

Sonorant Cluster Variation in Russian

1. Introduction. Historical Russian phonology is replete with examples of sound changes viewed in terms of the "immutability of sound laws." If one and the same sound has diverse historical reflexes that cannot be explained on the basis of phonetic context or later phonological change, it is assumed that the "exceptions" are caused by external factors (e.g. morphological analogy, borrowing) that have skewed an otherwise straightforward development. The complex phonetic-phonological E > O change is a case in point. In most Russian dialects after the jer shift lax *e* and strong *ь*, but not tense *ѣ*, were identified as *o* in the environment under stress when not preceding a palatalized consonant. After the E > O change ceased to be operational *ѣ* merged with *e*. Thus Russian (OR) *медъ, пьсь, семь, днь, лѣсъ* > Russian (R) *мёд, пёс, семь, день, лес*. Unexpected reflexes are labelled as exceptions and ascribed to morphological analogy (e.g. R *берёзе, звёзды* instead of **берёзе, *звёзды* from OR *березѣ, звѣзды*)¹ or borrowing (e.g. R *нёбо* 'sky' from Russian Church Slavic instead of **нёбо*, cf. R *нёбо* 'palate').

The present study questions the basic strategy of automatically projecting reflex heterogeneity directly onto the phonological/analagical model. In some cases it may be more appropriate to assume the existence of phonetically regular **variation** utilized by the morphophonemic system in the form of distinct phonemic reflexes. One such example is the diverse development of consonant-sonorant clusters in the history of Russian, e.g. R *смугл, смугла; мог, могла; угол, угла*. After reviewing the historical reflexes and traditional interpretations of the sonorants in such clusters, I propose a model of phonetic variation for sonorant clusters during and after the jer shift and suggest ways in which the variation was exploited during the restructuring of the Russian morphological system.

2. Reflexes of sonorant clusters. Russian has various reflexes for sonorant-final consonant clusters in syllable-coda position.² In most instances, the original OR sonorant corresponds to a biphonemic sequence of **vowel + sonorant**, e.g. OR *углъ, земль* > R *угол, земля*. But there are a number of nominal and adjectival forms that preserve the original sonorant without

phonemic modification, e.g. OR *добръ, корабль* > R *добр, корабль*. In the past tense masc.sg. forms of unsuffixed stems in obstruents (except *t, d*) and *r*, the sonorant *l* is lost, e.g., OR perfect participles *несль, пекль* > R past tense forms *нѣс, пѣк*. With three possible reflexes of the same sonorant-final cluster – retention (sonorant alone), deletion (loss of sonorant), or modification (vowel + sonorant) – the question naturally arises as to the phonologically regular reflex. Which of the three is to be considered the result of regular phonological change and which are to be interpreted as the products of analogical interference?

Karl Meyer (1923) was the first to address this issue in a systematic way. Using forms with word-final clusters in *l*, the only ones that consistently display trichotomous variation, Meyer reasoned that phonemic modification (*l* > vowel + *l*) was phonologically motivated, while the retention or deletion of *l* could be explained as the product of morphological analogy. Meyer determined the phonologically regular reflexes of tautosyllabic sonorant clusters (253),³ and stated further that the phonological interpretation of phonemic modification in Russian was supported on typological grounds as well, since the corresponding modification is found in South Slavic also (251). As far as retention, paradigm support would tend to preserve rather than alter the stem-final sonorant, e.g., R *кругл* < OR *кругль* supported by R *кругла, кругло, круглы*. As for the deletion of *l* in the past tense forms, Meyer explains (256) that with the loss of weak jers, all masc.sg. forms of the source participle became one syllable shorter than the others. What is problematic about Meyer's analysis is that the reasons he gives for retention and deletion of the sonorant in the analogical cases are valid for all the forms involved. The presence of stem-final *l* in all the case forms of R *угол*, for example, should have served to preserve the sonorant intact, without the development of a vowel-sonorant sequence. As for syllable counting, the short-form masculine singular adjectives also became one syllable shorter with the fall of the jers, and yet we do not find the deletion of the sonorant corresponding to that of the masc.sg. past tense.

Nearly fifty years later Alexander Isačenko (1970) reexamined the Russian data concerning the jer shift and came to the conclusion that none of the three variants of tautosyllabic sonorant clusters was the product of regular phonological development. He discounted the traditional view that sonorant modification (sonorant > vowel + sonorant) was motivated by an attempt to avoid the syllabic sonorants that obtained following the loss of

weak jers: "If syllabic sonorants are 'not characteristic of Russian' [a reference to the analysis of Borkovskij and Kuznecov (1963) - MSF], then why did they develop in the first place?" (79). Indeed, Isačenko counters the phonetic explanation of vowel insertion by completely disassociating the development of sonorant clusters from the loss of a succeeding weak jer.

