋgura → [ɪŋgər] *ingor* – ‘anchor’ (23b), the stem vowel in Old Irish surfaces as [a] and not [ɪ]. According to McCone (1996: 78), the regular forms *LiNdⁱe – ‘land’-gen.sg. and *kⁱimⁱbⁱ – ‘crooked’-gen.sg. were “eradicated in favour of the *a*-vocalism”. This levelling of the stem vowel is based on the perfectly regular development of the nom.sg., i.e. *lænda: → *laNda → [laNd] *land*, as shown in (23a), and the other paradigmatic cases.

Although in Old Irish there was neither [ɪ] nor [æ], nor the alternation between these two, these sounds were important members of the Primitive Irish vowel inventory. Moreover, the regular developments described in this section agree with our previous findings which indicate that nearly all the Primitive Irish vocalic alternations were triggered by the presence/absence of the prime (A) in the vocalic ending. Since the prehistoric changes discussed so far indicate that the Primitive Irish vocalic inventory was more numerous than that of Old Irish, we need to approach both systems of short vowels in terms of element structure.

4.3.7. Prehistoric element interactions – headedness

Trying to explain the changes shown in (23) as well as all those described in this chapter in terms of element interactions, we need to reconsider our assumptions as regards the element make-ups of all short vowels which have been in use up

to this point. So far we have been assuming that the Old Irish [e] can be represented as (A, I), [i] as (I), [a] as (A), [o] as (A, U), and [u] as (U). If we look at Old Irish alone, there seems to be no need to postulate other structures or resort to the notion of headship. When we consider the historical changes, though, we see that there were probably dissimilar *i*'s and *e*'s, there was the vowel [æ], and possibly different *o*'s as well. These segments must be differentiated by means of head-operator relations between the resonance elements. Thus, theoretically, the set of Primitive Irish short vowels can be elementally represented as follows:

- (26)
- | | | | |
|-----|-----------------|-----|-----------------|
| [i] | (I) | [i] | (<u>I</u>) |
| [e] | (<u>I</u> , A) | [ɛ] | (<u>A</u> , I) |
| [æ] | (A, I) | [a] | (<u>A</u>) |
| [o] | (A, U) | [ɔ] | (<u>A</u> , U) |
| [u] | (<u>U</u>) | | |

It should be borne in mind that these element representations are purely hypothetical. Now we need to look again into the synchronic and diachronic changes and decide whether these structures can be justified.

4.3.7.1. Primitive Irish changes and structures of front vowels

Let us begin with the prehistoric alternation [i – e] and the change of [æ] to [i] so as to determine the structures of front vowels. As shown in (9a) and (24a) the prime (A) spreads from the end of the word to affect the stem vowel. This high vowel is always lowered after the spreading. If (A) is absent from the ending, it is forbidden from the stem vowel too. The relevant cases are reanalyzed and juxtaposed below, where the front vowels [i] and [e] are represented by (I) and (A, I), respectively.

- (27)
- | | | |
|-----------------------------------|---|-----------------------------------|
| *wiso: | → | *weso – ‘knowledge’-gen.sg. |
| O N ₁ O N ₂ | | O N ₁ O N ₂ |
| | | |
| x x x x | → | x x x x |
| | | |
| w <u>I</u> s U | | w <u>I</u> s U |
| | | |
| A | | A << A |

The original vowel [i] in (N₁), containing the headed (I), is affected by A-spreading from (N₂). As a result, the vowel [e] is formed, whose element structure

must be (\underline{I} , A). The vowel [o] in the nucleus (N_2) is not considered as a headed expression because there is no evidence as yet that it should be treated as such.

Now, let us reconsider the reverse situation, which is the raising of the original [e] to [i] without the support from (A) in the following nucleus.

$$(28) \quad \begin{array}{cccc} & *melis & \rightarrow & *mili - \text{'honey'} \\ O & N_1 & O & N_2 & & O & N_1 & O & N_2 \\ | & | & | & | & \rightarrow & | & | & | & | \\ x & x & x & x & & x & x & x & x \\ | & | & | & | & & | & | & | & | \\ m & \underline{I} & l & I & s & m & \underline{I} & l & I \\ & | & & & & \text{---} & | & & \\ & A & & & & & A & & \end{array}$$

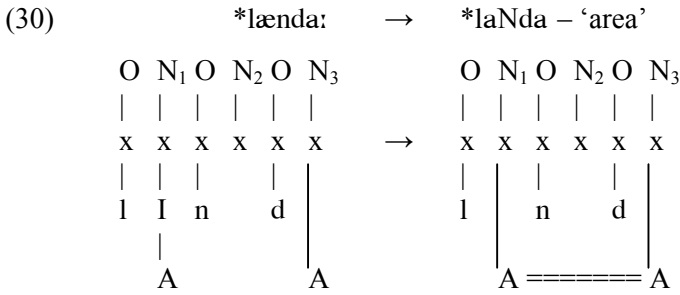
Here (A) cannot survive under (N_1) because it is not supported by the same prime from (N_2). Both (27) and (28) show that in order to survive in a segment headed by another prime, the element (A) has to be doubly linked, i.e. it must occur in two consecutive vowels. This constraint was proposed in (4.3.1.2.) above. (A) is not associated with two slots in (28) and it must be absent from the structure.

Now let us return to the change of [æ] to [ɪ]. Since this time the lax version of the high vowel is used, this is regarded as non-headed (I).

$$(29) \quad \begin{array}{cccc} & *æŋgura: & \rightarrow & *ɪŋgura - \text{'anchor'} \\ N_1 & O & N_2 & O & N_3 & & N_1 & O & N_2 & O & N_3 \\ | & | & & | & | & \rightarrow & | & | & & | & | \\ x & x & x & x & x & & x & x & x & x & x \\ | & | & & | & | & & | & | & & | & | \\ I & ŋ & & g & u & r & a: & I & ŋ & & g & u & r & a \\ & | & & & & & \text{---} & | & & & & & & \\ & A & & & & & & A & & & & & & \end{array}$$

The representations in (29) show that if [ɪ] is headless (I), [æ] should be viewed as headless (A, I) too. There are two reasons for this. First, this [æ] cannot be represented by (\underline{I} , A) because this structure is realized as [e]. Second, there is no evidence to suspect any headedness in the structure of this segment.

Finally, let us consider the other change involving the vowel [æ], that is, the retraction to [a].



In (30) the change of [æ] to [a] is illustrated. The prime (I) is attached to (N₁) in *lænda:. It is subsequently absent from (N₁) when the element (A) is supported (==) by the same prime from (N₃). In (27) above we saw A-spreading from the vocalic ending, i.e. *wisō: → *weso – ‘knowledge’-gen.sg., and no prime was delinked in the stem vowel after this operation. This showed that (A) can be an operator in an expression headed by another element. Here the situation is different. The reason why (I) is suppressed in *laNda may be that (A), when supported from another position, becomes headed (A). We may also hypothesize that the headed (A) does not license operators.

If we recall the development of *deγ^wih → *dæγ^wi → [daγⁱ] *daig* – ‘flame’ in (11), we can account for the stem vowel changes in this word in a similar fashion. The form *deγ^wih contains the stem vowel [e] composed of (I, A). When the element (I) loses headship, the vowel is lowered to [æ], whose structure is (A, I), and the form changes to *dæγ^wi. The next step is the change of [æ] to [a], which may consist in the shift of status from headless (A) to headed (A). Now, since headed (A) does not license operators, the element (I) is suppressed, as a result of which the form [daγⁱ] surfaces.

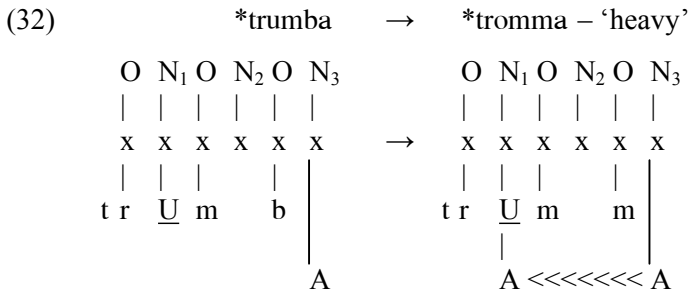
Thus, the disappearance of the prehistoric [æ] from the Irish system can be explained by the assumption that headed (A) does not license operators. This is but a working hypothesis, so no conclusions should be drawn at this stage. It remains to be seen whether this supposition can find confirmation in the other vowels containing (A).

Having analyzed short front vowels in prehistoric alternations, we can propose the following element structures for these vocalic segments in Primitive Irish.

- (31) [i] (I) obtained from [æ] (A, I) in *ængura: → *iŋgura
 [i] (I) obtained from [e] (I, A) in *melis → *mili
 [e] (I, A) obtained from [i] (I) in *wisō: → *weso
 [a] (A) obtained from [æ] (A, I) in *lænda: → *laNda
 [æ] (A, I) was apparently on the wane giving either [i] or [a]

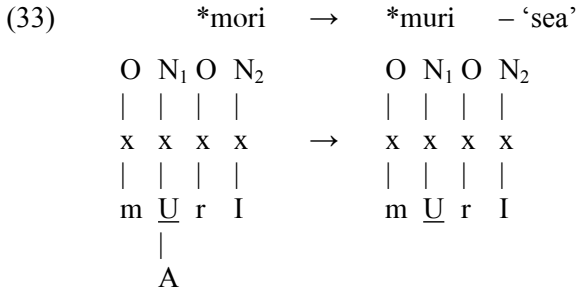
4.3.7.2. The element structures of Primitive Irish back vowels

Now we are returning to the back vowels so as to examine the element interactions with particular attention paid to the usefulness of the idea of headedness. The forms from (6) and (7), i.e. *trumba → *tromma – ‘heavy’ and *mori → *muri – ‘sea’, will serve as examples of lowering and raising, respectively. In other words, we are returning to the alternation of [o – u]. The reconstructed forms provide us with no clue as regards the actual quality of [u]. Nonetheless, taking into account the fact that A-spreading which caused [o – u] alternations was perfectly parallel to that triggering [e – i], changes, we will assume that the vowel [u] is a headed expression. Consider the following representations.



