GETTING YOUR HEAD AROUND:
THE VOWEL SYSTEM
OF MODERN ICELANDIC[*]

EDMUND GUSSMANN

Adam Mickiewicz University, Poznań

The vowel system of Modern Icelandic, unlike that of Old Icelandic, continues to spawn different interpretations. Scholars do not appear to be nearer any consensus of views than they were in 1960, when the distinguished Russian linguist, Steblin-Kamenskij, commenting on the situation, noted with some playfulness: … *are we to infer that it is the more difficult to reconstruct a phonemic system the more we know the phonetic nature of the phonemes involved?* (Steblin-Kamenskij 1960:36). There can be no doubt that the phonetic data of Modern Icelandic are both generally available and have figured in numerous studies, including acoustic and experimental, during the past century (Steblin-Kamenskij 1966 provides an exhaustive survey of earlier research, for more recent research see also Pétursson 2000, Árnason 2005). With Old Icelandic, the phonetic detail is obviously scanty and often totally unavailable, hence many questions can be asked but few can be answered: were the segments transcribed [t, d] dental, alveolar or post-alveolar? Was the vowel [e] almost half-close or was it more open, almost [ɛ], or was it anywhere in between? Was it fully front or partly retracted? Was it purely monophthongal or was it, as in the case of its long congener in the modern language, diphthongal, where the transcription [ˈɛ] or even [ɪɛ] (see Árnason 2005) would be closer to phonetic reality? Questions like these are legion as obviously any detailed phonetic study of living speech is bound to reveal the presence of considerable variation of,

say, vocalic articulations within the vowel space. A more pertinent question could be asked in this context: how much of the phonetic detail is necessary or even desirable when analysing the phonological structure of a language?

The partial aim of any phonological (phonemic) analysis has always been to sift through the richness of phonetic detail in order to expose the bare minimum of linguistically significant properties. In other words, much (most?) of the phonetic detail has been viewed as debris that needs to be removed and discarded in order to unravel the underlying phonological structure. A phonological analysis amounts then to the uncluttering of the phonetic surface and hence it is perhaps not surprising that familiarity with too much of *the phonetic nature of the phonemes involved*, in Steblin-Kamenskij's apt formulation, will tend to obscure with rather than clarify the linguistic structure. Needless to say, the concept of the phonological structure itself crucially determines what comes to be regarded as the significant structure (phonemes, distinctive features and their arrangements) and what becomes mere phonetic debris. Steblin-Kamenskij analysed in detail the major structural and pre-structural interpretations of Icelandic vowels; the structural approaches were particularly concerned with reducing the phoneme inventories and with arranging (diagramming) the resultant phonemes in such a way as to bring out both the distinctive and the redundant (allophonic) features. Additionally he offered his own interpretation which in many points departed from earlier views. Since the early 1960's there have been generative (re)interpretations of Icelandic phonology (e.g.: Anderson 1969, Orešnik 1972, 1977, 1978) and also post-generative or generative-informed descriptions (e.g.: Árnason 1998, 2005, Gussmann 2000, 2001, 2006a, b), where underlying theoretical models provided new concerns and prompted new interpretations. In this paper another look will be taken at Icelandic vocalic elements (vowels and diphthongs) within a model known as Government Phonology or GP (e.g.: Charette 1991, Harris 1994, Brockhaus 1995, Scheer 2004, Cyran 2010 to mention a few of the growing number of contributions). We start by mentioning the salient features of the model. These include: the non-derivational bias of the framework, the constituent and melodic structure of GP representations, and the nature of GP phonological generalizations.

On the negative side GP rejects the classical generative position which sets up a single underlying representation – a single underlier – for each morpheme and derives the attested phonetic forms by means of a set of ordered rules. GP claims that phonological regularities are all to be found in the linguistically interpreted representation and whether we call it phonetic or phonological is immaterial since there is only one such level in any case. In this sense the phonological processing in GP is non-derivational: there are no intermediate levels arising as a result of the application of a specific rule or regularity. Phonological regularities are phonologically conditioned, with no reference to specialised grammatical information: they hold within domains or across domain boundaries. Statements which require explicit grammatical and/or lexical contexts belong to morphophonology.

GP follows in the footsteps of non-linear phonology in recognising multiple levels of the phonological organisation including, minimally, skeletal structure, syllabic constituents and the melody. Skeletal structure reflects or depicts the temporal organisation of units making up a phonological domain. Units of the skeleton or skeletal points are associated with melodic units but may also be empty. To be pronounced, however, skeletal points with the associated melodies must be incorporated into some syllabic constituent, the onset or the rhyme (the rhyme additionally divides into the nucleus and the consonantal adjunct, commonly known as the coda). Both the onset and the rhyme may form binary branching structures with strict conditions imposed on the nature of segmental melodies that can attach to a given node. Specifically, onsets require the necessary presence of a following nucleus and coda require the necessary presence of a following onset (codas are licensed by onsets). This leads to a situation where word-final consonants cannot be codas since there would be no onset to license them. Word-final consonants are invariably onsets, branching or non-branching, and they are licensed by the final empty nucleus. For details of the argument see e.g. Kaye (1990), Harris and Gussmann (2002).

Finally, the melody is viewed as composed of monovalent primes, called elements which are arranged hierarchically: one element is taken to be the head and the remaining ones as its dependents. It is also possible that an expression consists just of dependents, in which case we say that it is empty-headed or that it contains no primes at all, i.e. it is empty. For the purposes of interpreting vowel systems we need to resort to three elements: {I} denoting frontness, {U} denoting roundedness and {A} denoting openness. Additional information and illustration will be supplied as we proceed (or see Harris 1990, 1994, Harris and Lindsey 1995, Cyran 1997, 2010).