No matter what explanations are proposed for the appearance of non-etymological jers in the given environment, all authors link the jer insertion with the dropping of a final "weak" jer in the next syllable. Jer insertion is said to have taken place in the nom.acc.sing. of /uglʲ/ > /uglʲ'/. But forms with inserted jers appear not only in these specific case/number forms, but also in derivations, cf. R *уголѣк*, *угольный*. In neither of the forms the conditions for the development of "syllabic sonorants" seem to have been given (cf. */ugl-ькѣ/, */ugl-ьн-/). The phonetic interpretation of the jer insertion has to be dismissed as inadequate and has to be replaced by a morphophonemic interpretation: secondary jers were inserted not in certain forms of a word, but in STEMS ending in "obstruent + sonorant" (79).

Isačenko's statements raise a number of issues that need to be addressed. From historical and contemporary data we know that tautosyllabic OR sonorant-final clusters tended to be eliminated after the jer shift, most commonly by means of an inserted vowel. Isačenko rejects the hypothesis that an anaptyctic vowel developed before the sonorant for phonetic reasons, to avoid the pronunciation of a syllabic sonorant. We shall discuss the phonetic aspects of sonorant cluster development below. For now, we simply note that the phonetic explanation of vowel insertion is motivated by the loss of weak jers and the apparent existence of phonetic constraints on the manifestation of syllabic sonorants. If such an explanation is cast aside in favor of a morphophonemic one, then the latter must be motivated. This Isačenko fails to do. In his view vowel insertion in sonorant clusters has nothing to do with the loss of weak jers. But he offers no explanation as to why the morphophonemic rules of Russian are suddenly (and coincidentally around the 13th century) supplemented with vowel insertion rules? And if such morphophonemic insertion rules are valid, why are they said to intercalate jers in stem-final obstruent clusters *after* the period that jers have ceased to be phonemes? Isačenko has apparently not consistently distinguished three aspects of the development under discussion, the phonetic, the phonemic, and the morphophonemic.

A more plausible explanation looks to the phonetic development of Russian for the impetus to interpolate vowels or, better, vocalic phases, in the relevant clusters during and after the fall of the jers. These phonetically manifested vocalic phases were susceptible of reinterpretation as vocalic phonemes participating in the already established pattern of vowel-zero alternations. The phonemic reinterpretation was accompanied by the establishment of morphophonemic constraints on stems, such that all stems ending in sonorant clusters were specified as having a vowel-zero alternation governed by the same constraints as inherited ones. One such constraint, discovered by Dean Worth (1967) and utilized by Isačenko in his study, is the elimination of all but the last (right-most) vowel-zero alternation in derivations by stabilizing the vowel. Thus the OR stem {ugl'} > MiR {ug#l'}, but in derived stems with suffixes containing vowel-zero alternations, the stem vowel-zero alternation is stabilized as o, thus {ug#l'-'#k} > {ugol'-'#k}, {ug#l'-'#n} > {ugol'-'#n}. Isačenko's morphophonemic analysis can be viewed not as a substitute for the phonetic one, but as an appropriate and necessary supplement to it, one that accounts for later reflexes that lack phonetic motivation but are instead the products of morphological manipulation. In support of the three-stage approach to the development of tautosyllabic sonorant clusters - phonetic, phonemic, morphophonemic - I will discuss in greater detail the decidedly phonetic nature of the processes involved in the manifestation of these clusters during and after the loss of the weak jers.

3. Phonetic manifestation of sonorant clusters. The gradual loss of weak jers in Russian territory in the 12th and beginning of the 13th century⁴ resulted in a number of phonetic sequences that had not been possible before the jer shift, among them, syllable codas consisting of two or more consonants, e.g. OR {volost-ɤ}, {zvězd-ɤ}, {rošč-ɤ} > MiR {volost'-∅}, {zvězd-∅}, {rošč-∅}. In sonorant-final codas Middle Russian phonology was obliged to respond to the inherently greater sonority of the sonorant vis-à-vis the preceding obstruent, since all sonorants bear the vowel-like feature of spontaneous voicing. Such sonority, manifested acoustically either in a more sharply defined formant structure or the introduction of additional formants (Jakobson and Halle 1956/1962, 484-85), permitted the interpretation of the sonorant as a syllable crest and the assignment of syllabicity by the phonological component. Such assignment implies the determination of the slope and crest of the syllable, and in the latter, the peak or syllabic phoneme.

A binary choice is implicit in the analysis of sonorant-final codas by speakers of Middle Russian as [$\pm$ syllabic] and constitutes the basis for variation. If the sonorant is not recognized as syllabic, the phonological component will treat it in accordance with the phonotactics of syllable-coda consonant clusters. For sonorants, this implies a gradual process of obstruentization, whereby the very features that distinguish sonorants from obstruents are attenuated, namely, intensity (concentration of energy) and spontaneous voicing. Over time, the degree of intensity and voicing of the sonorant can diminish to such a degree that cluster simplification results in the failure of the sonorant to be manifested. The substandard and dialectal forms *рунь* and *жысть* or *жысь* (R *рубль*, *жизнь*) testify to the congruent processes of obstruentization and apocope in clusters with nonsyllabic syllable-coda sonorants. In the case of *рунь* we can postulate the following development (fig. 1), in which the vertically ordered phonetic representations demonstrate increasing obstruentization and at degree (6), phonetic loss of the sonorant.