It is assumed above that in *trumba the vowel [u] under (N₁) is represented by (U). In *tromma, where the nucleus (N₁) is affected by A-spreading, the resulting [o] has the structure of (U, A). Otherwise, by analogy with the suppression of (I) in *lænda: → *laNda – ‘area’ in (30) above, we would expect the delinking of (U) under (N₁).

Now let us proceed to the example of contextual raising, where the absence of (A) in the ending triggers the transition from [o] to [u].



In (32), we first observe the form *mori, where the original vowel under (N₁) is [o], which consists of (U, A). When there is no support from the vocalic ending (N₂), the prime (A) is not licensed by the nucleus (N₁), as a result of which the vowel surfaces as [u], with the headed (U), i.e. *muri.

Both the examples in (32) and (33) show that in order for the element (A) to survive in the structure, it has to be doubly linked. This is exactly what we observed in (27-29), i.e. *wisso: → *weso – ‘knowledge’-gen.sg. and *melis → *mili – ‘honey’. If (A) occurs in the structure and triggers height harmony, it must be linked to two consecutive nuclei. If it is absent from the ending, it is suppressed altogether.²⁰

4.3.7.3. The Primitive Irish [a]

Finally, let us return to the vowel [a]. In the developments in (4.3.5.3.) we assumed that there were two vowels *a* in Primitive Irish. In Old Irish, the only difference between these two is the ability to alternate. The first type, i.e. let us call it [a]₁, either alternates with [au], e.g. [baL]/[bauL] *ball/baull* – ‘limb’/dat.sg., or is replaced by [u], e.g. [baL]/[buL] *ball/bull*, depending on the interpretation. The other Primitive Irish type of *a*, which will be referred to as [a]₂, is never affected by the environment in Old Irish, e.g. [mak]/[makⁱ]/[mak] *macc/maicc/macc* – ‘boy’/gen.sg./dat.sg. Nor was it able to alternate in Primitive Irish, e.g. *mak^wk^wah → [mak], *mak^wk^wi → [makⁱ], *mak^wk^wu → [mak].

In (4.3.7.1.) it was also hypothesized that the Primitive Irish vowel [a] which resulted from the retraction from [æ], e.g. *lænda: → *laNda – ‘area’, should be represented by the headed prime (A). Being headed, the prime (A) could not license operators and the element (I) in the form *lænda: had to be suppressed. The presumed development was as follows: acquisition of headedness (A, I) → (A, I), element decomposition (A, I) → (A), and hence the retraction of [æ] to [a]. Given this structure of [a], let us see whether this element representation can be confirmed in the analysis of the vowels [a]₁ and [a]₂.

The first type, that is the Primitive Irish [a]₁, developed from the ancient [ɔ]. As proposed in (21), the original [ɔ] was reinterpreted in two ways in Primitive Irish: either as [a], e.g. *k^wrɔnna → *kraNa → [kraN] *crann* – ‘tree’, or as [o], which led to the regular [o – u] alternation and the Old Irish form *k^wrɔnnu: → *k^wronnu: → *kruNu → [kruN] *crunn* – ‘tree’-dat.sg. (for the sake of clarity, we ignore here the alternative variant of the dative, which is *craunn*).

²⁰ This resembles Finnish Vowel Harmony (Kaye 2001:259ff.). In Finnish, “if a nuclear expression in a phonological domain contains (I) as an operator, the element (I) must be present (as head or operator) in every nuclear expression in the phonological domain”.

In terms of the element make-up, we assumed that the change of [ɒ] to [a] in $*k^wronnan \rightarrow *kraNa$ can be represented as $(\underline{A}, U) \rightarrow (\underline{A})$. As regards the development of [ɒ] to [o] in $*k^wronnu: \rightarrow *k^wronnu:$, the structural change involved the shift of headship, i.e. $(\underline{A}, U) \rightarrow (A, \underline{U})$. The subsequent raising to [u], i.e. $*k^wronnu: \rightarrow *kruNu$, and the origin of [kruN] *crunn* – ‘tree’-dat.sg. parallels that observed in $*mori \rightarrow *muri \rightarrow [mur^i]$ *muir*– ‘sea’ in (33) and entails the loss of (A), i.e. $(A, \underline{U}) \rightarrow (\underline{U})$. Thus, the vowel [a]₁, which developed from [ɒ], e.g. $*k^wronnan \rightarrow *kraNa$ – ‘tree’, can be said to have the same element make-up as [a] which originated from [æ] in $*lænda: \rightarrow *laNda$ – ‘area’.

Let us now turn to the non-alternating Primitive Irish vowel [a]₂, which originated from the Proto-Celtic [a], e.g. $*mak^wk^wos \rightarrow *mak^wk^wah \rightarrow [mak]$ *macc* – ‘boy’. The nom.sg. shows that in the Primitive Irish $*mak^wk^wah$ the prime (A) in the stressed stem vowel was supported by (A) in the vocalic ending. However, the gen.sg. $*mak^wk^wi \rightarrow [mak^i]$, and the dat.sg. $*mak^wk^wu \rightarrow [mak]$ reveal that there was no (A) in the endings of these forms to support the same prime in the left-hand nucleus. Thus, being linked to only one nucleus, the prime (A) should have been removed from the structure. No such development took place, though, and (A) survived in both the gen.sg. and dat.sg. without double linking.

A possible solution to this puzzle may come from the development of Primitive Irish tense sonorants, i.e. [r] → [R], [l] → [L], and [n] → [N]. As proposed in (2.3.6.), the original lax sonorants, e.g. [r], were first geminated in specified phonological contexts, i.e. they were linked to two positions on word-boundaries. This resulted in their tensing, e.g. $*ehja:h la:va: \rightarrow *ehja:lla:va: \rightarrow *eja:La:va:$ – ‘her hand’. Later on, in context-independent position, tense sonorants replaced the lax ones, e.g. $*la:va: \rightarrow *La:va:$ – ‘hand’. It was proposed that the acquisition of headedness was equal to double linking.

Therefore, if we assume that headedness in vowels has the same effect as double linking, then the element (A) survived in, say, $*wiso: \rightarrow *weso$ – ‘knowledge’-gen.sg., due to double linking, while it may have managed to remain in the structure of $*mak^wk^wi$ – ‘boy’-gen.sg. as a result of being headed. Thus, the vowel [a]₂ in [mak] *macc* – ‘boy’ should be represented (\underline{A}) , similarly to all vowels [a] in Primitive Irish. The vowel [a] in $*mak^wk^wi$ may have also survived simply because there was no I-spreading and, if [a] were delinked, nothing would have remained in the nucleus.

4.3.7.4. The Primitive Irish non-alternating [e] and [o]

Assuming that the element (A) can survive in the stem vowel without support only thanks to being headed, i.e. (\underline{A}) , we can finally turn to the other two non-alternating vowels, i.e. [e] and [o]. Consider again the stable *e*’s and *o*’s.

(34) NOMINATIVE	GENITIVE	DATIVE	
a. <i>non-alternating</i> [e]			
[L ⁱ eθ] <i>leth</i>	[L ⁱ eθ ⁱ] <i>leith</i>	[L ⁱ eθ] <i>leuth</i>	– ‘half’
[m ⁱ es] <i>mes(s)</i>	[m ⁱ eso] <i>mes(s)o</i>	[m ⁱ es] <i>mes(s)</i>	– ‘judgement’
b. <i>non-alternating</i> [o]			
[korp] <i>corp</i>	[kor ⁱ p ⁱ] <i>coirp</i>	[korp] <i>corp</i>	– ‘body’
[foL ^t] <i>folt</i>	[foL ⁱ t ⁱ] <i>foilt</i>	[foL ^t] <i>folt</i>	– ‘hair’

Lets us recall that these cases are exceptions to the regular alternations of [i – e], e.g. [fⁱer]/[fⁱirⁱ]/[fⁱir] – ‘man’/gen.sg./dat.sg. and [o – u], e.g. [kloθ]/[kluθⁱ]/[kluθ] – ‘fame’/gen.sg./dat.sg.

The words in (34) belong to two different declensions. For this reason they should display alternations in different paradigmatic cases. In particular, in (34a) the word for ‘half’ should display the vowel [i] in the genitive and dative. In the word for ‘judgement’ the vowel [i] ought to surface in both the nominative and dative, the genitive being a classic example of vowel harmony. In (34b) the words for ‘body’ and hair’ should display the vowel [u] in both the genitive and dative, which they actually do in the alternative [kurⁱpⁱ] *cuirp*, [fuLⁱtⁱ] *fuilt* as well as [korp] *corp*, [foL^t] *folt*, respectively. Nonetheless, the forms with [o] are regarded as perfectly licit and we need to account for them too.

