The status of diphthongs in Irish and Russian

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Abstract The status of diphthongs in languages with a palatal ≠ nonpalatal contrast among consonants is a debatable point as the occurrence of these frequently correlates with a given value for the feature [palatal] for the vowel-flanking consonants. By examining phonetic diphthongs in Irish and Russian, which have in common that in each language series of palatal and nonpalatal consonants exist, an attempt is made to develop rules which would predict the occurrence of these surface diphthongs from their consonantal environment as opposed to specifying them lexically and various possibilities for analysing the elements of diphthongs phonemically are critically examined.

In a language with a palatal ≠ non-palatal contrast among whole series of consonants the relationship between vowels and consonants is particularly close. The vowels which occur in palatal and non-palatal environments are phonetically distinguishable from each other (Bolla, 1981: 63ff., Avanesov 1972: 44ff.) and when carrying out a phonological analysis the correlation between consonants of a certain type and given realizations of vowel can lead to the phonological distinctiveness being posited with one group of sounds as opposed to another (see Hamilton (1976, especially 10ff.) on the notion of vowel power and consonant power). This has been a long-standing characteristic of analyses of the Russian phonological system (Bratkowsky (1980), Bidwell (1962)). In Irish where a similar division of the consonant inventory (in fact more symmetrically) into palatal and non-palatal sounds is found. All phonological analyses (for example de Bhaldraithe (1945: 24ff.), de Búrca (1958:22ff.), Ó Cuív (1944: 31ff.)) assume the burden of distinctiveness to lie with consonants although the contextual realization of vowels is equally sensitive to the palatal ≠ non-palatal distinction among consonants as it is in Russian.

For the issue at hand the vowel values of Russian and Irish are not to be examined in general but only in those instances where the realization is identifiably diphthongal. In Irish (in the sense of Western Irish as described in de Bhaldraithe (1945: 19ff.) and Hickey (forthcoming, a) and in Russian (Bolla, (1981: 63-65), Jones and Ward (1969: 73-79)) phonetic diphthongs are found; they are mostly quite different in each language but have in common that they are closely bound to the consonants which precede or follow them. There are certain similarities in terms of the types of diphthongs found. In both languages the diphthongs are falling (Jones and Ward (1969: 74)) the peak of sonority falls on the beginning of the diphthong and the position to which the tongue glides is acoustically less prominent. In both languages there are closing diphthongs where the position to which the tongue moves is higher in the mouth than the starting point. Irish also has centring diphthongs where the movement is from a non-central to a central position.
When looking at a language which has a palatal ≠ non-palatal contrast among consonants it is important to ascertain whether their occurrence is predictable. In Russian /j/ is not predictable after consonants (in word final position, see Bratkowsky (1980: 333) although it has its origin in a predictable environment, Lunt (1956: 315)), this providing a strong argument in favour of recognizing a series of palatal consonants (as opposed to a complex of vowels). If one assumes that palatal consonants consist phonologically of C+/i/ then the second vowel in a pair like

(1) a) стоп /stol/ ‘table’
   b) стопль /stol/ ‘so much’

requires an additional process of high front vowel deletion for its surface realization. If one views palatal consonants as consisting of C+/j/ then one cannot accommodate the contrast C [+pal] ≠ C [+pal] + /j/ as in

(2) a) нёц /p, os/ ‘dog, cur’
   b) нёшь /p, jof/ ‘you (sg.) drink’

In contemporary Standard Russian (that variety used for phonological analyses of Russian, see Halle (1959: 5)) the segment /w/ does not exist although in certain analyses of Russian it is posited (for the obstruent /v/) as the latter does not cause regressive voicing (and shares this with /j/ and the class of sonorants, Jones and Ward (1969: 198)). As /w/ does not exist then the possibility of considering non-palatal (i.e. velarized segments) as clusters of C+/w/ cannot be considered.