		[b]	[l']
OR /rubl'ъ/ > MiR /rubl'/	[rúb1']	(1) [+3 vcd]	[+3 vcd]
	[rúb1']	(2) [+3 vcd]	[+2 vcd]
	[rúb1']	(3) [+2 vcd]	[+1 vcd]
	[rúb1']	(4) [+1 vcd]	[0 vcd]
	[rúp1']	(5) [0 vcd]	[0 vcd]
	/rub'1'/	[rúp']	(6) [0 vcd]

Fig.1. Range of obstruentization of nonsyllabic syllable-coda sonorant in a cluster

The variation of obstruentization shown in the chart is simplified for presentation. Loss of intensity (indicated by raised and reduced sonorants) may be viewed as being in parallel with the loss of voicing (indicated by a subscript ^), both highly schematized here. In point of fact, varying degrees of devoicing can be charted within a single segment, with the latter portion displaying a higher degree of devoicing than the initial portion. The voicing assimilation of preceding consonants can also vary by degree, either equivalent to or less than the degree of the following consonant (Paufošima 1969, 151, 173; Reformatskij 1975, 129-33). The pronunciation with [p'] alone is ultimately a consequence of phonetic variation (obstruentization and loss of [l']) and phonemic reanalysis of *b* as *b'* (see below).

It is possible to view such variation in both synchronic and diachronic perspective. One and the same speaker may exhibit varying degrees of obstruentization of the sonorant depending on broader phonetic environment, sentence stress, tempo of speech, etc. But variation in degree of obstruentization may also be seen across time, e.g., degrees (5) and (6) may be more characteristic of a younger generation as compared to degrees (4) and (5) of an older generation. The higher the degree of obstruentization, the greater the likelihood of phonetic loss of the sonorant. Once the underlying sonorant is capable of being lost phonetically as a product of variation, it is subject to being reinterpreted as the $\{\emptyset\}$ allomorph of a particular suffix, e.g. R *нѣс* vs. *несла* or of being lost from the stem as a whole, e.g. R dial. *воп*, *вопа* or *вопъ*, *вопя*; *журав*, *журава* (see SRNG, s.vv.; Živov 1971, 74), cf. R *воплъ*, *вопля*; *журавль*, *журавля*. In Russian the reinterpretation of the sonorant as $\{\emptyset\}$ was limited to the one morphological environment in which the sonorant alone functioned as an inflectional suffix, that of the past tense (from OR perfect suffix $\{l\}$, Isačenko 1970, 87-88). Thus MiR $\{n'os-l-\emptyset\}$, eventually realized as $[n'ósɪ]$ ~ $[n'ós]$, was reinterpreted morphophonemically without the sonorant as $\{n'os-\emptyset-\emptyset\}$, the $\{\emptyset\}$ now distinguishing the unmarked masc.sg. desinence $\{\emptyset-\emptyset\}$ from the marked fem. and neut.sg. desinences $\{l-a\}$ and $\{l-o\}$ and the marked plural desinence $\{l-i\}$, e.g. R *нѣс*, *несла*, *несло*. *несли*.⁵ Other instances of nonsyllabic syllable-coda sonorants were preserved in underlying stems, but remain subject to varying degrees of obstruentization and even apocope when realized through phonetic variation rules, e.g. R *смысл* $[smýsl]$ ~ $[smýs]$; cf. modern forms like R *реатр* $[t'iátɪ]$ ~ $[t'iát]$, *цифр* $[cýfɪ]$ ~ $[cýf]$, *мотор* $[mɔtɔcyk]$ ~ $[mɔtacyk]$. Such apocope is simply part of a more widespread tendency to simplify consonant clusters in syllable-coda position, especially when word-final (Zemskaja 1973, 107ff, 114; 1987, 199).

If the sonorant was treated as syllabic, the phonological component presented further possibilities for variation in accordance with the distribution of peak energy. In the simplest case, syllabicity was concentrated in the sonorant and the cluster was realized with a syllabic sonorant, thus, OR $\{uglɔ\}$ > MiR $\{ugl\}$ $[úgl]$. While such a realization was and still is possible (cf. R $\{vop'l-\emptyset\}$ as $[vóp'l']$, $\{centr-\emptyset\}$ as $[céntɹ]$, Zemskaja 1973, 114), later reflexes point to a propensity towards segmental diphthongization of the syllabic sonorant (Andersen 1972, 33). According to Andersen's principle of peak attenuation, the primary sonority feature $[\pm\text{consonantal}]$ is distributed over the segment in the order unmarked/marked, so that the