Thus, we have two non-alternating vowels, both containing the prime (A). It was shown in the previous sections that the prime (A) is an operator responsible for vocalic alternations in Primitive Irish, e.g. *wiso: → *weso – ‘knowledge’-gen.sg., *æŋgura: → *ŋgura – ‘anchor’, etc. If (A) is attached to two consecutive nuclei, the vowels in the harmonic span are mid ones. If it is not doubly linked, it must be deleted, e.g. *mori → *muri – ‘sea’. If it is not deleted, it must be headed, e.g. *mak^wk^wi: → *mak^wk^wi – ‘boy’-gen.sg.

Given the examples in (34a, b), we must conclude that the non-alternating vowels [e] and [o] in, e.g. [Lⁱeθ] *leth* vs. [Lⁱeθⁱ] *leith* vs. [Lⁱeθ] *leuth* – ‘half’/gen.sg./dat.sg. and [korp] *corp* vs. [korⁱpⁱ] *coirp* vs. [korp] *corp* – ‘body’/gen.sg./dat.sg., respectively, are headed by the element (A). In particular, the non-alternating [e] equals (A, I), while the stable [o] is represented by (A, U).

The different status of (A) in alternating and stable vowels probably means a slight change in the quality of these vowels. In particular, the vowel *e* in *messu could have differed from that in *fera, e.g. [mⁱesu] vs. [fⁱera]. In terms of elements the difference may be between (A, I) and (A, I), respectively. Similarly, the vowel *o* in *korpa and *klotha, that is [korp^a] (A, U) vs. [kloθ^a] (A, U).

These proposals run into difficulty with what we postulated above, namely that headed (A) does not license operators. This was a hypothetical statement

used to explain the suppression of the element (I) in the development of forms such as *deγ^wih → *dæγ^wi → [daγⁱ] *daig* – ‘flame’. However, given the discussion concerning the behaviour of non-alternating vowels, we must redefine the cause of the delinking of (I) in words of this type.

Since the element (I) was the head of [e] in *deγ^wih, then it became an operator in [æ] of *dæγ^wi, it is likely that it finally disappeared from the stem vowel without any intervention from (A). This account is hardly scientific but, since the lowering of [e] to [æ] occurred without any locally present cause, we may suspect that the loss of (I) was a gradual process which occurred for systemic rather than phonological reasons.

4.3.7.5. Element representations of vowels

We are now in a position to propose a complete picture of Primitive Irish short vowels which either alternated or remained immune to the environment:

(35)	PRIMITIVE IRISH	OLD IRISH
[i] (I) < [æ] (A, I)	*æŋgura: → *iŋgura	[iŋgər] <i>ingor</i> – ‘anchor’
[i] (I) < [e] (I, A)	*melis → *mili	[m ⁱ il ⁱ] <i>mil</i> – ‘honey’
[e] (I, A) < [i] (I)	*wisso: → *weso	[f ⁱ eso] <i>feso</i> – ‘knowledge’-gen.
[ɛ] (A, I) < stable	*messu	[m ⁱ es] <i>mes</i> – ‘judgement’-dat.
[a] (A) < [æ] (A, I)	*lænda: → *laNda	[LaNd] <i>land</i> – ‘area’
(A) stable	*maku	[mak] <i>macc</i> – ‘boy’-dat.
(A) < [ɒ] (A, U)	*bolla → *baLa	[baL] <i>ball</i> – ‘limb’
[o] (A, U) < [u] (U)	*kluta → *kloθa	[kloθ] <i>cloth</i> – ‘fame’
[ɔ] (A, U) stable	*foltu ?	[foLt] <i>folt</i> – ‘hair’-dat.
[u] (U) < [o]	*mori → *muri	[mur ⁱ] <i>muir</i> – ‘sea’

Two things should be mentioned here. First, the vowels [æ] and [ɒ] are not included in the left-hand column in (35). The reason why they are omitted is that they were part of an earlier inventory which gave way to the one shown in (35). Second, this collection of segments along with their element structures represent the inventory which took part in purely phonological vocalic alternations. These changes occurred when the Irish words still had vocalic endings, that is, in Primitive Irish. It can be seen in the right-hand column that the Old Irish versions of words participating in these alternations do not display different *e*'s, *i*'s, *o*'s or *a*'s. The reason why this is so is that there is absolutely no evidence that there were dissimilar segments of these types in this system. We have seen that at the time of phonological alternations the vowels must have differed and one of the ways of depicting these differences is attributing diverse element structures

to them. In Old Irish, when there was no longer any context for phonological alternations, levelling must have occurred and all the dissimilar *i*'s, *o*'s and *e*'s merged as identical segments [i], [e] and [o], respectively. Their synchronic behaviour provides no convincing evidence to the contrary because the Old Irish alternations were morphophonological: they still observed the principles which had been followed in specific phonological contexts even though these contexts were no longer available. Thus, the Old Irish inventory of short vowels may be schematized in this fashion:

- (36) [i] (I) or (I)
 [e] (A, I) or (A, I) or (A, I)
 [a] (A) or (A)
 [o] (A, U) or (A, U) or (A, U)
 [u] (U) or (U)

The structures of the Old Irish short vowels cannot be established beyond doubt because these segments are merely a reflection of past phonological processes. It is impossible to state when exactly levelling occurred but Old Irish seems to be a transition period between past processes and the system of Middle Irish, which simplified many forms and introduced new methods of expressing differences between paradigmatic cases of lexical items. The most significant ways were the emphasis placed on the syntactic behaviour of paradigmatic cases and the growing importance of palatalization. These devices took over the role of prehistoric endings which were morphological exponents of contrast.

4.3.8. *Vowels in stressed syllables and vocalic alternations – summary*

In the first part of this chapter the behaviour of short vowels in stressed syllables, vocalic alternations and non-alternating vowels have been analyzed. The main conclusion is that short vowel alternations in Old Irish do not meet the basic condition which is necessary to name these vocalic changes phonological. There is simply no context for phonological change in the system of Old Irish viewed from the synchronic perspective. This is strictly connected with the inability to find sufficient evidence supporting the belief that there were three types of consonant qualities in Old Irish. In Thurneysen's (1946) view, where three consonant qualities are recognized, the context for alternations can be identified but, since the spelling conventions were highly inconsistent, there is no proof that three qualities were present in Old Irish. In Greene's (1976) and McCone's (1996) approaches, where two qualities are advocated, vocalic alternations do occur, but the context for phonological change is absent. If we recall the word

for ‘man’, i.e. [fⁱer] *fer*, its genitive [fⁱirⁱ] *fir* and dative [fⁱiur] *fiur*, and adopt McCone’s recognition of the diphthong [iu] as well as the broad quality of the final liquid in the dative, the context is identical in the nominative and dative, and yet the vocalic segments differ in these cases. According to the definition of alternation where the context is the trigger of changes, we cannot expect different changes in the same context. Thus, whether or not we recognize three short *u*-diphthongs is systemically irrelevant because there is no third quality anyway.

Therefore, our discussion was limited to pursuing phonological alternations in the system of Primitive Irish, where the context was invariably present and vocalic changes duly occurred. As a result, an inventory of Primitive Irish short vowels was proposed as one in which alternations took place, while the Old Irish system was described as one in which nothing results from the synchronic context. If we recall the definition of morphophonology (e.g. Árnason (1985), Cyran (2003)), according to which phonological regularities are grammaticalized or petrified and the synchronic effects may reflect past rather than present phonological patterns, the phenomenon of Old Irish vowel alternations can by all means be called morphophonological. In the light of this statement, purely synchronic analyses of Modern Irish vowel alternations may appear slightly out of place.

4.4. Word-medial vowels in unstressed syllables

In this part of the present chapter we will inspect the behaviour of short vowels in unstressed syllables. It is vital to state at the very outset that we will concentrate on vocalic segments in the interior of words, e.g. the second vowel in the word [klaðⁱəv] *claideb* – ‘sword’, but not on the final vowel in, say, [fⁱiru] *firu* – ‘man’-acc.pl. The reason for this choice is very trivial: the vocalic endings were discussed while dealing with short vowels in stressed syllables and nothing more can be said about them. There is relative concord among the scholars that these endings are never reduced and the orthographic symbols represent the actual vowels. Word-medial ones, in contrast, present a few problems concerned with both their actual phonetic shape and the qualities of the flanking consonants.

It is also essential to determine the status of the vowels we are about to discuss. They almost invariably alternate with zero if there is a vowel in the following syllable, e.g. [inⁱisⁱ]/[inⁱsⁱe] *inis/inse* – ‘island’/gen.sg. In GP every vowel alternating with zero is treated as an underlying empty nucleus. Thus, the majority of cases described below will include underlyingly empty nuclear positions.