In Irish both [j] and [w] exist. The former is not an independent segment however but the realization of /ɣ/, the palatal member of the velar voiced fricative pair /ɣ/ and /ɣ/. [w] is the pre- and post-vocalic realization of /v/ in Western Irish, this phoneme being otherwise realized as [v] (Hickey, loc. cit.). Because of this Irish can be said phonologically to have no glides while Russian does have a front glide, a fact which is decisive for the interpretation of phonetic diphthongs.

To consider the situation in Irish first: when a vowel is flanked in a word by a consonant which is not identical with it in terms of frontness or backness a glide appears between the two disparate elements.

(3) a) муйд [mʰid] ‘we’ b) фáил [faːl] ‘getting’

The vowel length distinction which distinguishes Irish from Russian is not relevant to this point. The vocalic core of the form in (3) b contains a phonetic diphthong not unlike the [ɔi] found in Russian in say

(4) a) бо́й [bɔj] ‘battle’ b) густой [ɡus’tɔj] ‘thick’

The onset of the Russian diphthong is higher than the Irish one and has the characteristic transition from labial to nonlabial articulation which characterizes stressed back vowels in Russian after non-palatal consonants (Jones and Ward (1969: 77)). With regard to the status of the diphthongs two aspects of their contexts must be considered, word-final and preconsonantal position. In Irish the diphthong in (3) b only
occurs before palatal consonants while that in Russian occurs both pre-consonantally as in

(5)  бойкий ['bɔɪkij] ‘brisk, quick’

and word-finally as already considered. The interpretation of the diphthong in (5) as being determined by its occurrence before a palatal consonant is not possible as it also occurs before a non-palatal

(6)  ко́йка ['kɔɪkə] ‘cot’

The next interpretation usually given (Jones and Ward (1969: 77)) is that the phonetic diphthong [ɔi] consists of the phonological sequence /oj/. This interpretation is motivated by a number of factors. To begin with /j/ occurs pre-vocally both word-initially and post-consonantally. The phoneme /i/ neither occurs prevocally (within a single morpheme) nor medially between vowels. To decide in Irish whether, with certain words, instances of diphthongs, two vowels or a vowel plus glide are present various items of information are necessary. Firstly sequences of two vowels can never be realized as a diphthong if there is a morpheme boundary between them. Both vowels in such cases have a peak of sonority which not however of quite equal prominence as Irish has initial stress and reduction of subsequent vowels, this reduction being in quantity when the vowels are long.

(7)  básadh /baː#uː/ (= ['baːuː]) ‘drowned-PASSIVE’

The pronunciation of the two vowels here resembles those of Russian in words like

(8)  наука /na’ukə/ ‘science’

inasmuch as the second element is pronounced fully as a vowel of its own, though in Russian the primary stress is on the second vowel (contrast this with the phonetic diphthongs considered below).

The same distribution of secondary stress can be used to distinguish real diphthongs from sequences of a vowel and a glide in Irish. In the forms

(9)  a)  snámh ['snaːw] ‘swum’
    b)  samhradh ['saurə] ‘summer’

The vowel of the first is long and the glide after it is pronounced with a slight secondary stress; with the second form stress falls on the vocalic onset [a] and there is a continuous glide to a [u]-position with attendant reduction in stress. The description of the form in (9)a holds good even if the glide belongs to the following syllable as in

(10)  lámha [laː$wə] ‘hands’

Secondary stress is retained even if glides vocalize. This happens frequently in spoken Irish where a labio-velar glide is preceded by a shwa. This is a continuation of a vocalization tendency which is natural considering that [w] derives from
non-lipped articulation which is characteristic of palatal sounds. The sequence [әw] then develops to [u:] but the realization of the forms below is similar to the Russian example in (8) that the second vowel is not reduced in quantity.

(11) a) ariamh \([ә r,iәw] \rightarrow [ә r,iu:]\) ‘ever’
    b) taobh \([tiәw] \rightarrow [tiu:]\) ‘side’

A similarity in phonotactics between Russian and Irish can be seen here but one which has quite different phonetic realizations. In both languages /v/ can occur post-consonantally at the end of a word.