onset of consonantal properties within the segment is delayed. Thus the initial portion of the segment develops vowel-like qualities in contrast to the consonantal qualities of the final portion. Symbolically the segmental diphthongization of a syllabic sonorant can be represented within brackets as an anaptyctic centralized vowel followed by the sonorant. Thus MiR {ugl-Ø} [úg^əl̩]. If the initial, vocalic portion of the segmental diphthong comes to be identified with a specific vowel phoneme, then phonemic (sequential) diphthongization takes place and a new sequence of phonemes obtains - vowel + sonorant - thus MiR {ugl-Ø} [úg^əl̩] > {ugol-Ø} [úgol].⁶ Sequential diphthongization in these cases not only had the effect of altering the stem of the particular word-form with the addition of a vowel, but resulted in changing the underlying base stem through the introduction of a vowel-zero alternation: MiR {ugl} > {ug#l}. Seen in this perspective, Isačenko's emphasis on a morphophonemic stem reanalysis completely independent of phonetic adjustment occasioned by the jer shift reflects his predilection to concentrate on the net result of a complex phonetic-phonemic-morphophonemic process. The morphophonemic restructuring of certain stems through the introduction of vowel-zero alternations was dependent on the possibility of syllabicity being assigned to sonorants in syllable-coda position during and after the jer shift. Likewise the morphophonemic restructuring of the past tense suffix to include the allomorph {Ø} alongside {l} and {l'} was dependent on the possibility of syllable-coda sonorants in clusters not being assigned syllabicity during and after the jer shift.

Textual evidence from the 13th century on testifies to the reality of phonetic variation - sonorant syllabicity vs. nonsyllabicity - in the immediate post-jer period. Sobolevskij (1907, 113-14) and Šaxmatov (1915, 230ff) cite forms reflecting overtly the fundamentally binary treatment of cluster-final sonorants in syllable codas, as syllabic (e.g. MiR *моголъ*, *потополъ*, *рекълъ*, *веперь*, *земель*, *вѣдоръ*, *хороборъ*, *круголъ*) or nonsyllabic (e.g. MiR *сѣъ прославъ*, *на перетславъ*, *понесъ*, *развѣргъ*, *рекъ*). Written forms with vowel + sonorant only indicate cluster syllabicity: they are unspecific as to phonological status (syllabic sonorant, segmental diphthong, sequential diphthong). Those without a written final sonorant indicate nonsyllabicity of the cluster, but do not reveal whether the sonorant has been lost at the morphological level. Forms lacking sonorant modification or elimination continue traditional spelling and indicate nothing about syllabicity.

These data suggest that after the jer shift, the sonorants in the clusters cited were capable of being manifested variously along a scale of syllabicity from completely syllabic, with or without diphthongization, to nonsyllabic, with lowered intensity and increasing devoicing. Eventual morphophonemic innovation through deletion ($\{l\} > \{\emptyset\}$ in the masc.sg. past tense suffix) or modification (**sonorant** > **vowel** + **sonorant**) eliminated variation in a wide range of forms. But in those cases in which normative and stylistic prescriptions demand retention of the sonorant alone (see Isačenko 1970, 82ff), phonetic variation in the realization of the sonorant is typical (Panov 1969, 172-77; Reformatskij 1971; Zemskaja 1973; 114-15, Svetožarova 1988, 45-47, 54-55). High-register "Slavonian" forms like *жизнь*, *мысль*, *игра* (gen.pl. of *игра*), *игл* (gen.pl. of *игла*) can be realized with varying degrees of syllabicity or obstruentization in Modern Russian, thus $[ig]$ ~ $[ig^{\partial}]$ ~ $[igə]$ ~ $[ig]$ ~ $[ig^{\partial}]$ ~ $[ik]$ ~ $[ik]$. The specific proscriptions against pronunciations with anaptyctic vowels (e.g. Gorbačevič 1973, 162) demonstrate the vitality of this phonetic variation.⁷

It is appropriate at this point to mention that the morphophonemic utilization of phonetic variation outlined above is not an isolated phenomenon in the history of East Slavic. In Flier 1983a I proposed that variation in the realization of syllable-coda *l* - $[l]$ ~ $[ɫ]$ ~ $[w]$ - was utilized by the morphophonemic systems of Ukrainian and Belorussian in a fashion analogous to the Russian. In the masc.sg. past-tense forms of vocalic stems, the word-final $[w]$ was reinterpreted as *v* instead of *l*. With this reanalysis the masc.sg. allomorph of the past-tense suffix of vocalic stems became distinguished from the other singular and plural allomorphs in $\{l\}$, a relationship that has a direct parallel in the past tense of consonantal stems, thus Ukr. $\{da-v-\emptyset\} : \{da-l-a\}, \{da-l-o\}, \{da-l-y\} = \{nis-\emptyset-\emptyset\} : \{nes-l-a\}, \{nes-l-o\}, \{nes-l-y\}$. The history of the pronominal-adjectival desinence $\{ogo\}$ in Russian provides another case in point (Flier 1983b). The progressive lenition of $[g]$ to $[ɣ]$ in Central and North Russian dialects produced a number of variants, the most advanced of which (complete lenition) were found in uniform intervocalic environments. It was precisely in the desinence $\{ogo\}$ that the partially or fully lenited variant $[ɣ]$ was especially susceptible to reinterpretation as $[w]$ from *v*, because, unlike *g*, *v* was functionally linked to the fricatives *j*, *x* and *s* in the expression of the genitive, cf. adjectival desinences $\{oj\}, \{ix\}$; pronominal desinences $\{oj\}, \{ex\}, \{as\}$; nominal desinences $\{ov\}, \{ej\}$. Other cases of intervocalic *g* were not reidentified, because of categorial constraints on morphophonemic alternation.