As stated in the introduction, the word-medial vocalic segments in unstressed syllables are represented by the same symbols as the stressed vowels, that is *i*, *e*, *a*, *o*, *u*. At first glance, it might appear that these orthographic symbols denoted five different realizations of unstressed vowels, which is implied in Thurneysen

(1946:63ff.). However, the more contemporary relevant literature offers a range of arguments disfavouring this view. Two most important ones are as follows. First, since primary stress was always initial in Old Irish, the medial position of these vowels was ideal for their reduction to schwa (Lewis and Pedersen 1974: 70ff.; McCone 1996:33ff.), e.g. [molað] → [moləð] *molad* – ‘praise’. Second, many of these vowels appeared in Early Old Irish as a kind of compensation for Primitive Irish apocope, which left ‘clumsy’ clusters at the end of the word, e.g. *doṽna → (apocope) *doṽn → (svarabhakti) [doṽun] *domun* – ‘world’, or syncope, which deleted any second vowel of the polysyllabic word and produced unpronounceable clusters word-medially, e.g. *evraθⁱi → (syncope) *evrθⁱi → (anaptyxis) [evərⁱθⁱi] *ebarthi* – ‘will give it’ (McCone 1996:127). These vowels were coloured according to the qualities of the flanking consonants, so they were ‘raw vocalic material’ which was filled with melody. Most likely these empty nuclei were simply voiced to schwa but in different contexts they may have initially taken on dissimilar phonetic shapes. It is difficult to state when exactly all unstressed vowels started to be realized as schwa, as they are in Middle and Modern Irish, but we will try to discover whether their pronunciation as schwa or non-schwa had any significance in the Old Irish period.

4.4.1. Approaches to the shape of vowels in unstressed syllables

4.4.1.1. Vowels in unstressed syllables – traditional view

In this section the traditional view of what vowels in unstressed syllables were like will be presented. Thurneysen (1946:63ff.), who recognizes three consonant qualities for the existence of which we have not found sufficient evidence as yet, offers the following account of the distribution of these vowels. Although he does not make a claim as regards the pronunciation of these segments, it is implied that there were five dissimilar realizations of word-medial short vowels:

(37)	<i>Context</i>	<i>Spelling</i>	<i>Example</i>	<i>Gloss</i>	<i>Possible Pronunciation</i>
a.	C ⁱ _ C ⁱ	<i>i</i> , seldom <i>e</i>	<i>berid</i>	– ‘(he) bears’	[i]
b.	C ⁱ _ C ^a	<i>e</i>	<i>sessed</i>	– ‘sixth’	[e]
c.	C ⁱ _ C ^u	<i>iu</i> , <i>i</i>	<i>imniud</i>	– ‘suffering’-dat.	[i]
d.	C ^a _ C ^a	<i>a</i>	<i>apstal</i>	– ‘apostle’	[a]
e.	C ^a _ C ⁱ	<i>ai</i> , seldom <i>i</i>	<i>fodail</i>	– ‘share’	[i] [a]
f.	C ^a _ C ^u	<i>u</i> , <i>o</i>	<i>denom/-um</i>	– ‘doing’	[u] [o]
g.	C ^u _ C ^u	<i>u</i>	<i>ilur</i>	– ‘great number’	[u]
h.	C ^u _ C ⁱ	<i>i</i> , <i>ui</i>	<i>cosmill/-uil</i>	– ‘like’	[i] [u]
i.	C ^u _ C ^a	<i>u</i> , <i>o</i>	<i>flechud/-od</i>	– ‘rainy weather’	[u] [o]

If the spelling can be indicative of the pronunciation, which it must be to some extent when we are dealing with a dead language, the frequency of occurrence of some orthographic symbols points to some revealing conclusions. In particular, the contexts in which the consonant preceding the unstressed vowels is slender (37a-c) display the same letters as those found in stressed syllables, e.g. *ressed* is comparable to *fer*, while *imniud* to *fiur*. Moreover, vowels between the consonants of the same broad qualities come up to our expectations as well; that is *apstal* in (37d) resembles *macc*, whereas *ilur* in (37g) is comparable to *sun*. However, the remaining four contexts, that is (37e, f, h, i), do not generally reflect the same pattern as that discussed in the first part of this chapter. There are some similarities in that one variant parallels that in the stressed syllable, e.g. *cosmuil* in (37h) could be like *suin*, but other spellings such as *cosmil* or even *cosmail* distort the picture and cast a shadow of a doubt on the actual shape of this vocalic segment.

As already mentioned, this distribution is based on the assumption that there are three consonant qualities although Thurneysen (1946:109) admits that the two non-palatalized qualities were frequently indistinguishable and that the levelling began very early in Old Irish. In the ensuing section we will examine another approach to the quality of vowels in unstressed syllables.

4.4.1.2. A modern approach to unstressed vowels

The fivefold distinction among the vowels in unstressed syllables is contested by McCone (1996:135) who claims that four word-medial vocalic segments, that is those represented by the letters *i*, *e*, *a*, *o* or digraphs indicating palatalization or non-palatalization of the flanking consonants (e.g. *ai*), were schwa-like objects. These segments, in his opinion, were phonemically schwas but the qualities of the flanking consonants provided them with appropriate colouring, thus making them contextual allophones. The only vowel which was pronounced according to the spelling was [u] which, due to the fact that *u*-quality is not recognized in his approach, could not have received the colouring from the neighbouring consonantal sounds. McCone's claim is also based on the assumption that there was no need to express any contrast between the unstressed vowels apart from that between [ə] and [u], which he exemplifies by [as 'RuvuRt] *as:ruburt* – 'I have said' vs. [as 'RuvəRt] *as:rubart* – 'he has said' and [forməd]/[formud] *format/formut* – 'jealousy'/dat.sg. These resemble the alternation of the *crann/crunn* type which we discussed above. Thus, viewed from McCone's perspective, all the cases from (37a, b, d, e, f) contain the phonemically distinct sounds [ə], whatever their phonetic realization is, the examples from (37c, g) display [u], while those in (37h, i) are dubious, but they are likely to have [u] as well.

This treatment of unstressed vowels logically follows from the recognition of short *u*-diphthongs in stressed syllables, as proposed by Greene (1976), and the distinction between, for example, [fⁱirⁱ]/[fⁱiur] *fir/fiur* – ‘man’-gen.sg./dat.sg., a difference which we have shown to be unnecessary given that the palatalized [r] of the genitive is sufficiently distinctive, that is [fⁱirⁱ]/[fⁱir]. It should also be recalled here that, apart from the morphological dissimilarity, paradigmatic cases are in syntactic complementary distribution, which greatly diminishes the necessity for minimal-pair contrast. The example of verbal forms is more convincing because contrast should be more explicit there. For instance, the verbal form for ‘I slaughter’ should phonetically differ from that for ‘you slaughter’, etc. Nonetheless, Old Irish has a number of verbal forms which do display identical forms for dissimilar persons, e.g. [do ‘gⁱnⁱi:] *do:gni* stands for both the second and the third persons singular of the verb ‘to do’ in the present tense.

Another interesting argument in favour of treating [u] as a non-reducible-to-schwa segment comes from the prehistory of Irish. While discussing *u*-infection, which perhaps created short *u*-diphthongs in stressed syllables, in (4.3.5.1.-4.3.5.3.) above, we disfavoured the idea that the symbol *u* stood for a phonological object in, e.g. [fⁱir] *fiur* – ‘man’-dat.sg. However, Greene (1976:30) and McCone (1996:112) provide examples of *u*-infection which was a more powerful type of umlaut in unstressed syllables. Therefore, although there was probably no visible umlaut in many stressed nuclei, e.g. *messuh → *messu → [mⁱes] *mess* – ‘judgement’, *u*-infection may have been fairly strong in recessive nuclei, e.g. *to^ovessuh → *to^oveusu → [to^ovus] *tomus* – ‘measurement’ and *doressuh → *doreusu → [dorus] *dorus* – ‘door’. The same goes for the synchronic and diachronic contrast between deuterotonic (independent) and prototonic (dependent) verbal forms, e.g. *eks-beru: → *eχs-biru → *es-bi(u)ru → [as bⁱiur] or [as bⁱir] *as:biur* (deut.) vs. *eks-beru: → *eχs-beru: → *ey-beuru → *eburu → [ebur] :*epur* (prot.) – ‘I say’.

These cases suggest that *u*-infection was an important prehistoric process which may constitute a counterbalance to palatalization. In particular, palatalization affected non-initial consonants, i.e. these which were exponents of contrast by being either slender or broad, e.g. [aθ^ri] *athair* vs. [aθ^r] *athar* – ‘father’/gen.sg., while *u*-infection took care of unstressed vowels, i.e. when there was no difference between non-palatalized consonants, the vowels [u] and [ə] were the only markers of contrast, e.g. [forməd] *format* vs. [formud] *formut* – ‘jealousy’/dat.sg. (see also Greene 1973). It goes without saying, then, that *u*-infection was an important part of the Primitive Irish phonological system. However, whether the dissimilarity between [u] and [ə] was still present in Old Irish is a different question. Solutions to this and other issues will be sought in the ensuing section.

4.4.1.3. Problems with approaches to unstressed vowels

Both the traditional and the modern approaches to the issue of quality in the case of unstressed vowels have their advantages. There are a few problems with each, however, because both are phonemic and both aim to prove that, one way or another, there was explicit contrast between word forms which did not differ with respect to the palatalization vs. broadness of non-initial consonants, e.g. *claideb* vs. *claidiub* – ‘sword’/dat.sg. Thurneysen (1946) would probably transcribe this pair as [klaðⁱev^a] vs. [klaðⁱiv^u], while McCone (1996) would undoubtedly propose the distinction between [klaðⁱəv] and [klaðⁱuv], respectively.