(12) a) nepә \(/n,erv/\) ‘nerve’
    b) tarbә \(/tarv/\) ‘bull’

In Russian it is automatically devoiced to [f]. In Irish an epenthetic vowel [ә] appears before it as it cannot form a tautosyllabic cluster with a sonorant. This gives [tarәw] for (12)b which then like the forms in (11) has further vocalization of the vowel plus labio-velar glide resulting in [ta:ru:] (with allophonic lengthening of the low stem vowel) as the phonetic realization. Now consider at this point the situation with centring diphthongs in Irish. These occur in a variety of phonotactic environments.

(13) a) iatacht \([iәtәxt\] ‘constipation’
    b) iotacht \([iәtәxt\] ‘avidity’
    c) cuaradh \([kuәrә\] ‘curving’
    d) cúradh \([kuәrә\] ‘chastisement’

The forms in (13)a and (13)c are traditionally regarded as embodying instances of the diphthongs /iә/ and /uә/. Those in (13)b and (13)d are phonetically exactly the same, the shwa after the high vowel being an off-glide to the following velar segment in each case. Leaving the orthography aside as a secondary phenomenon there is no justification for regarding /iә/ and /uә/ in (13)b and (13)d as phonemic diphthongs especially as the shwa changes to [i] when the first vowel is [u] and the following consonant palatal.

(14) fuair \([fuәr,]\) ‘got’

When the supposed diphthong /iә/ is however followed by a consonant which is palatalized as part of a change in grammatical category the result is not [i:] as one would expect from the form in (14) but a long middle vowel.

(15) a) iasc \([iасk]\) ‘fish-NOMINATIVE’
    b) eisc \([e:s,k,]\) ‘fish-GENITIVE’

This could hardly justify regarding [iә] as a phonemic diphthong; to do this the alternation should not be with a monophthong as in (15)b but with a further diphthong.

The motivation behind regarding the graphemic sequences ia and ua as representing diphthong wherever they occur is that they are also found word finally.

(16) a) bia \([b,iә]\) ‘food’
b) **bua** [bua] ‘victory’

If the shwa in the forms in (16)a and (16)b was merely an offglide to the following velar consonant then it should disappear when there is no following consonant. One could argue of course that the identical graphemic sequences *ia* and *ua* in (13)a and (13)c and (16)a and (16)b have nothing to do with the sounds involved and the latter group should not be used as a guide (just consider its inconsistency win Russian in not having an independent grapheme for /j/) it does reflect forms bound by morphophonemic alternations as in

(17) a) **uaigh** [ua] ‘grave’
   b) **uaigheannai** [uani:] ‘graves’

As the second form above is morphophonemically related to the first then the [ua] which occurs in it must be regarded as a token of /uә/, this being present as the non-suffixed form in (17)a. The solution to the question of the status of the vowels in (13)a and (13)c is only to regard those instances of [iә] and [uә] which alternate with word-final instances as manifestations of the diphthongs /iә/ and /uә/ and to neglect the orthographical similarity with the non-alternating vowels.

The significance of the palatal non-palatal distinction among Irish consonants can be shown to be significant here for the onset of these diphthongs. Recall the forms in (16), there [iә] occurs after a palatal consonant and [uә] after a non-palatal one. This holds absolutely in Irish. Because of this the phonological analysis can be made more economical and more general if one posits a single diphthong which has two realizations (Hickey: 1985)

(18)  /iә/ → [iә] / C [+pal] _____  
      → [uә] / C [–pal] _____

Phonologically, the analysis can be simplified further. As Irish also has contrastive /ә/, this effecting a distinction in meaning by its presence in certain sets of words like

(19) a) **lion** /l,i:n/ ‘fill’  
    b) **lionadh** /l,i:nә/ ‘filling’

the covering diphthong in (18) could be represented as a sequence of /i/ and /ә/. The former vowel would be unspecified for frontness and backness, this being determined by assimilation to the preceding consonant.