We now turn to the facts of Modern Icelandic and their possible interpretations. To make the initial discussion maximally theory-neutral, we shall introduce the basic facts by adopting a standard textbook presentation (Einarsson 1945, Gíslason and Þráinsson 1993) of Icelandic nuclei. These are, unimaginatively, divided into vowels and diphthongs, both of which can be either short or long – the concept of the length contrast among diphthongs continues to be bothersome (see e.g. White 2004). Leaving aside quantity for the moment, simple nuclei are further divided according to the degree of aperture and the part of the tongue which is raised. This produces a familiar diagram of monophthongs (Einarsson 1945:10):

	front	central	back
high	i		u
high mid	ɪ	ʏ	
low mid	ɛ	ö	ɔ
low		a	

Examples:

[i] spelt <í, ý>bíll [piṭl] 'car', þýða [θiːða] 'translate'

[u] spelt <ú>stúlka [stuḷka] 'girl', hús [huːs] 'house'

[ɪ] spelt <i y>illur [ɪtlʏr] 'bad', sykur [sɪːkʰʏr] 'sugar'

[ɛ] spelt <e>senda [sɛnta] 'send', vera [vɛːra] 'be'

[ö] spelt <ö>börn [pö(r)ṭn̩] 'children', röð [röːð] 'order'

[ɔ] spelt <o> horfa [hɔrva] 'look, vb.', sofa [sɔːva] 'sleep, vb.'

[a] spelt <a>galdur [kaltʏr] 'sorcery', maður [maːðʏr] 'man'.

Diphthongs are divided according to the nature of the second part into those ending in [i], [y] (= rounded [i]) and in [u]. These are exemplified below:

[ai] spelt <æ>sætta [saihta] 'reconcile', sætur [saiːtʰʏr] 'sweet'

[ei] spelt <ei, ey>seinn [seitn̩] 'late', mein [meiːn] 'damage, n.'

[öy] spelt <au>austur [öystʏr] 'eastern', laukur [löyːkʰʏr] 'onion'

[au] spelt <á>skáld [skault] 'poet', lát [lauːtʰ] 'death'

[ou] spelt <ó>nótt [nouhtʰ] 'night', bjóða [pjouːða] 'invite'

Additionally, Einarsson lists three diphthongs: [(ɪ)iː] spelt <ig(i)>, [ɔiː] spelt <og(i)> and [(ʏ)yː] spelt <ug(i)>. These will be left out of our discussion for the moment but we will come back to them in the final part of the paper.

A vowel chart distinguishing four degrees of height and three positions on the front-back scale is normally regarded as linguistically unsatisfactory. For example, within a binary distinctive feature framework, it is difficult to incorporate the concept of a central vowel without enriching the feature inventory as the vowel [a] has to be regarded as either front /a/ or back /ɑ/ with an allophonic adjustment to conform to the phonetic centrality; either decision would require justification if it is not to be arbitrary, with compelling evidence often hard or impossible to come by. Various attempts have been made to rectify the skewedness or irregularity of the phonetically-based interpretation: Benediktsson's (1959) influential analysis, for example, relies on just four distinctive features: ± compact (= ±open), ±diffuse (= ±close), ± flat (= ±round) and ±tense (or +tense and +lax). It arrives at an elegant and symmetrical system:

	tense	lax	tense	lax
close	i	ɪ	u	ʏ
	ɛ		ö	
open	a		ɔ	
	unround		round	

As pointed out by Steblin-Kamenskij (1960:40), however, the system entails a considerable measure of arbitrariness: for no apparent reason the frontness-

backness parameter is viewed as non-distinctive (redundant) and roundedness is distinctive; furthermore, vowel height is, in some cases, assigned in blatant violation of phonetic facts. Thus, in the scheme above, [ɛ] and [ɔ] differ in height, while [a] and [ɔ] do not (compare these decisions with Einarsson's phonetically-based diagram above). His final judgment is that "Benediktsson's scheme is no doubt of great interest as an attempt to apply the dichotomous scale to the vowel system of Modern Icelandic, but his scheme does not seem to be supported by either phonetic or phonologic facts". Similar assessments could be made of the other early attempts to reduce the phonetics of Modern Icelandic to a symmetrical and aesthetically pleasing phoneme system (see again Steblin-Kamenskij 1960, 1966:55ff. for an in-depth critique of the major analyses). The justified criticism of the various approaches does not solve the fundamental problem of the nature and amount of phonetic detail which a phonological interpretation in some way disposes of, either by viewing it as predictable, redundant or otherwise dispensable. While taking a phonetically front vowel as phonologically back, or vice versa, may seem questionable in individual instances, there can be no doubt that in principle such procedures have to be admitted; similarly few practising phonologists would be surprised by the fact that phonetic [t] is taken to be phonological /d/, that the uvular fricative [ʁ] may de derived from the alveolar trill /r/, or that [ʏ] may correspond to phonological zero, as melodic modifications and epenthesis are par for the course in the languages of the world. To repeat, the theoretical potential of a linguistic (phonological) model determines to a large extent what can and what cannot be viewed as a legitimate statement (generalisation). On the other hand, no model can be taken as sacrosanct and an encounter with novel data may result in its revisions and modifications. This obvious conclusion is dramatically confirmed by possible treatments of quantity, and in particular vocalic quantity in Modern Icelandic which we will now review.

Past studies of Icelandic quantity offer a rich spectrum of views (see Gussmann 2001 for an overview). Traditionally (Einarsson 1945, Kress 1963, 1982) stressed vowels[1] are long:

(a) in monosyllables ending in a vowel, e. g.: *bú* [puː] 'farmstead', *fá* [fauː] 'get'

(b) when followed by another vowel, e.g.: *búa* [puːa] 'dwell', *óeðli* [ouːɛðlɪ] 'unnaturalness'

(c) when followed by a single consonant, e.g.: *dagur* [taːɣʏr] 'day', *dag* [taːɣ] 'day, acc. sg.'

(d) when followed by two consonants of a highly restricted set (orthographically: *p, b, t, d, k, g, f + j, v, r*), e.g.: *betri* [pɛːtʰrɪ] 'better', *setja* [sɛːtʰja] 'set', *sakramenti* [saːkʰramɛn̪tɪ] 'sacrament', *Madrid* [maːtrit] 'Madrid'[2], *vogrís* [vɔːkris] 'sty (in the eye)', *febrúar* [fɛːpruar] 'February', *sötr* [söːtʰr̥] 'slurping', *Afríka* [aːfrikʰa] 'Africa'.

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[1] Primary stress in Icelandic is invariably initial; for this reason it is not marked in our transcriptions.

[2] The loan-word *Madrid* is particularly important as it points to the unquestionably productive nature of the process in question – in contradistinction to any possible source of the loan (Danish, English or, indeed, Spanish itself) – the initial vowel is both stressed and long.