In Thurneysen’s (1946) view there was probably a fivefold opposition among the word-internal unstressed vowels, although there was no need for such a complicated distinction in a system which had already mastered the palatalized vs. non-palatalized dichotomy as regards the non-initial consonants. Moreover, it is clear given the collection in (37) that in many cases the broad quality of the consonant can be marked by either *a* or *u*, apparently with no difference to the possible pronunciation, e.g. *cosmuil* vs. *cosmail*. This is another argument disfavouring three consonant qualities and proving that palatalization of consonants was a satisfactory marker of contrast. A difficulty may be said to arise with the forms in (37f, i), where the distinction between the two broad qualities should be denoted. However, this problem may also be apparent. If we recall cases like [mak] *macc* – ‘boy’-nom.sg./dat.sg. (both forms identical), it is evident that there are words in which no visible contrast is expressed and it is only the syntactic behaviour of a given form that is indicative of the paradigmatic case. In unstressed syllables we find fluctuations like that in [dⁱev^{~a}on^u] *demon* vs. [dⁱev^{~u}un^u] *demun* – ‘devil’-nom.sg., the dative being either of these, or even *demain*, while the genitive is usually *demuin*. These facts indicate that if contrast is to be expressed, it is marked by the quality of the consonant, but if it cannot, it is not displayed because the language has other means of showing which case we are faced with, and these means are primarily syntactic.

If we now turn to the modern approach, where the slender vs. broad consonant distinction is advocated by McCone (1996), it is clearly more economical in the treatment of oppositions among unstressed vowels. The idea of prehistoric *u*-infection of these vowels is fairly convincing and the maintenance of [u] in cases like [forməd]/[formud] *format/formut* – ‘jealousy’/dat.sg. is logical given that any other distinctions are taken care of by the slender vs. broad consonants.

However, it is not clear whether the treatment of the orthographic medial *u* as [u], stemming from the prehistoric development, can be extended to cases like *domun* quoted above. Let us recall the relevant details: *du[~]nah → (vowel lowering) *do[~]na → (apocope) *do[~]n → (svarabhakti) [do[~]un] *domun* – ‘world’.

Given that *u*-infection was a Primitive Irish development, while the second vowel in *domun* was a result of epenthesis occurring in Early Old Irish, we may have doubts about the significance of the latter process and the consequent treatment of the epenthetic vowel. Interestingly, the *u*-symbol did not appear in the vicinity of historically *u*-infected consonants, but in the neighbourhood of labials (almost exclusively). Thus, should the second vowel in *domun* be like that in *tomus*? Besides, the non-reduction of *u* to schwa in cases like *domun* and *tomus* would serve no purpose since the only information it carries is that the surrounding vowels are broad. The other paradigmatic cases where distinction occurs at all may be syncopated, e.g. [tõvus] *tomus* vs. [tõvs'io] *toimseo* – ‘measurement’/gen.sg., or the difference is rendered by the palatalization of the final consonant, e.g. [dõvun] *domun* vs. [dõvunⁱ] *domuin* – ‘world’/gen.sg. Thus, any schwa vowel could serve the same purpose. Given that spellings like *domon* and *doman* are attested for the nom.sg., as well as *domain* for the gen.sg., we can say that the phonetic quality of the unstressed vowel was totally unimportant. Interestingly, the gen.sg. form is a secondary formation. The regular development of *dũvni: → *dũvni:, which should have produced the regular Old Irish genitive *[dũvənⁱ], was abandoned in favour of [dõvunⁱ] *domuin*, where the stem vowel was replaced by analogy with the nom.sg. and acc.sg. [dõvun].

The disparity between the relevant persons in the historically *u*-infected verb [as 'bⁱiur] or [as 'bⁱir] *as:biur* – ‘I say’ can successfully be rendered by consonant quality in the stressed syllables, that is [as 'bⁱirⁱ] *as:bir* – ‘you say’, or by vowel quality, that is [as 'bⁱerⁱ] *as:beir* – ‘he says’. As a result, no *iu* diphthong is needed for the first person to indicate contrast. This is what we established while dealing with the hypothetical *u*-diphthongs in, say, [fⁱirⁱ]/[fⁱir] *fir/fiur* – ‘man’-gen.sg./dat.sg. The unstressed vowels in prototonic variants of this verb need not be distinct either; the first person singular prototonic does not have to be [ebur] :*epur* to be sufficiently contrasted with the palatalized consonant in [ebirⁱ] :*epir* in the second and third persons singular (identical). The reduced [ebər] for :*epur* seems a satisfactory differentiation, while the vowel [i] in [ebirⁱ] :*epir* is a phonetic effect (i.e. a coloured schwa).

At any rate, the idea that there was any distinction between only two separate vocalic segments in unstressed syllables is more likely than that according to which five dissimilar objects were involved in the opposition, if there was any vocalic opposition at all. We concluded in (4.3.2.2.) that Old Irish was a system in which vowel distinction was in the process of being shifted to consonant opposition, that is, the division into slender and broad consonants. Moreover, cases like *format/formut*, which so far seem the only problematic examples, are extremely rare as regards the whole system and it is not clear whether they should constitute a debatable issue.

Therefore, given that a traditional examination cannot be helpful, an analysis from the viewpoint of the Theory of Elements will be conducted below with a view to discovering whether there was any contrast among the unstressed vowels and whether it was vital to display any distinction among nuclei in this position.

4.4.2. A GP analysis of word-medial unstressed vowels

At the beginning of this section let us recapitulate what we established as regards the behaviour of resonance elements in stressed vowels. We found no proof that there were three consonant qualities, nor did we find enough evidence to recognize the short *u*-diphthongs. We discovered that regularly alternating vowels in stressed syllables, such as [e – i] and [o – u] displayed different shapes according to the prehistoric vowel harmony and that some apparently regular alternations, like [a – u], were triggered by different reinterpretations of some vocalic segments in prehistory. Another alternation, that is [a – e], was caused by non-phonological factors. Moreover, it has been claimed that leftward spreading of the prime (A) was present in prehistory, while the spreading of the other two resonance elements, that is (I) and (U), was not detected. To sum up, the Old Irish vocalic alternations reflected the prehistoric phonological processes and were synchronically morphophonological.

Now it is time we turned to the unstressed vowels. The spelling of medial unstressed vowels to a great extent parallels that used to represent vocalic segments in stressed syllables. This may be indicative of the fact that in prehistory both stressed and unstressed vowels underwent similar harmonic changes.

Let us consider the development of the word for ‘sword’, which is comparable to the history of *fer* – ‘man’ illustrated in (13) and repeated here for convenience. Below we also propose phonetic transcriptions of the unstressed vowels:

(38) <i>Stage I</i>	<i>Stage II</i>	<i>Old Irish</i>	
a. *wirah	→ *wera	→ [f ⁱ er] <i>fer</i>	} NOMINATIVE SG.
*klað ⁱ ivah	→ *klað ⁱ eva	→ [klað ⁱ əv] <i>claideb</i>	
b. *wir ⁱ i:	→ *wir ⁱ i	→ [f ⁱ ir ⁱ] <i>fīr</i>	} GENITIVE SG.
*klað ⁱ ivi:	→ *klað ⁱ iv ⁱ i	→ [klað ⁱ iv ⁱ] <i>claidib</i>	
c. *wiru:	→ *wiru	→ [f ⁱ ir] <i>fīur</i>	} DATIVE SG.
*klað ⁱ ivu:	→ *klað ⁱ ivu	→ [klað ⁱ əv] <i>claidiub</i>	

In (38) we can observe the phenomenon of vowel harmony taking place at Stage II. As a result of the spreading of the element (A) from the nominative ending in (38a), the original penultimate vowel [i] was lowered to [e]. Here the prime (A)

harmonized by being linked to two consecutive nuclei. In neither (38b) nor (38c) did lowering occur at Stage II because the endings contained high vowels. Let us note that the vowel [a] did not change at Stage II in either genitive or dative because it was represented by the headed (A). After apocope, which prefaced Old Irish, the vocalic endings were lost, while in Old Irish the unstressed vowels were most likely (phonetically) reduced to schwas. In terms of phonology, we may even assume for the time being, that these nuclei were reinterpreted as empty, i.e. ones which can be properly governed if followed by another vowel.²¹

Now let us focus on the differences between the paradigmatic forms of the two words in (38). If we accept the view that neither the diphthong *iu* (McCone 1996) in the dative nor the three consonant qualities (Thurneysen 1946) should be recognized, the situation in the paradigmatic cases of the word for ‘man’ is fine: each case is different either due to the vowel quality, i.e. [fⁱer] vs. [fⁱirⁱ] and [fⁱir], or the palatalized vs. broad final consonant, i.e. [fⁱirⁱ] vs. [fⁱir] and [fⁱer]. In the word for ‘sword’ an additional factor must be taken into account, namely the vowel reduction in the unstressed syllables. As assumed above, these reduced vowels are underlyingly empty nuclei. In (38a) the empty nucleus can be represented as schwa, i.e. [klaðⁱəv] *claideb*, which seems uncontroversial. It is proposed in (38b) that the empty nuclear position in the genitive should be transcribed as [i], i.e. [klaðⁱivⁱ] *claidib*. This results from the fact that unlicensed empty nuclei between two palatalized vowels must be phonetically realized as [i]. This is the case in Modern Irish, for example. As for the dative, we can argue that the empty nucleus should be viewed as schwa as well, i.e. [klaðⁱəv] *claidiub*. The reason why this form is identical to the nominative singular is simple: there is no need for contrast between the nominative and the dative of the same lexical item since these two paradigmatic cases can never be confused in a syntactic context.