Returning to Russian one could postulate by analogy that the diphthongs in (4) consist of a sequence of two vowels. After all /i/ exists already as a segment in Russian so that Russian would have double vowel sequences as in (20), realized phonetically as diphthongs.

(20) a) /ei/ : **людей** ‘people-GENITIVE’
    b) /ai/ : **чаїй** ‘tea’
    c) /oi/ : **стой** ‘stop’
    d) /ui/ : **поцелуй** ‘kiss’
An additional argument in support of this is that languages tend frequently to diphthongize stressed vowels in final position. In Irish for instance there is no diphthong /ei/ but when the mid vowel /e/ occurs in this open position it diphthongizes slightly with a closing off-glide towards /i/.

(21) \[beidh \quad /b\epsilon/ \rightarrow [b\epsilon] \sim [b\epsilon i] \] ‘will-be’

This diphthong is quite rare (because of the rarity of word-final /e/) but does not need to be lexically specified (as does the rare diphthong [ui] in English, as in ruin) but can be derived by phonetic rule. But there are flaws with assuming the second element of the diphthongs in (20) to be /i/. Consider the fifth case not listed in (20).

(22) /ii/ : кий ‘cue’

To posit a sequence of two /i/ vowels would run counter to an absolute rule of Russian phonology that no two tokens of the same vowel can follow immediately on each other. Words such as

(23) подоирать ‘to encourage’ (Avanesov, 1972: 76f.)

have a morpheme boundary between the two vowels (here: /…V # V…/) which corresponds to a hiatus phonetically. A phonological rule of the type

(24) /i/ \rightarrow /j/ /i/ _____

could always be introduced to solve the difficulty created by words with –уи or –ыи but this is an additional rule. By assuming that phonologically all diphthongs end in /j/ one not only needs no such rule as in (24) but one also has maintained the distributional symmetry of /j/ which in the latter analysis occurs before and after vowels.

A further aspect of the Irish diphthongs in (16) needs to be considered when a number of other forms are taken into account.

(25) a) лиан /l,i:\n/ ‘trowel’
    b) суан /su\a:n/ ‘juice’

The above diphthongs occur intramorphemically (contrast /ba:\#u:/ in (7) above). They have /i/ or /u/ as their first element as do the phonetic diphthongs [iə] and [uə]; they are in complementary distribution with regard to the consonants they occur after. As with the first pair of diphthongs the high front vowel comes after palatal, the high back vowel after non-palatal consonants. The question which arises is, are the diphthongs in (25) predictable in terms of consonant structure? When one views pairs like

(26) a) суван /su\o:n/ ‘sleep, slumber’
    b) суван /su\a:n/ ‘juice’
then one can predict the occurrence of /uә:/ as opposed to /uә/ by, say, a rule which converts the latter into the former in a pre-sonorant position. At least one could not do this by a global rule. But recall now that Irish has initial stress and that short low vowels are reduced to central vowels in stressed position (i.e. /a/ → [ə] [-stress]). This would allow one to view [iә], [uә] as phonemically /ia/, /ua/ (→ /ia/); [iә:] and [uә:] can also be reduced to a single diphthong [iә:] as the occurrence of the initial element is predictable. If one wishes to reduce the phonemic diphthongs /ia/ and /iә:/ to one diphthong then in view of the forms on (26) one would have to have a rule which lengthens /a/ to /ә:/ (the phonemically long equivalent of the /a/ vowel) before certain nasals. This would involve lexically marking nasals as inducing length of the low vowel preceding them in some instances and not in others. This would seem an unjustified complication of the phonological component just in order to reduce these four phonemic diphthongs to one.

But it turns out that this analysis is the most favourable, because in Irish as opposed to Russian, nasals and laterals have to be lexically marked as either inducing length in the vowel preceding them or not doing so. Consider the following forms.