An early generative formulation posits a single *very late rule* (Anderson 1969:53) of vowel lengthening:

$$V \rightarrow \left[+ \text{long} \right] / \text{———} C_0^1 \left(\begin{bmatrix} + \text{son} \\ + \text{cnt} \end{bmatrix} \right) \left\{ \begin{matrix} V \\ \# \end{matrix} \right\}$$

The rule is responsible for long vowels appearing before at most one consonant followed optionally by a continuant sonorant (i.e. [j, v, r]) either before a vowel or word-finally. Obviously a single generalisation of lengthening is preferable to a disjoint list of atomistic statements. It must be admitted, however, that the singleness of the vowel-lengthening rule above is largely illusory since it is nothing more than a notational – or gimmicky conflation – of a few separate statements. Note above all that there is nothing in the statement – and in the underlying phonological theory – that makes the conjunction of a vowel and word-boundary anything but an accident: in fact, the rule would be equally (non-)explanatory if the conjunction were completely different, e.g. a consonant and morpheme boundary. There are descriptive difficulties in Anderson's formulation as well: given the formulation above, we would expect long vowels in words such as *selja* [sɛlja] 'sell', *bræðra* [praiðra] 'brother, gen. pl.', *stöðva* [stöðva] 'stop, vb.' and numerous others, something which clearly is not the case. At the very least the rule would have to be significantly more complex to allow it to apply in, say, *Afríka* [aːfrikʰa] but not in *góðra* [kouðra] 'good, gen. pl.' (cf. *góður* [kouːðʏr] 'good, nom. sg. masc.' with length assigned regularly).
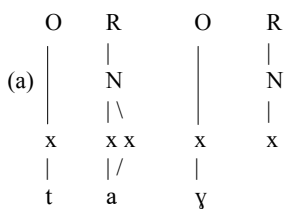
For quite some time now, the prevailing view holds that vowel length is determined by metrical considerations: in short, stressed vowels in open syllables must be long. The converse is that a short vowel must be followed by a consonantal coda or that the presence of a coda disallows a preceding long vowel; since the very presence and nature of the consonantal coda cannot be predicted (*seldi* [sɛltɪ] 'sold' – *sendi* [sɛntɪ] 'sent'), it is clear that the coda has to be taken as basic and the length of the nucleus depends on or derives from the structure of the rhyme. The syllabic statement covers a few isolated cases of the traditional, segment-based textbook account. If things were that simple, one might well wonder why grammarians and linguists in earlier times never hit upon this idea: after all, the concept of the syllable, open or close, is certainly not a late-generative discovery … A closer inspection of the four "atomistic statements" above reveals, however, that they cannot be straightforwardly translated into a traditional syllabic reformulation.
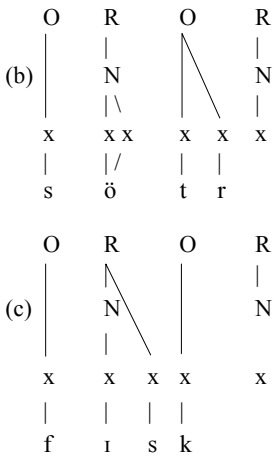
Examples in (a) and (b) above correspond directly to the traditional open syllable, hence the syllabic and non-syllabic statements are equivalent or the two could be reduced to a single syllabic one. Examples in (c) are only partially translatable into open syllables but this holds just for those cases where a single consonant is followed by a nucleus; as universally agreed, a sequence VCV is

syllabically divided into V+CV rather than VC+V. For this reason words like *dagur* [taːɣʏr] have a stressed long vowel since the second consonant forms the onset of the second syllable. Words like *dag* [taːɣ] are monosyllabic and since they end in a consonant, they should form a closed syllable. If quantity alternations were to be governed by the openness of the syllable, words of the structure CVC should admit a short vowel only – in fact, the reverse is almost invariably the case. We will return to this issue after looking at examples in (d).

Here, just as in (c), some cases of two intervocalic consonants can naturally be regarded as forming a branching onset, hence the first vowel will be in an open syllable, i.e. long. This is the case with words like *betri*, *Madrid*. The example with two consonants at the end of the word and a preceding long vowel, *sötr* [söːtʰr̥], just like those single consonants mentioned above, e.g. *dag* [taːɣ], provide a challenge to any open-syllable account of Icelandic quantity. Discussing the length rule Thráinsson (1994:150) concludes: … *either we need a more sophisticated theory of syllables, namely one that does not consider final consonants and certain final consonant clusters part of the preceding syllable in some sense, or the length of stressed vowels in Modern Icelandic does not depend on syllable boundaries.* The crucial point is the restriction to *certain final consonant clusters,* since some (in fact most) clusters do not tolerate a preceding long nucleus, e.g.: *lamb* [lamp] 'lamb', *barn* [pa(r̥)tn̥] 'child', *fisk* [fɪsk] 'fish, acc. sg.'. Government Phonology supplies a desirable syllabic framework to handle the Icelandic data.

As presented above, GP treats all single word-final consonants as onsets, since codas need to be licensed by following onsets. For this reason, the traditional monosyllables ending in a consonant are in fact bi-nuclear with an empty second nucleus. This makes all consonant-final monovocalic words disyllabic, hence the first vowel appears in an open syllable and must be long. Similarly, monovocalic words ending in a consonant cluster can contain an initial open syllable if the final consonantal cluster qualifies as a branching onset (e.g. *sötr* [söːtʰr̥]), hence the long vowel before the two consonants. If the final consonantal cluster cannot form a branching onset, it must be broken up between a consonantal coda and a (non-branching) onset; with the coda position filled by a consonant, the first syllable cannot be open and hence the vowel must be short. This is illustrated in the following diagrams for the words *dag* [taːɣ], *sötr* [söːtʰr̥], and *fisk* [fɪsk].