The fact that a nuclear point becomes underlyingly empty at a certain stage in the development of the language may, but need not be accidental. In the case of Irish, some of the Insular Celtic full vowels were reinterpreted as empty nuclei in Primitive Irish, after the process of apocope. Given that stress was already initial, and that every other syllable was weakly stressed in long words, the second (and the fourth) nucleus of the word became the target of Proper Government. Consider the detailed developments of the two cases of the word for ‘sword’, namely nominative singular and dative plural. The latter form was syncopated in late Primitive Irish. The second vowel in each word (the target of Primitive Irish syncope or Proper Government) is emboldened.

²¹ In Chapter Three we adopted the view that some empty nuclei are ‘buried’, i.e. phonologically irrelevant, while others are ‘unburied’, i.e. phonologically valid. Here the term ‘empty nucleus’ is used with reference to ‘unburied’ empty positions.

(39) a. NOMINATIVE SINGULAR

*klad**ib**os → (Proto-Celtic lenition) *klað**iv**os → (Insular Celtic weakening)
 *klað**iv**ah → (Primitive Irish vowel harmony) *klaðⁱ**ev**ah → (Primitive Irish *h*-
 dropping) *klaðⁱ**eva** → (Primitive Irish apocope) *klaðⁱ**ev** → [klaðⁱəv] *claideb*

b. DATIVE PLURAL

*klad**ib**obis → (Proto-Celtic lenition) *klað**iv**ovis → (Insular Celtic weakening)
 *klað**iv**ovih → (Primitive Irish vowel harmony) *klaðⁱ**ev**ovⁱh → (Primitive
 Irish *h*-dropping) *klaðⁱ**ev**ovⁱi → (Primitive Irish apocope) *klaðⁱ**ev**ovⁱ →
 (Primitive Irish syncope) *klaðⁱ**v**ⁱovⁱ → [klaðⁱ**v**ⁱivⁱ] *claidbib*

Consonant lenitions apart, the original vowel [i] was raised to [e] due to Primitive Irish vowel harmony (A-spreading from the end of the word) in both the cases. After the periods of *h*-dropping and apocope this [e] was deleted by syncope only in the dat.pl., i.e. *klaðⁱ**ev**ovⁱ → *klaðⁱ**v**ⁱovⁱ. The vowel [e] in the nom.sg. *klaðⁱ**ev** was apparently an empty nuclear position at that time too but syncope could not affect it: there was no longer a following vowel in this form. Hypothetically, if the Proto-Celtic form of the nom.sg. had been *kladibois, the whole chronological derivation would have produced the non-existent syncopated *[klaðva]. This was not the case and the empty or ‘properly governable’ second nucleus of the original *klad**ib**os never underwent syncope.

However, it is conceivable that the reduced vowels in the non-syncopated forms were not underlying empty nuclei. Given that they had been full vowels until late Primitive Irish and were never deleted afterwards, they may be viewed as vowels reduced to schwas only. In particular, the second vowel in the dat.pl. *klaðⁱ**ev**ovⁱ → *klaðⁱ**v**ⁱovⁱ became a target of Proper Government because the phonological system of late Primitive Irish was undergoing syncope. Thus, every second vowel in words which were at least trisyllabic was marked as properly governable. In other words, it underwent a shift of status from a vowel to an underlying empty nucleus. On the other hand, the second vowel in *klaðⁱ**ev** (nom. sg.) did not change formally at that time because syncope did not apply to disyllabic words. Thus, it was still composed of (A, I), similarly to that in [fⁱer] *fer* – ‘man’, but the recessive position of the second nucleus in [klaðⁱəv] ‘muffled’ the acoustic properties provided by these elements. The same goes for the forms of the gen.sg., i.e. *klaðⁱ**iv**ⁱ, and the dat.sg., i.e. *klaðⁱ**iv** or *klaðⁱ**iu**v. These nuclei survived until Old Irish and this is why we cannot objectively decide that they were underlyingly empty in that system. What seems certain is that they were reduced to schwas and were phonologically indistinctive. Contrast in Old Irish was rendered only by the quality of consonants, as proposed in (38).

Cyran (2003:278) proposes a formal distinction between schwas which are reduced vowels and schwas which separate consonant clusters unable to contract governing relations. On the basis of the prehistoric developments shown above, we can assume that the second realized nuclei in forms such as [klaðⁱəv] *claiðeb*, [klaðⁱəv] *claiðiub*, and [klaðⁱivⁱ] *claidib* – ‘sword’/dat.sg./gen.sg., are vowels reduced to schwas. In the last case the schwa is phonetically [i]-like because it is sandwiched between two palatalized consonants.

Nonetheless, there were also underlying empty nuclei which were realized as schwas in Old Irish. The word for ‘world’, that is *domun*, will serve as an example. The derivation offered by McCone (1996:127) is as follows: *dumnos → *duṽnah → *doṽna → (apocope) *doṽn → *domun*. Thus, after apocope, the cluster [ṽn] was left stranded at the end of the word. Given that no interonset governing relation was permissible in this situation (see Chapter Three for details), this sequence was split by an epenthetic vowel, i.e. [ə]. McCone transcribes this form as [doṽun] and justifies the presence of [u] by saying that [ə] “tended to be rounded in the vicinity of a labial”. This suggests that he treats [u] as a contextual realization of [ə]. Later on, however, McCone (1996:135ff.) argues that there was phonemic opposition between [ə] and [u] and that [ə] had “several allophones”, depending on the qualities of the flanking consonants. This standpoint seems markedly different from that quoted above, which makes McCone’s treatment of the epenthetic vowel unclear. Let us recall, however, that spellings such as *domon* and *doman* are also attested, which suggests that the actual phonetic quality of this epenthetic vowel did not matter at all in Old Irish. It could have been [ə] or [u] or something in between these two. Most importantly, this [ə] or [u] was phonologically indistinctive because a contextual realization of a schwa is simply a phonetic interpretation of an empty nucleus in a given environment.

We may also add two examples (McCone 1996:127) which support the view that an epenthetic schwa had different realization depending on the environment. In the word *bre:θⁱrⁱ → (apocope) *bre:θⁱrⁱ → (epenthesis) [bre:θⁱirⁱ] *bréithir* – ‘word’-dat.sg., the cluster [θⁱrⁱ] was palatalized after apocope. When an epenthetic vowel appeared between the cluster members, it was spelt with *i*, and its phonetic realization probably reflected the spelling. In the form *bre:θra → (apocope) *bre:θr → (epenthesis) [briaθər] *briathar* – ‘word’-nom.sg., the surviving final cluster [θr] was non-palatalized, and the svarabhakti vowel was spelt with *a*, which suggests that it may have been realized as [ə].

All this suggests that, although the Old Irish [ə] may have had two different origins, i.e. it was either a reduced vowel or a realization of an empty nucleus, there was no distinction between the diverse realizations of this schwa. Thus, phonological contrast between different words was rendered by the quality of the non-initial consonant. If this device was absent, no contrast was present.

4.4.3. Consonant quality agreement in syncope

Finally, let us focus on an interesting phenomenon which can be detected in syncope Old Irish word-forms. In particular, consonants displaying different qualities before syncope had to agree with respect to quality when the intervening vowel was lost. While discussing the development of the dat.pl. of the word for ‘sword’, i.e. *klaðⁱevovⁱ → (Primitive Irish syncope) *klaðⁱvⁱovⁱ → [klaðⁱvⁱivⁱ] *claidbib*, we did not mention that the Primitive Irish [ð] was originally slender, while [v] was broad. This distinction was simply not crucial to the discussion about vowel deletion. Now we can note that, after the intervening vowel [e] had been deleted, both these spirants were palatalized and entered Old Irish with this property. Let us now consider a few other examples which show that, after syncope, the newly formed consonant clusters must agree as regards the quality.

(40)	<i>Primitive Irish</i>		<i>Old Irish</i>	
a.	*kar ⁱ ida	→	[kaR ⁱ d ⁱ a]	<i>cairtea</i> – ‘friend’-acc.pl.
	*av ⁱ ena:	→	[av ⁱ n ⁱ a]	<i>aibnea</i> – ‘river’-acc.pl.
	*p ⁱ r ⁱ ð ⁱ χaθ ⁱ	→	[p ⁱ r ⁱ ð ⁱ χ ⁱ ð ⁱ]	<i>pidchid</i> – ‘(he) teaches’
b.	*b ⁱ enaθ ⁱ	→	[b ⁱ eNti]	<i>bentai</i> – ‘strikes him’
	*woγav ⁱ eod	→	[foγvəd]	<i>:fogbad</i> – ‘they find’(prot.)

What we can see in (40a) is that the left-hand emboldened consonants, i.e. [rⁱ], [vⁱ] and [ðⁱ] were palatalized before syncope, while the right-hand ones, i.e. [d], [n] and [χ], were not. After syncope progressive palatalization occurred and in Old Irish the clusters [Rⁱdⁱ], [vⁱnⁱ] and [ðⁱχⁱ] surfaced as palatalized. In (40b), on the other hand, the left-hand emboldened segments, i.e. [n] and [γ], were broad before syncope, while the right-hand ones, i.e. [θⁱ] and [vⁱ], were slender at that stage. Here progressive depalatalization took place and the resulting Old Irish clusters [Nt] and [γv] were broad.²²

Thurneysen (1946:98) remarks that the quality of the first consonant was usually taken over by the second. This is confirmed by McCone (1996:129). Thus, thanks to this progressive quality assimilation, consonant sequences in Old and Modern Irish have to display the same quality.

