

THE NATURE OF THE SO-CALLED NON-SYLLABIC VOWELS IN THE UKRAINIAN LANGUAGE

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The report, based on the data of the experimental phonetic analysis /X-ray cinematography and spectrography/ is devised to prove that the so-called non-syllabic vowels in the Ukrainian language /w/, /j/ are acoustically, articulatory and functionally different from the vowels /u/, /i/. It is suggested that /u/, /i/ are typical representatives of the sonants /w/, /j/, and that the terms non-syllabic vowels, or half-vowels are unsatisfactory and do not describe the true nature of the sounds.

One of the characteristic features of the system of sounds in the Ukrainian language is further vocalization of the maximally voiced sonants /w/, /j/ and their change into half-vowels or so-called non-syllabic /u/, /i/. On the other hand, the unstressed vowels /u/, /i/ are weakened in some positions and also change into non-syllabic /u/, /i/. Thus we may say that the non-syllabic vowels /u/, /i/ create a link between vowels and consonants.

The existence of the sounds /w/, /j/ in Ukrainian is well-known, attempts were made to study their origin and functioning as well as their acoustic and articulatory nature /A.A.Potebnya, P.G.Zhitetsky, N.F.Nakonetchny, I.P.Suntsova, P.P.Kostruba, M.A.Zhovtobruk, V.S.Perebynos and others/. However the phonetic nature of these sounds has not been duly investigated and it is still to be proved whether they are vowels or consonants and whether it is necessary to establish a separate type of sounds - "half-vowels" or "non-syllabic vowels".

The aim of this report is to present comprehensive analysis of the acoustic and articulatory nature of the sounds /w/, /j/ in modern Ukrainian as revealed in their functioning.

The data for investigation were obtained by means of spectrography, X-ray cinematography and auditory observation.

Phoneticians agree that the sounds /w/, /j/ occur in the following positions: in the beginning of a word preceding a consonant or a group of consonants /udowa/, /uporu/, /uprawa/, /ulas/, /idu/ /imu/ in the end of a word or syllable after a vowel as a result of vocalization of the consonants /w/, /j/ /dauno/, /buu/, /stauka/, /l'ii/, /toj/, /l'ika/, /soika/; in other cases, i.e. in the beginning of a word or syllable or in the middle of a word in the intervocalic position, their main allophones are the sounds /w/ or /j/ (/woda/, /towar/, /jama/, /majak/). Thus, it becomes evident that the phonemes /w/ and /j/ may be realized as allophones of both vowel and consonant types, i.e. they are ambivalent in nature.

The nature of sound traditionally defined as /u/, /i/ can be made clear only by means of articulatory and acoustic collation with the similar vowels /u/, /u/, /i/, /i/ as well as with the consonants /w/, /v/, /j/, in which the phonemes /w/ and /j/ may be realized.

The results of the analysis show certain differences, so each sound will be treated separately.

X-ray cinematographic stills show that in the beginning of a word the articulation of /w/ preceding a consonant, as in /uzuw/, differs in principle from /u/ and /u/ in three aspects: a/ the sounds /u/ and /u/ as vowels are characterized by a distinct movement of the back of the tongue to the soft palate; the sound /u/ as the consonant /w/ does not demand any strict localization of the back of the tongue, normally it acquires the shape necessary for the pronunciation of a preceding or following sound; b/ the distance between medial incisors in pronouncing /u/ is shorter than in the case of /u/ or /u/, thus approaching to /w/ or /v/, or, to be more exact, this distance changes from /w/ to /v/, i.e. from a bilabial to a labio-dental sound; c/ in pronouncing /u/, /u/ the lips are rounded and protruded more

in the case of /u/ and less in the case of /u/; in pronouncing /u/ the position of lips is changeable: first bilabial, then labio-dental; the lips are slightly rounded, but not protruded and not tense. Schematic diagrams clearly show that the sounds of the /u/ class are characterized by a wide lip opening, and, consequently, the absence of the typical for /w/- sounds constriction.

The same can be seen in the end of a word or syllable. Thus, it may be clearly seen that in the word /uzuw/, where /w/ follows /u/, the lips are less protruded after its articulation, the distance between them narrows, the back of the tongue moves somewhat down and forward, as in the case of the non-stressed /u/ the position of lips changes from bilabial to labiodental.

Spectrograms give the possibility to broaden the scope of investigation. It turns out that /w/ preceding vowels may function in a number of allophones. The sound, which is the most frequent in this position, has only the fundamental tone it has no formant structure, typical for vowels, no noise components, typical for noise consonants, i.e. this is a sonant. Another type is a noise consonant: besides the fundamental tone, there are other noise components of different intensity in the sphere of high frequency. The third type is the sound with an unstable articulation: it is a sonant at the beginning, and a noise consonant at the end. The fourth type is represented by very rare occurrences, when /w/ is substituted with a sound with a formant structure, i.e. of a vowel type.

The same variation can be observed not only in the end of a syllable after a vowel, but, contrary to our notions, in the intervocalic position as well, with /w/ in the latter case occurring in 36 per cent of instances with a more or less expressed noise components. In some instances these are sounds characterized only by the fundamental tone or weak traces of the formant structure.

Auditory observation shows that in the colloquial style, when the tensity is weakened, the noise components are less prominent. Naturally, this may be regarded as strengthening of sonority alongside with the weakening of articulation in the phonation focus.