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        O    R        O    R
        |    |        |    |
(a)     |    N        |    N
        |    |\       |    |
        x    x x      x    x
        |    | /      |
        t    a        ɣ
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        O    R    O    R
        |    |     \   |
(b)     |    N      \  N
        |    |\      \ |
        x    x x   x  x   x
        |    |/    |  |
        s    ö     t  r


        O    R    O    R
        |     \   |    |
(c)     |    N  \ |    N
        |    |   \|    |
        x    x  x x    x
        |    |  | |
        f    ɪ  s k
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In (a) the final consonant [ɣ], like any single consonant, can form an onset which is licensed by the final empty nucleus. Similarly in (b), the final empty nucleus licenses a well-formed branching onset and for this reason the first syllable in both (a) and (b) is open with the necessarily long vowel. In (c) we have the final obstruent sequence ([sk]) which, just as any obstruent sequence, is inadmissible as an onset and that is why elements of the sequence have to be split between the coda of the first syllable and the onset of the second. In this way the rhymal position is filled by a consonant and hence the vocalic melody cannot occupy it and must remain attached to a single skeletal position, yielding, what is phonetically realised and perceived as a short vowel.

The above interpretation allows us to maintain a simple and uniform account of the different contexts where long nuclei are found, i.e. in open syllables. At the same time the lengthening itself becomes phonologically understandable: rather than comprising a set of arbitrary and unrelated contexts, which can only artificially be conflated to a single rule, we are dealing with a typologically unremarkable process, since lengthening of vowels in open syllables, sometimes called metrical lengthening, is an extremely common process found in languages of the world. Hardly anything needs to be said at this stage about the process in focus. This does not mean, however, that the GP analysis leaves no room for doubt or alternative solutions. The problems it generates are largely theory-internal and we cannot go into them in any detail here. In general, they refer to the governing potential of individual segments and to the interaction of the lengthening with other processes in the phonology of Icelandic.

As an illustration, consider the requirement of coda-licensing (Kaye 1990) which binds the appearance of a consonant in the coda position (and hence a preceding short vowel) with the presence of a following onset. The onset consonant has to be strong (complex) enough to authorise or license the preceding coda. There are numerous cases where this relation is straightforward: in *kerti* [cɛr̥tɪ]

'candle' the medial cluster [r̥t] neatly illustrates the point where an obstruent, a strong consonant, controls the preceding weaker sonorant, hence the latter occupies the coda position of the preceding rhyme. In *betri* [pɛːtʰrɪ] 'better' the same relation obtains but this means that the two consonants find themselves in the onset of the second syllable as otherwise a stronger consonant would have be controlled by a weaker one; as a result, a skeletal position in the rhyme is available for lengthening. There are more complex contact relationships involving the coda and the onset where both consonants appear to be of equal strength, which leads to mirror-image sequences following a short vowel, e.g.: *veðra* [vɛðra] 'erode' – *verða* [vɛrða] 'become', *bölva* [pölva] 'curse' – *rövla* [rövla] 'blather'. Other instances of this view of lengthening opacity involve vowel shortness; it can be argued to derive from the interaction of the lengthening with other phonological regularities which yield a short vowel before what looks like a branching onset, e.g.: *trufla* [trʏpla] 'disturb', *fugl* [fʏkl] 'bird', *rugla* [rʏkla] 'confuse', *sagna* [sakna] 'story, saga, gen. pl.', *sofna* [sɔpna] 'fall asleep' and others. For more discussion of these and related issues see Gussmann (2002:167–184, 2003, 2006a). Here, in line with the dominant view, we will hold that vocalic length is predictable in Icelandic[3] and in line with the GP analysis we will associate vocalic length in Modern Icelandic with syllable openness. At the same time we take pains to stress that the notion of the syllable – open or close – is inextricably interwoven with phonological theories and cannot be taken as something obvious in no need of justification.

Moving from quantity to quality we need to consider the question of the vowel system as a phonological system rather than a purely phonetic grouping of segments. In other words, we need to face the question of the phonological organising principles that assign structure to the vocalic elements found on the surface. If the classical structural principles of economy, pattern congruity, symmetry and the like fail to produce compelling phonological solutions, we need to look elsewhere for evidence of the working of the system. Steblin-Kamenskij's (1960) perspicacious analysis, which combines some of the very traditional Icelandic notions with concerns of the day is, we believe, on the right track. In what follows we will indicate the differences that the GP perspective introduces and reformulate some of the general conclusions.

Traditionally Icelandic vocalic nuclei – vowels and diphthongs – are divided into two groups, usually called *broad* (*breið*) vs. *thin* (*grönn*) in Icelandic descriptions. These were renamed *tense* and *lax* by Einarsson (1945:11), even if tenseness is nothing but a cover term here – we would be equally justified in using any other cover term such as *long-short*. For this reason Árnason's (2005:148ff.) decision to refer to the broad/tense class as the *í/ú sounds* is at least unpretentious. The division into the two classes does, in fact, reflect a historical distinc-

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[3] The dissenting voice of Árnason (1998) should be noted here. Regrettably space restrictions preclude a discussion of his arguments.

tion between complex nuclei (long vowels and diphthongs) and simplex or short vowels of Old Icelandic, a distinction which was largely or completely unpredictable. As we have just seen, the long-short distinction in the modern language is largely or completely predictable and relates to the structure of the stressed rhyme. In any event, the two classes of nuclei comprise the following segments:

broad/tense: [i, u, ei, ou, öy, au, ai]

thin/lax: [ɪ, ʏ, ɛ, ɔ, ö, a]

We thus have high monophthongs and diphthongs in one group and non-high monophthongs in the other. It is well-nigh impossible to think of the two groups in terms of natural classes, short of pseudo classes like 'non-high and short' vs. everything else. There is clear morpho-phonological and phonological evidence which testifies to the separateness of the two classes and to their interaction not only in historical but also in synchronic terms. We review it below starting with the [i~ɪ] alternation which is found in the inflectional paradigm of the possessive pronouns *minn* [mɪn] 'my', *þinn* [θɪn] 'your, thy', *sinn* [sɪn] 'one's'. Using the first pronoun as an example we find the vowel [ɪ] in the following cases:

nom. and acc. masc. sg.   minn [mɪn]

nom. and acc. neut. sg.   mitt [mɪht]

dat. fem. sg.   minni [mɪn:ɪ]

gen. fem. sg.   minnar [mɪn:ar]

gen. pl. (all genders)   minna [mɪn:a].

The vowel [i] on the other hand appears in the following instances:

nom. fem. sg., nom. and acc. neut. pl.   mín [mi:n]

acc. fem. sg. and acc. masc.pl.   mína [mi:na]

dat. masc. sg. and dat. pl.   mínum [mi:nʏm]

gen. masc. and neut. sg.   míns [mins]

nom. and acc. fem. pl.   mínar [mi:nar]

dat. pl. (all gend.)   mínum [mi:nʏm].