²² In *bⁱenaθⁱ → [bⁱeNti] *bentai*, we can also observe the delentition of [θ] → [t] after the homorganic nasal and the tensing of [n] to [N] under the influence of the homorganic [t].

4.4.4. Vowels in unstressed syllables – summary

In the second part of this chapter an attempt has been made to describe the workings of the Old Irish vocalic system with particular attention paid to the quality of unstressed vowels in word-medial position. It has been concluded that all the unstressed non-final vowels were schwas. These segments were either reduced full vowels or underlying empty nuclei which had to surface phonetically after apocope. The other problem was the number of consonant qualities in the Old Irish system. We have found no reliable evidence to counter the view that Old Irish consonants were either palatalized (slender) or non-palatalized (broad) and that palatalization, viewed as a privative property of some consonantal segments, was the only exponent of phonological contrast.

4.5. Alternating long vowels and consonant qualities

In the final part of this chapter we will consider an aspect of the phonology of Old Irish which is only partly connected with the problems discussed so far. In particular, what still needs to be mentioned is the behaviour of long vowels in front of slender and broad consonants. Let us recall that Thurneysen (1946) proposes three consonant qualities, i.e. *i*-quality, *u*-quality, and *a*-quality. We have not found convincing evidence to maintain this division so far, but an analysis of alternating long vowels seems necessary to support our position.

Although interpretations on the subject of vowel qualities differ, we will assume that there are six long vowels in Old Irish, namely [i:], [e:], [ɛ:], [a:], [o:] and [u:]. This is implied in Thurneysen (1946) and McCone (1996) although they never formally admit the synchronic distinction between the two types of *é*.²³ These vocalic segments enjoy greater distributional freedom than short vowels. In particular, short vowels cannot appear word-finally in Old Irish monosyllabic words, while long vowels can occur without any following consonants, e.g. [d^lɛ:] *dé* – ‘clay’. Of course, they can also precede consonants, e.g. [d^lɛ:d] *dét* – ‘tooth’, or consonant clusters, e.g. [ɛ:s^lk^l] *éisc* – ‘fish’-gen.sg. Moreover, they do not normally occur in non-initial syllables and they seldom alternate. However, there is one long vowel which does alternate regularly.

The only alternating vowel is *é*. The fact that this vowel changes in two different ways may suggest that there are in fact two dissimilar phonological objects

²³ Thurneysen (1946) admits that the Old Irish *é* has two different origins. Greene (1976) suggests that there were also two long *o*'s, but synchronic evidence does not seem to confirm this. It is a fact that some long *o*'s fluctuate (context-independently) with the diphthong *úa*, but otherwise the synchronic behaviour does not indicate different phonological structures of these originally dissimilar segments.

represented by *é*, i.e. [e:] and [ɛ:]. Assuming that there were actually two vowels *é*, consider the following cases illustrating the two types of alternation:

(41) a. [e:] – [ia]

[k ⁱ e:L ⁱ]	[k ⁱ iaL]	<i>céill/cíall</i>	– acc.sg./‘sense’
[e:s ⁱ k ⁱ]	[iask]	<i>éisc/íasc</i>	– gen.sg./‘fish’-nom.sg.

b. [ɛ:] – [eu]/[iu]

[N ⁱ ɛ:l]	[N ⁱ iul ⁱ]	[N ⁱ iul]	<i>nél/níuil/níul</i> – ‘cloud’/gen.sg./dat.sg.
[ɛ:n]	[ɛun ⁱ]	[ɛun]	<i>én/éuin/éun</i> – ‘bird’/gen.sg./dat.sg.

These cases show relatively regular vocalic alternations occurring in two long vowels [e:] and [ɛ:]. Other long vowels do not alternate under the influence of the environment. Let us begin with the examples in (41a).

This original mid high long [e:] underwent breaking into the diphthong [ia] in Early Old Irish (Thurneysen 1946:36; McCone 1996:134) if it preceded a neutral, i.e. *a*, or rounded consonant, i.e. *u*. This means that the only condition for this vowel to break was the presence of a following broad consonant. To conclude, no distinction between *u*-quality and *a*-quality seems to be required.

The mid low [ɛ:], which occurs in the cases in (41b), originates from the ancient short [ɛ] which once underwent compensatory lengthening. It surfaces as [ɛ:] when preceding an *a*-quality consonant but is apparently broken into diphthongs [iu] or [eu] (or whatever the actual pronunciation was) before *u*-quality or *i*-quality consonants. Interestingly, words containing this long [ɛ:] are spelt with the letter *u* or sometimes *o* even if the following consonant is palatalized. Actually the spelling of the gen.sg. may be *éuin*, *éoin*, or even *éiuin*. These spellings seem peculiar if we consider the prehistoric developments of the paradigmatic cases (all singular) of the word for ‘bird’ based on McCone (1996:122):

(42)	<i>Primitive Irish</i>		<i>Old Irish</i>	
*ɛtnos	→ *ɛθna	→ *ɛθn	→ [ɛ:n]	NOMINATIVE
*ɛtni:	→ *ɛθni	→ *ɛθ ⁱ n ⁱ	→ [ɛun ⁱ]	GENITIVE
*ɛtnu:	→ *ɛθnu	→ *ɛuθn	→ [ɛun]	DATIVE

The nominative shows that the originally short vowel [ɛ] was lengthened at the expense of the spirant [θ] between Primitive and Old Irish. Let us assume that this final fricative has *a*-quality. The nucleus is also lengthened in the other two cases. The dative displays the diphthongisation to [eu], which is logical since the archaic ending was [u]. When the spirant was lost, the short diphthong became

long. This also parallels the *u*-infection if unstressed vowels advocated by Greene (1976), e.g. *toṽessuh → *toṽeusu → [toṽu/əs] *tomus* – ‘measurement’. The genitive, however, also shows the same diphthongization, which is totally unexpected taking into consideration the prehistoric version of the word, which displayed a palatalized ending and no trace of [u] was ever present in it. Greene (1976:34ff.) assumes that, when the spirant was lost, it left a rounded vowel behind. This is peculiar given that the spirant was dental. Moreover, no trace of this rounding is ever found in the nominative. The details of the formation of the genitive are unclear, then.

If we turn to the development of the diphthong [iu] in [Nⁱiu] *níul* – ‘cloud’-dat.sg., it is interesting to note that the prime (A) is absent from both components of this diphthong. Although the origin of this form is uncertain, we may suspect that, when [ε] was diphthongized to [εu] due to *u*-infection, vowel harmony occurred. In particular, since (A) was absent in the right-hand component, i.e. [u], it had to be absent from the left-hand part, i.e. [ε]=(A, I) → [i]=(I).²⁴ In any event, the *u*-infection in the genitive [Nⁱiuⁱ] *níuil* is phonologically peculiar as well.

Compensatory lengthening affected also other non-high vowels in Primitive Irish, e.g. *magl → *mayl → [ma:l] *mál* – ‘prince’, *ognos → *oɣn → *o:n → [uan] *úan* – ‘lamb’ (Old Irish breaking of [o:] to [ua]). The long vowels in these forms are followed by the symbol *i* before palatalized consonants in the genitive, e.g. *máil*, *úain* but no sign of *u*-infection can ever be observed. A clue may be provided by the development of another compensatory lengthened vowel [ε:] in *dakro → *dæχr → [dⁱε:r] *dér* – ‘tear’. This word initially belonged to the same declension as *nél* and *én* and displayed the dative *déor* and the genitive *déoir*. Apparently [dⁱε:r] *dér* also developed in another declension, with a vocalic ending in the genitive, i.e. [dⁱε:rⁱe] *déire*.²⁵

This dual-identity development, i.e. *déoir* vs. *déire*, and the fact that the alternation between [ε:] and [εu] occurs in a handful of words classified under only one declension may suggest that the formation of the genitive took place on the basis of the dative form. In other words, palatalization may have affected word-forms which were already infected by the vowel [u]. It seems certain that palatalization occurred in three phases in Primitive Irish, around the same time as *u*-infection, and its final stage post-dated *u*-infection (McCone 1996:119). Thus, the palatalization of the *u*-infected form appears the only logical explanation of the irregularity in the genitive if we adopt the view that otherwise the developments were regular.

²⁴ The head-operator status of (I) and (A) in the make-up of [ε] is unimportant here.

²⁵ The chaos in the choice of endings was discussed in (4.3.1.2.).

To sum up, the breaking of the Early Old Irish [e:] into the diphthong [ia] is the only development we can take into account while discussing the consonant qualities of Old Irish. This suggests that no distinction into two broad qualities was present phonologically. The developments in the word for ‘bird’ and other similar cases took place a long time before Old Irish and cannot be treated as evidence of different consonant qualities because the vocalic endings were still present at the time of alternations and, when they were dropped, no further vocalic change occurred. It seems plausible to assume that the prime (U) affected recessive nuclei via *u*-infection, while the element (A) contributed to the lowering of some vowels in Primitive Irish. Later on, however, when the effects of all these vocalic processes were petrified, no division into *a*-quality and *u*-quality was necessary.