4. Phonetic and phonemic consequences of sonorant diphthongization. The reanalysis of a segmental sonorant diphthong with vocalic and consonantal phases into a sequential diphthong of vowel + sonorant raises a number of issues that have been inadequately treated in the existing literature. Since it is apparently not a jer that is inserted between consonant and sonorant (Isačenko), but rather the vocalic phase of a segmental diphthong that is reinterpreted as a full vowel, why is the consonant preceding that vowel sometimes sharpened and sometimes not? Why do we see *угол* and *резов*, but *узел* and *восемь*? Šaxmatov (1915, 232) recognized the question, but was unable to provide an answer.

Мне неясно, чем именно вызывается колебание *ег* и *ог* в указанных выше случаях, как *хоробор* при *хоробер*, *добор* и *добёр*, *вѣтер* и *вітор*, *вѣдор* и наше *вѣдер*; не находя *е* после заднебных, думаю, что фонетически *г* переходило в *ог* только после них; после других согласных фонетически оно изменялось, вероятно, в *ег*, а *ог* являлось под влиянием той или иной аналогии. Напротив, *ѣ* всегда переходило в *оѣ*, а *еѣ*, напр. в *узел*, *вѣсел*, объясняется аналогией.

Šaxmatov's difficulty appears to stem from his interpretation of orthographic variants like *хоробор*, *хоробер*. Taken at face value, the texts seem to show two reflexes, {xorobor-Ø} and {xorob'ler-Ø} or {xorob'or-Ø}. Isačenko (1970, 75-76) noted that medieval Cyrillic orthography had no traditional means of rendering the new phonemic sequences of paired sharpened consonant + *o* without doing violence to the spelling pattern. Although the phonemic composition of 'honey' was /m'od/, there existed no traditional way of indicating /o/ as such: neither *модъ* nor *медъ* was sufficient, since the former obscured the sharpness of the consonant, and the latter the flatness (rounding) of the vowel. Spellings like *хоробор*, *хоробер* may simply reflect the scribe's dilemma in trying to render overtly one or the other phonemic feature. Both variants might represent a single underlying string of phonemes, in this case /xorob'or/. It is also possible, however, that there was dialect variation in the interpretation of the preceding consonant as sharpened or nonsharpened.⁸ Nonetheless the tonality of the consonant preceding the vowel + sonorant sequence remains to be addressed.

Analogy was invoked by Sobolevskij (1907, 54) as well as Šaxmatov to explain the tonality of the vowel and preceding consonant in the sequences

under study. Thus in the stem {těsn}, Sobolevskij posits the introduction of *ɛ* rather than *ɪ* by analogy to the stem of an adjective like {béd-ɛn} with an etymological front jer, apparently with a concomitant reinterpretation of stem-final *ɛn* as a suffix, thus {tēs-ɛn}. But it is not at all clear what the analogical sources would be for the putative front jer in adjectival stems like dialectal {dob'#r} and {xorob'#r}. Isačenko (1970, 79) assumes the morphophonemic insertion of jers into stems ending in sonorant-final clusters and provides the following distribution without further comment:

Inserted jer → {ɪ} after velars or before {v}
 → {ɛ} otherwise

With the jer shift, labials and dentals became distinctively sharpened before the reflexes of front jer, and thus OR stems {bobr}, {větr} > {bobɪr}, {věɪtr} > MiR {bob'#r}, {vět'#r}. Isačenko never discusses the significance of the conditioning environments for the "inserted jers": after velars or before *v* vs. elsewhere. This rather straightforward and consistent distribution deserves closer scrutiny, especially in light of the proposal above to view the initial stages of the development of sonorant clusters in phonetic terms.

During the period of the jer shift, a major change in the distribution of tonality was under way. The Russian system, in which the distinctive grave/nongrave tonality of vowels determined the subphonemic nonsharpened/sharpened tonality of preceding noncompact consonants, was receding before one with opposite determination, one in which distinctive consonantal tonality determined subphonemic vowel tonality. Since the loss of weak jers and the intensification of strong ones did not proceed at the same rate in all environments, the perception of tonality determination was by no means unambiguous. It is during this period of transition that syllabicity assigned to sonorant clusters in syllable-coda position could lead to segmental and ultimately sequential diphthongization with different results, crucially dependent on the nature of the sonorant and the consonant preceding it.

The sonorants themselves may be subdivided according to primary tonality and secondary tonality as follows:

Primary tonality		Secondary tonality	
Low /+grv/	High /-grv/	Low /-shp/ [+flt]	High /+shp/ [-flt]
m v	n l r	C ^e	C ⁱ

Fig. 2. Distribution of consonantal tonality.