Although the number of such alternating forms is obviously restricted,[4] there can be no question as to the relatedness of the forms displaying the alternation. The completely fundamental nature of the lexical items involved further strengthens the close connection between [i] and [ɪ]. The following two argu-

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[4] Apart from the possessive pronouns the alternation [i ~ ɪ] is found in the paradigm of the isolated adjective *lítill* [li:tɪtl̥] 'small' (for the full paradigm see Thomson 1987:303).

ments come from distributional restrictions, and specifically from constraints affecting segment combinations.

In the intervocalic position Icelandic displays long alveolar nasals (nasal geminates).[5] Since geminates typically constitute a coda-onset domain, it is not surprising that the preceding vowel is invariably short. What is remarkable is that the short vocalic melody can only belong to the thin/lax group, e.g.: vinna [vɪnːa] 'work', banna [panːa] 'ban', kenna [cɛnːa] 'experience, vb.', munnur [mʏnːʏr] 'mouth', tannar [tʰanːar] 'tooth, gen. sg.', önnin [önːɪn] 'concern, n.'.

After vowels of the other group, the long nasal is fissured into a non-nasal plosive followed by a single nasal stop, i.e. [tn̥], e.g.: steinn [steitn̥] 'stone', brúnn [prutn̥] 'brown', sónn [soutn̥] 'sound', grænn [kraitn̥] 'green', finn [fitn̥] 'smart', daunn [töytn̥] 'smell, n.', ánn [autn̥] 'toil, n.'

No matter how this melody fissure is to be described, what is unmistakable is that the process takes places after the specific group of vowels only. This further strengthens the conclusion that the two groups of vowels function as units in admitting a following geminate or in conditioning its breaking.

The third argument comes from the exclusion of thin/lax vowels from before *ng*, *nk* normally pronounced [ŋk, ŋ̊k]. This phenomenon is regularly noted in phonetic descriptions of Modern Icelandic (e.g. Einarsson 1945:9, Gíslason and Þráinsson 1993:129, 133f., Árnason 2005:148ff.) but is hardly ever brought to bear on a phonological interpretation of the Icelandic vowels – Steblin-Kamenskij (1960, 1965) being the most significant departure from this tendency. Since in what follows we will adopt Steblin-Kamenskij's basic insights, let us start by looking at the data.

In the context before [ŋk, ŋ̊k], with qualifications to follow, we find short nuclei of the "tense" set only, e.g.:

[i] syng [siŋk] 'I sing', minnka [miŋ̊ka] 'diminish, lessen'

[u] sungum [suŋkʏm] 'we sang', munkur [muŋ̊kʏr] 'monk'

[ei] engi [eiŋkɪ] 'meadow', drengur [treiŋkʏr] 'boy'

[ou] kóngur [kʰouŋkʏr] 'king', kónguló [kʰouŋ̊kʏlouː][6] 'spider'

[öy] löng [löyŋk] 'long, nom. sg. fem.', söng [söyŋk] 'I sang'

[au] banki [pauŋ̊ci] 'bank', langur [lauŋkʏr] 'long, nom. sg. masc.'

[ai] vængur [vaiŋkʏr] 'wing', frænka [fraiŋ̊ka] ' (female) relative'.

The vowels of the so-called "lax" set [ɪ, ʏ, ɛ, ɔ, ö, a] are basically inadmissible in the context at hand. The qualification 'basically' needs some clarification

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[5] We simplify the presentation somewhat: geminates are also found in word final position although they are most often shortened there, i.e. their length is perceived indirectly in the shortness of the preceding nucleus. This may create a pseudo-contrast and lead to "minimal pairs" like *man* [maːn]'remember' – *mann* [man] 'man, acc. sg.'. Such contrasts have been suggested in Árnason (1998:3). Needless to say, the shortened final nasal remerges before a vowel, hence *manna* [manːa] 'man, gen. pl.'.

[6] The final long diphthong is due to secondary stress on that nucleus.

since we do find a sizable number of words with the lax vowels before the two clusters, e.g.: vangá [vaŋkau] 'carelessness', vinga [vɪŋka] 'befriend', inngangur [ɪŋkauŋkʏr] 'entrance', innkaup [ɪŋ̊köypʰ] 'purchase', mungát [mʏŋkautʰ] 'ale, beer', vinkona [vɪŋkʰɔna] 'female friend', syndga [sɪŋka] 'sin, vb.'

　　Such examples are normally treated as instances of compounds (*samsett orð*), where the lax vowels only accidentally come to stand before the sequence [ŋk, ŋ̊k] (Árnason 2005:149). This restriction seems to work in most cases: *vangá* [vaŋkau] 'carelessness' can be argued to be as a compound consisting of *van-* [van] 'lacking in' and *gá* [kauː] 'attention', even if the appearance of the velar nasal at the juncture of the two components shows that not all regularities are checked in compounds. Extending this reasoning to all examples could be somewhat dicey: the unproductive suffix *-ga* of *vinga* [vɪŋka] 'befriend' (cf. *vinur* [vɪːnʏr] 'friend') would have to make up a compound, while the equally unproductive suffix *-ka* of *minnka* [miŋ̊ka] 'diminish, lessen' (cf. *minni* [mɪnːɪ] 'less') could only produce derivatives. In general then, the concept of a compound would require some creative handling to produce the desired results. The last example in our list – *syndga* [sɪŋka] 'sin, vb.', obviously related to/derived from the noun *synd* [sɪnt] 'sin' – shows additionally simplification of a heavy three consonantal cluster by deletion of the middle segment. If the appearance of the tense vowels in the velar nasal context were to be regarded as a live phonological regularity rather than a static condition imposed on representations, the derivation of the verb *syndga* would appear to impose an order of the processes involved: vowel tensing, consonant deletion and nasal assimilation. We cannot go into an extended discussion of the implications of the possible interpretations here – we will merely assume that the exclusion of lax vowels before [ŋk, ŋ̊k] holds within phonological domains, while other regularities, such as nasal assimilation or vowel lengthening, can apply across domain boundaries.[7] In any event, the regularity reflected in the exclusion of lax vowels from the velar nasal context is not a mechanical, blind, or phonetically-conditioned process but must take into account some aspects of the phonological organisation, namely domain structure.