The above analysis makes it evident that the sound represented in transcription as a non-syllabic vowel /u/ is in almost all instances more similar to consonants, sonants in fact, than to vowels. Not only articulation and acoustic structure testify to the fact, but also the tendency in careful pronunciation to strengthen tensity of the speech organs in the phonation focus.

The specific characteristics of the articulatory nature of the sound /j/ are more difficult to define by means of X-ray cinematography. Nevertheless the comparison of the first sound in the word /jama/, traditionally represented as /j/, with the stressed /i/ and the unstressed /i/ shows that the lips are, the most widely open in the case of /i/, and the least widely open in the case of /j/, with /i/ occupying the intermediate position. The back of the tongue occupies the highest position in the case of /j/, it is less high in the case of /i/ and still less in the case of /i/. Evidently this is the result of greater or smaller tensity of the speech organs in the phonation focus of these sounds. Unfortunately in this case the character of the constriction cannot be defined by means of X-ray cinematography. Still there is little doubt that the articulatory initial sound considerably differs from /i/ and /j/, possessing more consonant qualities.

The same differences can be observed if we compare the articulation of /j/ in the word-final position after a vowel with the articulation of /i/ and with the articulation of /j/. The position of the back of the tongue in the case of /j/ is similar to that of unstressed /i/. Unfortunately radiograms don't display the character of labial and linguo-palatal constriction.

Spectrography gives a more complete notion of the sounds in which the phoneme /j/ is realized, displaying a wide range of their acoustic qualities.

Thus, in the beginning of a word before a vowel and in the intervocalic position the following variants are realized: 1/ The sound, which has the fundamental tone only. 2/ The sound which, apart from the fundamental tone, has traces of the formant structure, specifically those of F<sub>1</sub>. These qualities make it possible to qualify both types of sounds as sonants, the second type being the sound with a more vividly expressed sonority, which, however, doesn't develop into vocality, as both sounds have no distinct formant structure. 3/ The sound, which, apart from the fundamental tone, has more or less distinct noise components in the highest frequencies - i.e. this is a typical voiced noise consonant. 4/ There are instances when in the intervocalic post-tonic position (/rozwal'ajec'ca/) /j/ devoid of noise components, is obviously weakened, reduced and fuses with the neighbouring vowels. 5/ In the word-final position, far from the stressed syllable (/dobroji/) the phoneme /j/ may have the qualities of a typical voiced noise consonant. Thus we may conclude that the majority of realizations in this position are sonants, some are noise consonants,

the remaining realizations are sporadic, depending mainly upon the style of pronunciation.

Distinct variation may be observed also in the end of a syllable after a vowel. The most frequent realization here is the sound which consists of the fundamental tone only. Sometimes traces of the formant structure of the previous sound may be observed. Finally, in very rare instances, spectrograms show the picture, slightly reminding of unstressed [i]. When the sound in the word-final position is characterized by a changeable structure, another variant may occur, which begins with a voiced and ends with a voiceless noise consonant (/jij/, /st'ij/).

The picture will be complete if we dwell on the problem of the phonological status of non-syllabic [w] and [j]. Functional approach made it possible to prove the consonant character of [w], [j], /P.P.Kostruba/. This conclusion was confirmed by applying the principle of complementary distribution /V.S.Perebynos/: [w], [j] can't be allophones of the phonemes /w/, /j/, but they undoubtedly are allophones of the consonants /w/, /j/, with which they are in the relations of complementary distribution.

Summing up the results of our analysis we come to the following conclusions.

The range of realization of the sonants /w/, /j/ is wide enough, from the voiced sonant (traditionally of the type /w/, /j/) to the voiceless noise consonant and even - in careless pronunciation - the reduced sound of an indefinite quality. Of the voiced noise consonants [b], [d] may be fully voiced half-voiced (with different degrees of the loss of the quality), they may alternate with voiceless consonants, may be reduced to the loss of their distinctive features.

The sonants /w/, /j/, that occupy the intermediate position between vowels and noise consonants in one part of their allophones approach vowels, in the other allophones they are close to consonants.

The so-called non-syllabic vowels [w], [j] are by their articulatory and acoustic nature not vowels, but resonant consonants, occurring not only in the beginning of a word before a consonant or in the end of a word or syllable after a vowel, but also before a vowel, as well as in the intervocal position - i.e. practically in any position.

Naturally the question arises what allophones of the sonants [w], [j] are to be considered typical. The investigation shows that it is the allophones [w], [j] that are the typical represen-

tatives of the phonemes /w/, /j/. It is these allophones that preserve the essential features of the sonants /w/, /j/. In this case the term "non-syllabic vowels" as well as the notion itself can hardly be considered justifiable. If the sonants are considered without "non-syllabic vowels" there remains practically nothing apart from comparatively rare noise allophones. This term as well causes confusion in the definition of vowels, which are characterized by the existence of the formant structure. As it has been shown, the so-called non-syllabic vowels [w], [j] do not possess the formant structure. Moreover, the admission of the existence of the so-called non-syllabic vowels or halfvowels brings about the necessity to divide all the sounds in the Ukrainian language into vowels, consonants and half-vowels, which does not correspond to the existing reality neither on the phonemic nor on the phonetic levels.

If the sonants [w], [j] are more than normally vocalized, they can alternate with the voiceless vowels [w], [j] (e.g.: /wranc'i/ - /uranc'i/; /wpered/ - /upered/). The opposite is also possible - the alternation of [w], [j] with [w], [j]. This is the characteristic feature of the Ukrainian language.