(27) a)  gal  /gal/  ‘steam; valour’
       b)  gall  /ga:l/  ‘foreigner’

The phonological structure of both these words is the same except for the vowel, the second has the phonemically long equivalent of the vowel in the first. It is not possible however to lexically specify the vowel in the second as simply long and leave the laterals without any additional specification. In

(28) a)  lán  /lә:n/  ‘full’
       b)  lann  /lә:n/  ‘blade’

the phonological structure is precisely the same but the morphonemic alternations which both forms undergo show differing vowels at other points in their respective paradigms.

(29) a)  láin  /lә:n/  ‘full-GENITIVE’
       b)  lainne  /lanә/  ‘blade-GENITIVE’

On suffixation the vowel in (28)b is shortened (see (29)b). That of (28)a remains long always (and so is lexically a long vowel). Because of this widespread phenomenon of sonant shift (see Hickey, 1986) there is a long-short vowel alternation before certain laterals and nasals in Irish. Only those sonorants which derive from former geminates (compare the orthography of the above forms) cause this shift. But as phonological length among consonants has been lost in Irish the result is that among identical laterals and nasals some will cause lengthening of a short vowel when they are in final position (the lengthening not applying in medial position) while others will not. Seeing as how this lexical marking is unavoidable in this case it can also be used to mark laterals and nasals before which a cover diphthong /a/ can occur such that the value of the preceding consonant for the feature [palatal] and the lexical marking of
the following nasal or lateral will determine whether /iә/, /uә/, /iә:/ or /uә:/ will appear phonetically.

As in Russian, in Irish there are also closing diphthongs. Phonetically the vowel sequences [ai] and [au] occur in both languages. In Russian the second only occurs if the second vowel is also stressed.

(30) 

наптопо /naʼutә/ ‘the following morning’

or if neither is stressed

(31) 

напчі́ть /nauʼtʃ,іt/ ‘to teach someone something’

whereas the first diphthong occurs widely with initial stress.

(32) a) май /mai/ ‘May’
    b) дайме /ʼdait,ә/ ‘give-IMPERATIVE PLURAL’
    c) гайка /ʼgaiкә/ ‘nut’

As can be seen from (32)c and indirectly from (32)a the occurrence of /i/ is not determined by a following palatal consonant following palatal consonant (as it is not with other diphthongs which end in a high front vowel) nor is the occurrence of the vowel sequence [au] dependent on a non-palatal consonant following it, cf. (31).

In Irish the situation is not as clear cut. To begin with one must distinguish between non-alternating and alternating lexical stems. With the former the diphthongs /ai/ and /au/ have become lexicalized through various vowel changes and vocalizations of voiced fricatives in the history of Irish. It is not possible to determine their occurrence from the flanking consonants. Thus /ai/ is found before non-palatals and /au/ before palatals in some cases (contrast this situation with that of /iә/ and /uә/).

(33) a) slaghdán /slaidә:n/ ‘cold, illness’
    b) cabhair /kaur,/ ‘help’

Furthermore, both occur in absolute initial position

(34) a) orlár /aulә:r/ ‘floor’
    b) éirigh /air,ә/ ‘to get up’

There are however a variety of alternating stems in Irish. These are monosyllables whose final consonant (with possible suffixation) changes its value for the feature [palatal] to indicate a certain grammatical category.

(35) a) бад /ba:d/ ‘boat-NOMINATIVE’
    b) байд /ba:d,/ ‘boat-GENITIVE’

All vowels of Irish can occur in such stems. Those with short vowels show some variation. For one thing there is a front-back alternation among short vowels.
(36) a) troid /trd/ ‘fight-NOMINATIVE’
b) troda /trədə/ ‘fight-GENITIVE’

For another diphthongs may occur in such alternations.

(37) a) obair /əbrər/ ‘work-NOMINATIVE’
b) oibre /əibrərə/ ‘work-GENITIVE’

In any set of alternations one diphthong or two may be found.

(38) a) poll /paul/ ‘hole-NOMINATIVE’
b) poill /pail/ ‘hole-GENITIVE’

It might seem obvious from the above forms that /au/ only occurs before non-palatal and /ai/ only before palatal consonants. But such a neat distribution is contradicted by further instances of diphthongization.