　　We have been indiscriminately referring to the two sets of vowels as tense/lax, broad/thin or long/short thereby implying that it makes little difference what we call them, the important thing being that the two sets are phonologically separate. While the long/short opposition is unabashedly historical, the broad/thin one is traditional and intuitive:[8] it serves to indicate that the two groups of vowels are systematically different, an intuition we have just justi-

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[7] For more discussion of the role of domains in phonology see Kaye 1993, Gussmann (2002: Chap. 3), Scheer (2004).

[8] The linguistic tradition is replete with such intuitive nomenclature: in British English we speak of *clear* or *dark l*, in Norwegian of *thick l*, in Irish of *slender* and *broad* vowels, in Polish of bending vowels (samogłoski pochylone) etc. To be meaningful, all such terms must be converted into unambiguous phonetic or phonological labels.

fied in phonological terms. Both sets of terms correspond to no obvious phonetic unit. The tense/lax distinction with its more recent transformation as ±ATR (advanced tongue root) on the other hand has attempted to supply the opposition with some consistent phonetic content. These attempts are generally regarded as unsuccessful (Harris and Lindsey 1995); with reference to Icelandic they have been rejected or questioned by, among others, Benediktsson (1959), Steblin-Kamenskij (1960), Allen (1995), Árnason (2005), while their standing in phonological theory at large has been even less firm (see Lass 1976, Durand 2005); the tense/lax distinction is no less whimsical or contrived than the impressionistic traditional labels. Within GP and other element-based frameworks, such a Dependency Phonology (Anderson and Ewen 1987), some of the distinctions traditionally disguised as tense/lax are viewed as phonetic effects of the internal structure of segments, specifically of the positioning of some element as a head and another – or others – as dependents. Thus, the English distinction between the [i] *green* and the [ɪ] of *grin* is ascribed to the element {I} occupying the head position in the former and the dependent position in the latter segment (Harris 1994, Durand 2005); similarly in Polish there are headed and empty-headed vowels, with tangible phonological and partial phonetic consequences (Gussmann 2005, 2007). I propose that the two sets of Icelandic vowels are likewise distinguished in being either headed nuclei [i, u, ei, ou, öy, au, ai] or empty-headed ones [ɪ, ʏ, ɛ, ɔ, ö, a].

The clearest exemplification of the distinction comes from the vowels [i, ɪ] where the phonological element involved is the prime {I} denoting frontness – when headed (underlined in our representation) the element corresponds to [i] and when the dependent with the head position empty, the prime reflects [ɪ]. Minimal-pair hunters will be gratified by examples such as:

> víti [viːtʰɪ] 'hell' – viti [vɪːtʰɪ] 'lighthouse',
>
> bakarí [paːkʰari] 'baker's shop' – bakari [paːkʰarɪ] 'baker'.

In the context before the velar nasal-velar plosive cluster we find the headed nucleus, e.g. *þing* [θiŋk] 'parliament'. By the same reasoning the vowels [u, ʏ] are, respectively, headed {U} and headless, or empty-headed {U}, where the prime itself denotes roundedness, e.g.:

> fúll [futl̥] 'foul' – full [fʏtl̥] 'fully',
>
> úlpa [ul̥pa] 'anorak' – ugla [ʏkla] 'owl'.

We come here to an interesting point, often stressed in connection with the phonetic interpretation of phonological primes: the empty-headed expression containing {U} as a dependent is pronounced as a front vowel in Modern Icelandic. In other words, primes define the phonological content of segments and only indirectly the way the segments are realised phonetically –

the full phonetic interpretation involves other aspects of the phonological struc-
ture such as their placement as a head or a dependent, syllabic affiliation, and
possibly the influence of other elements within a given expression as well as
those in neighbouring segments. Details of the mechanism of the phonetic con-
version are not fully understood as yet (for some recent discussion of the struc-
ture of the melody within GP see Bloch-Rozmej 2008) but the crucial point is
that GP pays attention or recognises the relevance of those phonetic parame-
ters which are of phonological significance only. Everything else is taken to
form the "packaging" in which primes are clad, which may less disparagingly
be called *phonetic effects* (see Harris 1996, Gussmann 2004).[9]

Moving now to diphthongs we note that typically the combined melodies
associated with them differ in what they can support; specifically right-hand
member is much more restricted in the melodies it supports than the left
member: the former is regarded as the governee or governed position whereas
the latter, the governor, is treated as a head of the expression (see Harris 1990).
In Icelandic the governees in diphthongs are restricted to just [i, u] – in our terms
{I̱} and {U̱} (on the status of [y] see below). The governors are the vowels [e, o,
ö, a]; these, in terms of elemental primes translate into {I̱ A}, {U̱ A}, {U̱ A I}
and {A̱} respectively. When combined with the two governees they could derive
a great number of phonological expressions; in actual fact their number is re-
stricted to just five diphthongs:

> {I̱ A} + {I̱} = [ei], e.g.: engi [eiŋkɪ] 'meadow', beisla [peisla] 'bridle, vb.', heima [hei:ma]
> 'home',
>
> {U̱ A} + {U̱} = [ou], e.g.: kóngur [kʰouŋkʏr] 'king', nótt [nouht] 'night', hóta [hou:tʰa]
> 'threaten',
>
> {U̱ A I} + {I̱} or {I̱ U} = [öi] or [öy], e.g.: söng [söiŋk/söyŋk] 'I sang', austur [öistʏr/öystʏr]
> 'eastern', auður [öi:ðʏr] 'empty'
>
> {A̱} + {U̱} = [au], e.g.: banki [pauɲ̊ci] 'bank', ást [aust] 'love, n.', mál [mau:l] 'language'
>
> {A̱} + {I̱} = [ai], e.g.: vængur [vaiŋkʏr] 'wing', þræll [θraitl̩] 'slave', bæði [pai:ðɪ] 'both'.