During a period sensitive to consonantal and vocalic tonality it is reasonable to assume that with segmental diphthongization the vocalic portion of the sonorant diphthong would be colored by the tonality of the base sonorant. But with the emerging status of sharpening as a phonemic feature for noncompact consonants during the jer shift, secondary high tonality seems to have had an even greater impact on the coloring of the vocalic portion than primary tonality. With four sonorant combinations possible ($/\pm\text{shp}, \pm\text{grv}/$), we might expect a range of tonality for the derived vocalic portion from low to high as follows:

	Vocalic Phase		Consonantal phase	
LOW ↑ ↓ HIGH	1.	[ə] [+flt,+grv]	[m]	[-shp,+grv]
			[v]	
	2.	[ê] [+flt,-grv]	[n]	[-shp,-grv]
			[l]	
			[r]	
	3.	[ë] [-flt,+grv]	[m']	[+shp,+grv]
			[v']	
	4.	[ë] [-flt,-grv]	[n']	[+shp,-grv]
			[l']	
			[r']	

Fig. 3. Tonality range in vocalic portion of segmental sonorant diphthongs.

Other things being equal, we might expect the vocalic portion of the segmental diphthongs to bear the tonality range from low to high shown in the chart above. The ordering is based on the valuation of the feature $[\pm\text{flt}]$ (flat), since the jer shift resulted in a reranking of flatness above gravity in the Middle Russian vocalic system, the former assuming phonemic status and the latter becoming subphonemic. The top and bottom ends of the scale represent maximum and minimum low tonality, respectively: $[\text{+flt}, \text{+grv}]$ and $[-\text{flt}, -\text{grv}]$.

In the environment after labials (P) and dentals (T), the increasing emergence of the vocalic portion of segmental sonorant diphthongs presented phonetic sequences capable of different analyses on the part of speakers. In the period of the jer shift, both labials and dentals had sharpened and nonsharpened variants distributed complementarily, the former before nongrave vowels, the latter elsewhere. Although the evidence is scarce, the low tonality inherent in the $[\text{+grv}, \text{+flt}]$ vocalic portions of contextually syllabic *m*, *v* favored the ultimate reinterpretation of the sequence as nonsharpened P or T + *om* or *ov*, respectively. The now obsolete masc.sg. short form *pesov* represents such a reanalysis, as do the textual citations of nouns with suffix $\{tv\}$ given by Isačenko (1970, 86), e.g. gen.pl *молитовъ* (1284); derivatives *бриговщикъ* 'barber', *бриговня* 'barber-shop' from Nordstet 1780. There are no native forms with P or T + nonsharpened *m*, but cf. Russian *пасмо/пасм* and Ukrainian *пасмо/пасом*.

In the case of contextually syllabic *n*, *l*, *r*, the slightly fronted $[-\text{grv}]$ and rounded $[\text{+flt}]$ vocalic portion of the segmental diphthong must have had an effect on the preceding P or T, such that the final phase of their acoustic realization was adjusted to the following higher tonality (indicated by a raised $\cdot$). In the case of a phonemic diphthongization, the higher tonality of the vowel may be perceived as an onglide to a preceding high tonality consonant, rather than a consonantal adjustment to the following vowel. In such a case a resegmentation occurs, whereby the P or T is reanalyzed as P' or T' and the flat vocalic portion of the diphthong as *o*, thus OR $\{\text{bobr-}\cdot\} > \text{MiR } \{\text{bobr-}\emptyset\}$ $[\text{b}^{\circ}\text{b}^{\circ}\text{r}^{\circ}] > \{\text{bob'or-}\emptyset\}$ $[\text{bob}'\text{or}]$, and OR $\{\text{větr-}\cdot\} > \text{MiR } \{\text{větr-}\emptyset\}$ $[\text{v}'\text{é}t^{\circ}\text{r}^{\circ}] > \{\text{vét'or-}\emptyset\}$ $[\text{vét}'\text{or}]$. A bifurcating analysis is possible here since the vocalic portion of the diphthong bears a level of tonality intermediate between the extremes of low (from *m*, *v*) and high (from C'), so that in the phonemic diphthongization, the vowel is identified as *o* and the preceding P or T as nonsharpened P or T. This alternative analysis is comparatively rare on Russian territory, but

possible, cf. Russ. dial. *узол, ветор* vs. R *узел, ветер* and the doublets cited by Šaxmatov noted above, e.g. *хоробор/хоробер*.

The relatively high tonality of the vocalic portion of sharpened syllabic sonorants (all [-flt]) must have occasioned an even higher level of readjustment of the preceding P or T than described above, since phonemic diphthongization regularly resulted in a reidentification of P, T as P', T' followed by e + C'. OR gen.pl. {kapl'-ь} > MiR {kapl'-Ø} [káp'ᵉ] > {kap'el'-Ø} [káp'el'], and OR {osm'-ь} > MiR {osm'-Ø} [uós'ᵉm] > {os'em'-Ø} [uós'em'], cf. Russ. dial. *рубель, жизнь*.