4.6. Chapter Summary

In this chapter we have been dealing with short vowels in the phonological system of Old Irish. The first part was devoted to vowels in stressed syllables. At the outset, the alternating Old Irish vowels were analyzed with a view to determining whether phonological context had any impact on the vocalic changes. As a result of the analysis it transpired that the most typical Old Irish alternations have no synchronic phonological trigger and the cause needs to be sought in pre-history. The diachronic treatment of alternations revealed that Primitive Irish displayed vowel height harmony dependent on the presence or absence of the element (A) in the vocalic ending. In order to survive in the phonological structure, the prime (A) had to be linked to two consecutive nuclei. If (A) was absent from the ending, it was also not licensed in the root vowel. In the course of the analysis it was shown that not all vowels in stressed syllables containing this prime had endings also equipped with it. It was proposed that (A) had the status of a headed prime in those segments in order to be preserved in the phonological representation of a given item. Consequently, the inventory of Primitive Irish short vowels was said to contain nine phonological objects which were reduced to five by the time of Old Irish. The conclusion of the first part was that, since Old Irish vocalic alternations had no synchronic trigger, they should be viewed as morphophonological.

It was also inevitable to address the question of what and how many consonant qualities the phonological system of Old Irish possessed. After analyzing stressed vowels, it was concluded that there was no synchronic evidence that the palatalized quality had any active opponent, i.e. palatalization was claimed to be the privative property of some consonants, while others were assumed to lack this feature.

Then we turned to word-medial unstressed vowels and examined two main competitive views on both their number and qualities. Neither approach has been found plausible. As a result of a GP analysis, we proposed that there were only two consonant qualities, i.e. palatalized (slender) and non-palatalized (broad). Moreover, we argued that all the medial unstressed vowels were schwas. These schwas may have been phonetically realized in a number of ways, depending on the provenance, e.g. [a] → [ə] vs. [u] → [ə], or on the qualities of the synchronically present flanking consonants, i.e. palatalized or non-palatalized. However, these schwas were indistinctive in terms of phonology. Given that a number of lexical items displayed no visible contrast in monosyllabic words and that the syntactic behaviour of diverse cases left no doubt as to their grammatical function, it was concluded that the recognition of schwas in unstressed syllables of longer words without the concomitant acceptance of an extra consonant quality was sufficient to the phonological system of Old Irish.

Finally, the behaviour of long alterable Old Irish vowels was briefly presented and analyzed, the aim being to confirm the standpoint that the recognition of three consonant qualities in this system finds no phonological justification.

Given the postulated absence of *u*-quality in Old Irish as well as the proposal that vocalic alternations were morphophonological as early as in Old Irish, one may need to reconsider the following two aspects of Modern Irish: the presence of *u*-quality and the synchronically triggered vocalic alternations.

Conclusion

The chief object of this work has been to comprehensively describe the most crucial and conspicuous phenomena occurring in the phonological system of Old Irish and to show that they are by and large a reflection of the prehistoric developments of both single lexical items and close syntactic groups. It has been argued that the majority of vocalic and consonantal alternations, which must be regarded as morphophonological from the synchronic perspective, are to a great extent determined by the past phonological changes.

At the outset, word-initial mutations in Old Irish were presented and approached in terms of changes in the element make-up. We observed that the pattern of lenition in obstruents involved the delinking of one phonological prime, while that of nasalization entailed either the addition or the subtraction of one element. Given that the contexts for initial mutations of consonants were no longer present in Old Irish, we investigated the prehistoric causes of the Old Irish mutations and found that the ancient phonological contexts in closely connected syntactic groups brought about a wide range of changes in the shape of word-initial consonants. For example, the historical leniting and non-leniting environments triggered the word-initial mutations on a large scale. In terms of the element make-up, the obstruents lost one prime, mostly (?), due to lenition. As regards the non-mutating contexts, these were also shown as ones which were responsible for alterations in the element structure of certain segments. The origin of the Old Irish [f] and tense sonorants can be accounted for phonologically only under the assumption that the so-called no-mutation contexts were in fact mutating. In particular, the segment [f] first developed from the glide [w] exclusively in non-mutating *h*-prefixing contexts. It was argued that the element (U) constituting this glide and the prime (H) which took part in *h*-prefixation merged to produce the structure (U, H), which was realized as [f]. Later on, [f] replaced [w] in all no-mutation contexts, but this replacement was not phonologically motivated. It was also argued that the tense sonorants first appeared in *h*-prefixing contexts as well. It was proposed that, although there was no element merger in this case, the previously lax sonorants utilized the skeletal position which was earlier occupied by the prefixing [h]. Thus, gemination (or double linking) provided the sonorants with tenseness. Afterwards, the tense sonorants also surfaced in all no-mutation environments, but their occurrence in many contexts must be viewed as analogical to that in *h*-prefixing sites. It was postulated that in such cases the tense resonants are not doubly linked but headed.

The subsequent morphological reductions in the words which preceded the mutated consonants resulted in further phonological adjustments. For example, the definite articles lost their final consonantal segments only in front of obstruents and tense sonorants. On the other hand, those deleting article-final segments were reinterpreted as word-beginnings before both the lax resonants and vowels. Moreover, we found that the formal division into historical mutating and non-mutating contexts was frequently ignored by the phonology of the pre-Old Irish system because the adjustments which took place in both these environments often produced identical results in the Old Irish close syntactic groups. A good case in point is the phenomenon of *t*-prefixation, which occurred in both historical leniting and non-mutating contexts.

As regards nasalization, this prehistoric process manifested itself in the addition of the element (N/L) to the original make-up of obstruents. Under the assumption that nasality and voicing are represented by the same prime (N/L), we argued that when this element was added to the structure of stops which already contained the element responsible for voicelessness (H), the two opposing primes were neutralized and removed from the structure. As a result, the Old Irish system perceived the process of mutation as either the addition or the suppression of one phonological prime.

Then we turned to the prehistoric word-initial consonant clusters with a view to determining why some of them were affected by lenition, while others resisted this process. It was argued that the consonant sequences in which stops underwent weakening to the corresponding fricatives were not involved in interonset governing relations, while the clusters which were immune to lenition constituted interonset governing domains. Furthermore, while attempting to find the reason why voiced stop+sonorant clusters, e.g. [gl], underwent lenition a few centuries before voiceless stop+sonorant sequences, e.g. [kl], we first hypothesized that all the stop+sonorant sequences displayed rightward interonset governing domains (RIO). We also argued that the government-licensing power of the prehistoric nuclei was gradually diminishing and the first lenition affected consonant sequences in which the complexity ratio was shallow. In particular, shallow complexity clusters, e.g. [gl], ceased to be RIO relations much earlier than steep complexity groups, e.g. [kl]. Subsequently, the constantly waning government-licensing potential of nuclei led to the decomposition of all RIO domains. A side effect of this analysis was a proposition that the very process of consonant lenition originated not in single consonants, e.g. [g], but in shallow complexity clusters, e.g. [gl]. This hypothesis, which is *volens nolens* revolutionary, was based on the internal assumption of GP that empty nuclei must be weaker (government)-licensors than full vowels and that lenition should primarily affect those consonants which were followed by weak licensing nuclear points.

Another important issue connected with Old Irish consonant clusters was the different behaviour of seemingly identical word-final sequences both in the subsequent development and in the mediaeval verse. It was initially assumed that all sonorant+stop sequences were leftward interonset relations (LIO) in Primitive Irish and that some of them ceased to be such governing domains late in that period. In particular, it was proposed that the phenomena of vowel epenthesis in sonorant+heterorganic voiced stop clusters, e.g. [lg] → [ləg], and the simplification of homorganic sonorant+voiced stop groups, e.g. [Ld] → [L], took place before Old Irish and that these processes were a consequence of the constantly diminishing government-licensing power of nuclei. This analysis made it possible to pinpoint the precise moment when the rules of the verse made most sense phonologically. Then we analyzed the triconsonantal sequences in Old Irish and concluded that most of them reflected the patterns observed both word-initially and finally. As regards the sequences which violated the well-established patterns, it was argued that word-internal morphological boundaries should be recognized in these cases.

Finally, the inventory of short vowels and the phenomena of vocalic alternations in Old Irish were examined. Also in this case a purely synchronic analysis turned out to be flawed since contexts for alternation were no longer available. An inspection of diachronic developments revealed that the Primitive Irish vowels obeyed the principle of vowel height harmony. This harmony was determined by the presence/absence of the element (A) in the nuclei of a given lexical item. This prime had to be either linked to two consecutive nuclear slots or absent altogether. As regards the cases where this prime remained under only one nucleus, we argued that (A) was headed there. The double linking or headedness was viewed as similar to that observed in the tense Irish sonorants. The parallel behaviour of certain elements in the structure of both resonants and vowels indicates that this pattern was not unique in the system.

An equally important issue turned out to be a discussion about the consonant qualities in Old Irish. Having analyzed both traditional and modern approaches to the number and impact of these qualities on the phonological system, we concluded that Old Irish had only palatalized (slender) and non-palatalized (broad) consonants. As regards the alleged necessity to render contrast among different paradigmatic cases of the same lexical items, either by the employment of more than two consonant qualities or by the recognition of short diphthongs, it was argued that no contrast was displayed unless the palatalized vs. non-palatalized consonant distinction allowed to mark it. This analysis may have consequences for the treatment of consonant qualities and the synchronically triggered vocalic alternations in Modern Irish.

To summarize, this work has sought to demonstrate that purely synchronic analyses of phonological systems may sometimes turn out to be insufficient, superficial or imprecise because they concentrate on what is only apparently phonological. This seems to be the case with respect to Old Irish because the workings of that system were to a great extent conditioned by truly phonological phenomena which occurred many centuries before and there are very few issues in this language which can be synchronically approached from a phonological perspective.

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