These representations call for a few comments and qualifications. There
are three examples in each case: we start with the nucleus required before the
pre-velar cluster, which has to be headed and short. This is followed by an
instance of the short diphthong before some consonantal coda and completed
with an example of the same diphthong when long, i. e. when no consonantal
coda follows. One of the elements in each expression is its head while the
other, and in one case, two others are dependents or operators. The headedness

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[9] It would be possible – and quite simple – to represent directly the roundedness of the vowel
[ʏ]. This could be an empty-headed expression {I U}. By doing so, however, we would sever
the link between this vowel and the back [u] thereby introducing two restrictions which would
have to be viewed as phonologically accidental: the vowel [ʏ] would have no headed congener
while the vowel [u] would similarly have no headless one.

of the second element of each diphthong might be questioned: we see no evidence which might decide the issue unambiguously apart from the fact that they are articulated in the same way, or practically in the same way, as when headed in the pre-velar cluster position, i.e. as [i, u] rather than [ɪ, ʏ]. There is a minor problem with the complex diphthong, which up to now we have transcribed in accordance with the dominant Icelandic tradition as [öy] whose second part is the rounded congener of the high [i], a segment, which does not seem to exist outside this particular diphthong. Were we to take the phonetic information as reflecting the phonological structure, the second part of the diphthong would require two elements arranged as {I̲ U}. It is possible, however, that the rounding of the second element is marginal and/or due to spreading of {U} from the first element and as such does not need separate specification. It must be noted, however, that the phonetic roundedness of the second part of the diphthong is not universally recognised: while some (Icelandic) phoneticians and linguists (Einarsson 1945, Árnason 2005) transcribe it as [y], others (Pétursson 1976:45, Thráinsson 1994:144, Gíslason and Þráinsson 1993:133f. and throughout the book) use the symbol for the unrounded vowel and transcribed the diphthong as [öi]. Steblin-Kamenskij (1960, 1966) uses the rounded symbol in his phonetic transcriptions but evidently regards it as a contextual modification, hence his phonological diphthong is rendered as /öi/. Here we will adopt the view that the second member of the diphthong is the monoelemental {I̲}-expression.[10]

We can now use the results arrived at so far to determine the content of the remaining vowels. It is clear that empty-headed nuclei cannot appear in the pre-velar cluster position and this means that just like [ɪ, ʏ] are unheaded {I, U}, so the remaining vowels of the lax/thin set must be unheaded. This produces the following expressions:

{I A}= [ɛ] e.g.: skessa [scɛsːa] 'giantess', veður [vɛːðʏr] 'weather'

{U A} = [ɔ] e.g.: opna [ɔhpna] 'open, vb.', þola [θɔːla] 'tolerate'

{U A I} = [ö] e.g.: örva [örva] 'encourage', vör [vöːr] 'lip'

{A} = [a] e.g.: valda [valta] 'cause, vb.', gata [kaːtʰa] 'street'.

On this interpretation the relationship between the two sets of vowels reduces to a distinction between headed and un-headed nuclei; headed vocalic expressions, with the exception of those containing either {I} or {U}, are accompanied by a second member, either {I} or {U}, acting as heads.[11] Thus head-

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[10] Theoretical implications of the representation of the Icelandic diphthongs are partially unclear and remain to be worked out. In particular, the concept of the root node in the sense of Harris (1994:129ff.) seems called for to account for the appearance of two heads dominated by a single skeletal position in the case of short diphthongs. Possibly headed elements must span two root nodes, a suggestion which links headed structures directly with diphthongs.

[11] In this paper we have not considered the representation of diphthongs in any detail resorting instead to concatenating both members by means of a plus. This point requires additional work.

edness allows us to capture the traditional division of nuclei into two groups
and relate the division both to specific phonological facts of Icelandic and to
general expectations – or predictions – following from a specific view of the
internal organisation of segments and their building blocks. The totality of the
qualitative distinctions in Modern Icelandic discussed so far can be chartered
as follows:

{<u>I</u>}	{I}	{<u>U</u>}	{U}
{<u>I</u> A}+{<u>I</u>}	{I A}	{<u>U</u> A}+{<u>U</u>}	{U A}
{<u>U</u> A I}+{<u>I</u>}	{U A I}		
{<u>A</u>}+{<u>U</u>}	{A}		
{<u>A</u>}+{<u>I</u>}			

This can be straight-forwardedly translated into the traditional phonetic
symbols:[12]

i	ɪ	u	ʏ
ei	ɛ	ou	ɔ
öi	ö		
au	a		
ai			

Although formulated in phonetic terms, this system does not correspond
to any familiar charting of the vowel space. To some extent it is derived from
phonetic data but is based mostly on the behaviour of segments in the position
of neutralisation, i.e. before the velar nasal + plosive cluster. Although cast within
a very different framework from Steblin-Kamenskij's (1960, 1966) (Government
Phonology vs. Prague-type of phonology), the present account comes remark-
ably close to his. The major difference is that Steblin-Kamenskij refuses to relate
linguistically – phonemically in his case - that back vowel [u] and the front
rounded [ʏ] since for him the front-back opposition is distinctive. Another point
of difference is the position of the low vowel [a]: Steblin-Kamenskij (1960:45,
1966:67) relates it to the two diphthongs [ai] and [au], while the account above
relates [a] and [au] but leaves [ai] as an unpaired diphthong, i.e. one which
has no unheaded congener.

Presenting Einarsson's chart of the Icelandic vowels we mentioned the fact
that he also recognized the following three nuclei as diphthongs [(ɪ)iː] spelt
<ig(i)>, [ɔiː] spelt <og(i)> and [(ʏ)yː] spelt <ug(i)>. In the examples below we

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[12] Note again the absence of the front high rounded vowel [y] in the Icelandic system; in
our terms this means that the elements {I} and {U} on their own do not combine (to combine
they need additional {A}). This seems somewhat peculiar – or arbitrary – but the phonetic facts
are unambiguous: it is only the front non-high [ɪ] and the mid [ɛ] that can be accompanied by
rounding.

illustrate not only the diphthongs listed by Einarsson but also a few others that he either consciously or inadvertently omitted.

[ii] e.g.: stígi [stiiːjɪ] 'path, dat. sg.' stígið [stiiːjɪð] 'you (pl.) step'

[ɪi] e.g.: stigi [stɪiːjɪ] 'stage, dat. sg. ', svigi [svɪiːjɪ] 'bracket'

[ʏi] e.g.: hugi [hʏiːjɪ] 'mind, n.', bugir [pʏiːjɪr] 'curve, nom. pl .'