In the environment after velar consonants (K), the vocalic portion of the segmental diphthong was constrained as regards the implementation of inherent high tonality. Velars in principle did not occur before nongrave vowels,⁹ and therefore the established pattern of sharpened and nonsharpened allophones determined by following context as in the case of P and T was not firmly established. A relatively high tonality vocalic portion of the segmental diphthong could not be interpreted as an onglide to a preceding sharpened velar, since sharpened velars were not phonemic. Instead it is likely that the vocalic portion was itself adjusted to [+flt, +grv] to conform to the phonotactics of nonsharpened velars. Phonemic diphthongization resulted in the sequence K + o + sonorant, thus OR nom.sg. {vixr'-ь} > MiR {v'ixr'-Ø} [v'ixᵉr] > {v'ixor'-Ø} [v'ixór], and OR nom.sg. {ugr'-ь} > MiR {ugr'-Ø} [úgrᵉr] > {ugor'-Ø} [úgor'], cf. substandard Russ. *игол, игор*.

The effect of sonorant tonality on the reflexes of the syllabic sonorants that emerged with the jer shift is apparently valid for the Middle Russian period only. Once the distinctive feature /±shp/ is firmly established in the consonantal system of Russian, it alone determines the quality of the vocalic portion of segmental sonorant diphthongs. In colloquial Russian, nonsharpened sonorants imply [+grave] anaptyxis (symbolized here as [ᵉ]) and sharpened sonorants [-grave] anaptyxis (symbolized here as [ᵉ̃], at least after P and T. Thus the consonants before syllabic r in *добр, театр* are pronounced as nonsharpened: [dóbᵉr], [t'ieátᵉr], cf. Russ. dial. *добѣр*. The z before the syllabic manifestation of n' in *жизнь* is pronounced as sharpened: [žýz'ᵉñ], cf. Avanesov 1972, 373, n.31. Velars tend to be pronounced as nonsharpened, regardless of the sharpening of the syllabic sonorant, e.g., *тигр, вихрь* are pronounced [t'igᵉr], [v'ixᵉr]. But note the derivative *кегельный* from *кегли*.

5. Conclusion. The purpose of the present study has been twofold: 1) to show that the variety of Russian reflexes of consonant-sonorant clusters in syllable-coda environments involves morphophonemic exploitation of original phonetic variation (syllabic vs. nonsyllabic realization) during and after the jer shift, and 2) to suggest that the tonality (especially the secondary tonality) of the syllabic sonorant played a crucial role in the analysis underlying its phonemic diphthongization. In advancing this view, I depart both from the traditional interpretation (one reflex is phonological, the others are analogical), and its revisionist congener (the reflexes are solely morphophonemic).

The analysis here has focussed on a source of variation - binary choice (syllabic vs. nonsyllabic) - that has provided the morphological system with a vehicle for clarifying the form-function relationship. At the same time, the discussion has documented another instance in the history of East Slavic in which morphology has interacted with and influenced the course of phonetic and phonemic change.

Notes

Phonetic transcriptions are given in square brackets []; phonemic transcriptions, in slashes / / or in italics; morphological transcriptions, in braces { }; and orthographic representations, in Cyrillic.

- ¹ The source of the analogy in the traditional explanations may be intraparadigmatic (e.g. singular forms *берёза*, *берёзы*) or interparadigmatic (e.g. singular vs. plural, *женá/жённы*).
- ² Although the analysis here is restricted to consonant-sonorant clusters in syllable-coda position, sonorant-consonant clusters found in forms like *R рта, мха, льна* exhibit analogous phonetic developments and are susceptible of a similar interpretation.
- ³ Meyer states that after the jer shift, word-final clusters of velar + *l, r, n* or *s + k* intercalated a phonetically regular reduced vowel [ɤ] (*lautgesetzlich ein [ɤ] eingeschoben wird*) from which the vowel *o* developed, while the reduced vowel [ɤ], eventually to become *e*, was intercalated in the clusters dental [stop] + *r, n, m*; labial + *l*; and *s + l, m, n*.

- 4 Zaliznjak's detailed study of the Novgorod birchbark letters provides concrete evidence that the process in the northwestern dialects was well under way by the middle of the 12th century and was largely completed by the beginning of the 13th (1984, 45-51).
- 5 This analysis assumes the loss of gender distinctions in the plural during the 12th-13th centuries. Apparently an analogous morphologization of {Ø} from a derivational suffix was precluded, e.g. {1} in the adjectival stem {krug-1}, thus *круга*, *кругла* and not **круг*, *кругла*.
- 6 Once the vowel [ə] is assigned to a specific vowel phoneme, in this case *o*, the appropriate contextual manifestation of that phoneme is introduced by phonological rule. Depending on the dialect, the unstressed midvowel is subject to varying degrees of reduction, e.g. R [úgal].
- 7 Stems with vowel-zero alternations adjudged as normative in the past have been subject to later proscription, replaced by stems without such alternation. Dopolčev (1909, 238), for example, specifically proscribes *pъзъзъ* in favor of normative *pъзозъ*, while Gorbačevič (1973, 386) marks *pъзъ* as normative and *pъзозъ* as obsolete.
- 8 The scattered dialects that did not experience consistent results in the general E > O change would require a different interpretation, but only in the underlying vowel, not in the sharpness of the preceding consonant.
- 9 The few exceptions are lexical (borrowings like *евангелие*, *китъ*) and morphological (the levelling or original nonassibilation of stem-final velars across morpheme boundaries from *ě*, e.g. *рукъ* instead of expected *руцъ*).