(39) a) ladhar /lair/ ‘fistful-NOMINATIVE’
b) ladhair /laिर/ ‘fistful-GENITIVE’
c) diabhal /dəul/ ‘devil-NOMINATIVE’
d) diabhail /dəul/ ‘devil-GENITIVE’

Here the appearance of diphthongs would seem to be independent of flanking consonants. But I chose to regard the diphthongs in (39) as lexicalized, something which is acceptable seeing their lack of alternations, but this also involves the lexicalization of other diphthongs (e.g. those in (38)) as well unless they can be derived by a productive process. However, this can now be shown to be the case.

To begin with certain aspects of the vowel system of Irish must be considered. Irish has three height levels for vowels; short (stressed) vowels can be classified according to these three levels: /i/ is high, /e/ and /a/ are mid and /a/ is low. Now the front back alternations of (36) involve the mid vowels /e/ and /a/. There would seem to be a tendency to distribute /e/ before palatals and /a/ before velars. In a few instances of words with mid vowels /e/ and /a/ are fond al alternative pronunciations depending on whether one regards an initial non-palatal or a final palatal consonant as decisive for vowel quality.

(40) goid /gəd/ ~ /gəd/ ‘steal’
    (de Bhaldraithe, 1945: 12)

Furthermore, there are words which have alternative pronunciations with a monophthong or a diphthong.

(41) droichead /dre:d/ ~ /draid/ ‘bridge’
    (de Bhaldraithe, 1945: 103)

This alternation can be seen to have its origin in a short mid vowel which on loss of /h/ after it was lengthened. A pronunciation with /h/ is found in the area immediately west of that area whose Irish us used as a basis here.
(42)  *droichead* /dʁe̞hɔd/  ‘bridge’

(de Bhaldráithe, 1945: 120)

From these examples it would appear that there is a correlation between the occurrence of short mid vowels and the consonants which follow them so that a distribution could be given as follows.

\[
\begin{align*}
/\varepsilon/ & \rightarrow /\varepsilon/ / C [-\text{pal}] \_ \_ \_ C [+\text{pal}] \\
/\Lambda / & \rightarrow /\Lambda / / C [-\text{pal}] \_ \_ \_ C [-\text{pal}] 
\end{align*}
\]

Added to this would be a rule of mid vowel diphthongization

\[
\begin{align*}
a) /\varepsilon / & \rightarrow /\text{ai}/ \\
b) /\Lambda / & \rightarrow /\text{au}/
\end{align*}
\]

which would have the same distribution as in (43).

\[
\begin{align*}
/\text{ai} / & \rightarrow /\text{ai}/ / C [-\text{pal}] \_ \_ \_ C [+\text{pal}] \\
/\text{au} / & \rightarrow /\text{au}/ / C [-\text{pal}] \_ \_ \_ C [-\text{pal}] 
\end{align*}
\]

This corresponds to the distribution for centering diphthongs and so the phonological analysis has won in generalization. With derived diphthongs in Irish the high vowel element (/i/) is contextually determined by the value which the following consonant has for the feature [palatal]. This is not true of lexicalized diphthongs however (see (33) and (39)) nor do the flanking consonants affect the initial vowel of a diphthong when the source of the diphthong was a long vowel. This can be seen where there is fluctuation in pronunciation with mid-vowel diphthongization applying to long front vowels although the consonant preceding them is palatal.

\[
(46) \quad \text{téigh} \quad /\text{t},\text{ai}/ \sim /\text{t},\text{e}/ \quad ‘\text{go}’
\]

Contextually determined mid-vowel diphthongization only applies to short vowels and only when the consonant preceding them is non-palatal. This is phonetically motivated: on diphthongization the onset assimilates to the non-palatal consonant before it by lowering to /a/ while the high off-glide agrees in frontness or backness with the consonantal segment which follows it. It is not possible to predict when diphthongization takes place (see the mixed paradigm in (37)) as diphthongization is spreading slowly by lexical diffusion in modern Western Irish but has not affected all possible inputs which meet its structural description.

References