[ui] e.g.: múgi [muiːjɪ] 'crowd, dat. sg.', ljúgi [ljuiːjɪ] 'I tell a lie, subjunctive'

[ei] e.g.: tregi [treiːjɪ] 'sorrow', veginn [veiːjɪn] 'road, acc. sg. defin.'

[ɔi] e.g.: togi [tɔiːjɪ] 'tuft of wool', bogi [pɔiːjɪ] 'arch'

[öi] e.g.: lögin [löiːjɪn] 'tune, nom. pl. defin.', sögin [söiːjɪn] 'saw, nom. sg. defin.'

[ai] e.g.: daginn [taiːjɪn] 'day, acc. sg. defin.', hagi [haiːjɪ] 'pasture'.

Strictly speaking, [ii] can hardly be regarded as a conventional diphthong and it could just as well be transcribed as the long [iː]; the diphthongs [ei, öi, ai] in the examples could be identified with those interpreted above as headed structures. We would then be left with the following four nuclei [ɪi, ʏi, ui, ɔi] not discussed so far. Even if we were to restrict ourselves in this manner, the resulting diphthongs would be peculiar: as noted by Steblin-Kamenskij (1960:38) these would be the only nuclei in Icelandic which are invariably long. Icelandic phoneticians are not unanimous here and also they differ as to where the length resides: as illustrated by Árnason (2005:151) a word such as *daginn* 'day, acc. sg. defin.' has been variously transcribed as [taijɪn, taiːjɪn, taijːɪn]. My own phonetic impression would favour the last of the transcriptions but it is a singular sign of the unstable status of a group of sounds when trained phoneticians (and native speakers to boot!) cannot make up their mind which, if any segment in the group is long … Partly for these reasons most investigators have refused to elevate the complex nuclei to the status of true diphthongs, even if it forces them to adopt the bizarre position that diphthongs are only those complex nuclei which can appear between two plosives (Pétursson 1976:44). We would like to add a morphophonemic argument to the various objections to the diphthongal status of the nuclei at hand. It should be noted that there are common and numerous alternations between such diphthongs as for example [ʏi] and pure long vowels. All the examples above can be supplemented by such alternants:

[ii] ~ [iː]
stígi [stiiːjɪ] – stígur [stiːʏʏr] 'path, nom. sg.'; stígið [stiiːjɪð] – stíga [stiːʏa] 'step, infin.'
[ɪi] ~ [ɪː]
stigi [stɪiːjɪ] – stig [stɪːʏ] 'stage, nom. sg.'; svigi [svɪiːjɪ] – sviga [svɪːʏa]'bracket, gen. sg.'
[ʏi] ~ [ʏː]
hugi [hʏiːjɪ] – hugar [hʏː(ʏ)ar] 'mind, nom. pl.'; bugir [pʏiːjɪr] – buga [pʏː(ʏ)a] 'curve, gen. pl.'
[ui] ~ [uː]
múgi [muiːjɪ] – mugar [muː(ʏ)ar] 'crowd, nom.pl.'; ljúgi [ljuiːjɪ] – ljúga [ljuː(ʏ)a] 'infin.'

[ei] ~ [ɛː]
tregi [treiːjɪ] – trega [tʰrɛːɣa] 'mourn, vb.'; veginn [veiːjɪn] – vega [vɛːɣa] 'road, gen. pl.'

[ɔi] ~ [ɔː]
togi [tɔiːjɪ] – toga [tɔːɣa] 'tuft of wool, acc. sg.'; bogi [pɔiːjɪ] – bogar [bɔːɣar] 'arch, nom. pl.'

[öi] ~ [öː]
lögin [löiːjɪn] – lög [löːɣ] 'tune, nom. pl. '; sögin [söiːjɪn] – sög [söːɣ] 'saw, nom. sg. indefin.'

[ai] ~ [aː]
daginn [taiːjɪn] – dagur [taːɣʏr] 'day, nom. sg.'; hagi [haiːjɪ] – haga [haːɣa] 'pasture, gen. sg.'.

These alternations confirm that the so-called diphthongs appear just before the palatal approximant (or spirant) [j]; the palatal approximant itself may be viewed as a transformation of the velar spirant [ɣ] before the vowel [ɪ]. Details of the phonological processing involved in the operations need not concern us here: it appears to be a straightforward case of {I}-spreading from the final nucleus to the preceding onset and further left to the slot of the long vowel, which results in a diphthong-like long vowel. Once the spreading fails to hold, the nucleus is realized as a pure long vowel. In some cases such diphthongoids (e.g. [ei]) may coincide with an independent phonological expression ({I̲ A}+{I̲} = [ei]), whereas in others they are different. Note however, that we have identified eight such spurious diphthongs, which is exactly what we can have from a combination of eight unheaded vowels, each combined with {I}.

There are also complex nuclei starting with the palatal spirant that could be regarded as rising diphthongs [jɛ] *vél* [vjɛːl] 'machine' and [jö] *jökull* [jöːkʰʏtl̩] 'glacier'. However, if these nuclei were to be regarded as diphthongs, there would be nothing to prevent us from recognising triphthongs [jau] in *bjáni* [pjauːnɪ] 'fool', *járn* [jautn̩] 'iron', [jou] in *jórtra* [jour̥tra] 'ruminate', *jól* [jouːl] 'Yule, Christmas' and [jai] in what is probably the most frequently used Icelandic word, namely *jæja* [jaiːja] 'well then'. As the examples show we would further need to recognise long and short triphthongs … Instead of pursuing this futile path we will say simply that the palatal approximant (spirant) is a segment that just happens to precede regular diphthongs in these words.

Finally, among the realisation of vowels one should note the diphthongal pronunciation of certain traditionally "pure" vowels. The various modifications are described by Einarsson (1945:11) and partly recognised by Árnason (2005:139) who transcribed the traditional long [ɛː] as [ɪɛː] and [ɔː] as [ʊɔː]; the segmental nature of the transcription grossly overstates the process and mere on-glides are of necessity treated as separate segments. This is a classical example of what Chao (1934:41f.) called *over-analysis* of phonetic data. While the tendency in present-day Icelandic to diphthongise long unheaded vowels should be noted, there is no evidence that it plays any role in the synchronic phonology of Modern Icelandic. It may be of interest historically as yet another instantiation of the tendency to diphthongise long vowels, a tendency which is neither novel nor restricted to Icelandic alone.

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