References

- Andersen, H.: 1972, 'Diphthongization', *Language* 48, 11-50.
- Andersen, H.: 1974, 'Towards a typology of change: Bifurcating changes and binary relations', *Historical linguistics*, Proceedings of the First International Conference on Historical Linguistics, vol. 2, J.M. Anderson and C. Jones (eds.), Amsterdam, 17-60.

- Avanesov, R.I.: 1972, *Russkoe literaturnoe proiznošenie*, 5th ed., rev. and exp., Moscow.
- Borkovskij, V.I. and Kuznecov, P.S.: 1963, *Istoričeskaja grammatika russkogo jazyka*, Moscow.
- Dopolčev, V.: 1909, *Opyt slovarja nepravil'nostej v russkoj razgovornoj reči*, 2nd ed., rev. and exp., Warsaw.
- Flier, M.S.: 1983a, 'The alternation *l ~ v* in East Slavic', *American contributions to the Ninth International Congress of Slavists*, Kiev, September, 1983. Vol. 1: *Linguistics*, Michael S. Flier (ed.), Columbus, Ohio, 99-118.
- Flier, M.S.: 1983b, 'The origin of the desinence -ovo in Russian', *From Los Angeles to Kiev*, Vladimir Markov and Dean S. Worth (eds.), Columbus, Ohio, 85-104.
- Gorbačevič, K.S. (ed.): 1973, *Trudnosti slovoupotreblenija i varianty norm russkogo literaturnogo jazyka. Slovar'-spravočnik*, Leningrad.
- Isačenko, A.V.: 1970, 'East Slavic morphophonemics and the treatment of the jers in Russian: A revision of Havlík's Law', *International Journal of Slavic Linguistics and Poetics* 13, 73-124.
- Jakobson, R. and Halle, M.: 1956/1962, *Phonology and phonetics*. Reprinted in: Roman Jakobson, *Selected writings*, vol. 1, *Phonological studies*, The Hague, 464-504.
- Meyer, K.H.: 1923, 'Zur Entstehung der sekundären Halbvokale im Ostslavischen', *Archiv für slavische Philologie* 36, 250-57.
- Nordstet, I.: 1780, *Rossijskij s nemeckim i francuzskim perevodom slovar'*. Pt. 1: A-N, St. Petersburg.
- Panov, M.V.: 1967, *Russkaja fonetika*, Moscow.
- Paufošima, R.F.: 1969, 'Nekotorye voprosy, svjazannye s kategoriej gluchosti-zvonkosti soglasnych v govorach russkogo jazyka', *Ėksperimental'no-fonetičeskoe izučenie russkich govorov*, S.S. Vysotskij (ed.), Moscow, 138-215.

- Reformatskij, A.A.: 1971, 'Slogovye soglasnye v russkom jazyke', *Razvitie fonetiki sovremennogo russkogo jazyka. Fonologičeskie podsistemy*, S.S. Vysotskij et al. (eds.), Moscow, 200-208.
- Reformatskij, A.A.: 1975, *Fonologičeskie étjudy*, Moscow.
- Shevelov, G.Y.: 1965, *A prehistory of Slavic: The historical phonology of Common Slavic*, New York.
- SRNG = *Slovar' russkich narodnych govorov*, F.P. Filin et al. (eds.), Moscow-Leningrad. 1965- .
- Sobolevskij, A.I.: 1907, *Lekcii po istorii russkogo jazyka*, 4th ed., Moscow.
- Svetozarova, N.D.: 1988, *Fonetika spontannoju reči*, Leningrad.
- Šaxmatov, A.A.: 1915, *Očerok drevnejšego perioda istorii russkogo jazyka* (Ėnciklopedija slavjanskoj filologii, 11.1), Petrograd.
- Worth, D.S.: 1967, 'On cyclical rules in derivational morphophonemics', *Phonologie der Gegenwart, Wiener slavistische Jahrbuch* 4, 173-185.
- Zaliznjak, A.A.: 1984, 'Nabljudenija nad berestjanyimi gramotami', *Istorija russkogo jazyka v drevnejšij period*, K.V. Gorškova (ed.), *Voprosy russkogo jazykoznanija* 5, Moscow, 36-153.
- Zemskaja, E.A. (ed.): 1973, *Russkaja razgovornaja reč'*, Moscow.
- Zemskaja, E.A.: 1987, *Russkaja razgovornaja reč'*. *Lingvističeskij analiz i problemy obučenija*, 2nd ed., rev. and exp. Moscow.
- Živov, V.M.: 1971, 'Tipologija sočetanij soglasnyh v russkich govorach', *Voprosy jazykoznanija*, no. 2, 69-82.