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A Study of the Stylistic Foundations of the Ethnic Music of the Finno-Ugric Peoples by Means of Modern Information Technologies*

The article actualizes the issue of research of the stylistic foundations of the Finno-Ugric ethnic musical systems. With the aid of present-day informational technologies the musical texture is researched in the aspect of segmentation: the pitch organization, specificity of timbre-intonation and the articulation are revealed. The author brings in the achievements of musical acoustics, and also makes use of computer technologies with the corresponding software, making it possible to carry out a detailed analysis of the temporal structure of any musical signal. A method of research is proposed for determining the types of musical thinking inherent to the peoples of the Finno-Ugric world (monophonic and/or polyphonic) and, in general, for characterization of the essence of the artistic universals of the Finno-Ugric culture. Elucidation is given of the first results received upon analysis of the heterophony of the monophonic nature. The material for the research was provided by recordings of folk singing made during expeditions, representing an original stratum of the singing and instrumental musical cultures of the Finno-Ugric peoples. The work is carried out within the framework of the scholarly project "Research of the Stylistic Foundations of the Music of the Finno-Ugric Peoples of Russia with the Aid of Present-Day Informational Technologies" (project of the Russian Humanitarian Scholarly Fund No. 16-14-10003). The creations of multigenre multimedia resources and, first of all, an electronic database of Finno-Ugric timbres will provide a subsequent stable development and popularization of the musical traditions of the Finno-Ugric peoples.

Keywords: ethnomusicology, musical folklore, studies of Finno-Ugric music, acoustic analysis, pitch, timbre.

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Исследование стилевых основ этнической музыки финно-угорских народов с помощью современных информационных технологий

В статье актуализируется проблема изучения стилевых основ финно-угорских этномузыкальных систем. С помощью современных информационных технологий музыкальная ткань исследуется в аспекте звуковысотного сегментирования: выявляется звуковысотный строй, специфика темброинтонирования, артикуляция. Автор привлекает достижения музыкальной акустики, а также использует компьютерные технологии с соответствующим программным обеспечением, позволяющие выполнить детальный анализ временнóй структуры любого музыкального сигнала. Предлагается исследовательский метод для определения типов музыкального мышления, присущих народам финно-угорского мира (монодийного и/или многоголосного), и в целом для характеристики сущности художественных универсалий финно-угорской культуры. Освещаются первые результаты, полученные при анализе гетерофонии монодийной природы. Материалом исследования

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послужили экспедиционные записи, репрезентирующие самобытный пласт певческой и инструментальной культуры финно-угорских народов. Работа осуществляется в рамках научного проекта «Исследование стилевых основ этнической музыки финно-угорских народов России с помощью современных информационных технологий» (проект РГНФ № 16-14-10003).

Создание многожанровых мультимедийных ресурсов и, прежде всего, электронной базы данных финно-угорских тембров, обеспечит дальнейшее стабильное развитие и популяризацию музыкальной традиции финно-угров.

Ключевые слова: этномузыкология, музыкальный фольклор, музыкальное финно-угроведение, акустический анализ, звуковысотность, тембр.

1. Introduction

The traditional music of the Finno-Ugric peoples has more than once been the object of study of the researchers. Scholars are primarily interested in issues associated with the theory, practice and historiography of Finno-Ugric studies, research of the specificity of the genre and the analysis of texts of folk music. The study of the stylistic foundations of ethnic music of the Finno-Ugric peoples at the level of the musical language as *sounding musical material* by means of present-day information technologies remains a challenging issue for modern ethnomusicology. Nonetheless, such studies, aimed at solving the problem of thorough and detailed research of the phenomenon of folk music, today are the most relevant and are of great importance for the development of the science of ethnomusicology (a principally complex scholarly discipline).

When investigating the music pertaining to the oral tradition, the material of the music, i.e. the sound organized according to certain laws, is of great importance. These laws result from the harmonic structure, time and dynamic parameters of the sound and are connected not only to the physical foundations of sound, but also to human physiological potentials [11, p. 11]. At the same time the acoustic properties of the material do not define the specifics of the music itself. As Anna Chekanovska notes in her work "Muzykal'naya etnografiya: metodologiya i metodika" ["Musical Ethnography: Methodology and Methods"], important significance is assumed by the social determinants, which define the choice, mastery and stability of the musical peculiarities arising from one or another culture [Ibid.]. In other words, music of the oral tradition, based on a certain type of musical thinking, acquires meaning and significance only in a particular cultural tradition that forms its own unique sound ideal (*die Klangideale*) [12].

The study of a complexly organized sounding musical text presents a challenging task for ethnomusicology. The research of a sounding musical texture in the context of the issues of precise fixation of pitch (which at times does not conform with the precision of the pitch scale of the European equal tempered system) and pitch segmentation, involves *identification of the pitch system, the specifics of timbre intonation, articulation* (including instrumental articulation), and in general, gradations of the *musical substance*[1] [5, p. 187] in all of its morphology. The questions of identifying the types of musical thinking: *monophonic* and/or *polyphonic*, and the levels of their interaction within a particular culture become important.

Initially the application of the methods of the exact sciences to the study of ethnic musical cultures, in general, and due to the consistent patterns of the connections of the timbre with the pitch level, in particular, has been carried out in the field of sound psychology (*Tonpsychologie*) and acoustics. The issues of such phenomena as timbre, pitch level and spatiality of pitch perception, which became the focus of attention in the 19th and 20th centuries, are covered in the works of Hermann Helmholtz, Alexander. Ellis, Hugo Riemann, Carl Stumpf, Erich von Hornbostel, Ernst Kurth, Nikolai Garbuzov, Andrei Volodin, Yuri Rags, and other researchers. As far back as in 1884 Ellis, with the aid of the results of the measurements which made it possible for him to define the intervals between sounds, offered a set of hypotheses concerning the formation of the musical scales of different peoples [11, p. 35]. Stumpf, while studying the music of various non-European peoples, carried out acoustic measurements of hearing and of musical instruments [13]. Hornbostel along with Otto Abraham applied exact measurements when transcribing exotic musical material. Wolfgang Köhler studied the patterns of hearing separate sounds of speech (the development of the theory of speech formants)

and the peculiarities of perception of pitch [8]. Garbuzov's ideas about the zonal nature of pitch, timbre and intonational hearing [4] and Volodin's ideas about the spectrum as the bearer not only of timbral but also intonational and dynamic qualities of musical sound, and on the fact that, in terms of perception, pitch level and timbre of sound are not isolated phenomena, but in fact present various forms of understanding the spectral content under specific conditions of their usage in music [2, p. 37–38], were considered very important for defining the phenomena of pitch and tone in the 20th century.

In the present day ethnomusicology has accumulated a certain amount of research experience in the study of monody, heterophony, and polyphony. Primarily this is reflected in the works of Izaliy Zemtsovsky, Liliya Vishnevskaya, Iosif Zhordaniya, Evgeniy Trembovelsky, Savolina Galitskaya, Nailya Almeyeva, among others. Through the examples of numerous specimens of Eastern Slavic, Turkic, North Caucasian folk music the specificity of the traditional performance practice of various ethnic groups is studied, "substantial and structural diversity of forms" is revealed, and a typology of the most important and compositionally essential universals[2] is established. These universals also underlie the musical thinking of the Finno-Ugric peoples. However, it is not always possible to determine unequivocally the musical style of an ethnic group in terms of its attribution to a certain type of musical thinking. At the same time, the traditional music of the Finno-Ugric peoples, especially in regard to the specificity of the musical language at the level of the sounding musical material, has been researched very little and highly irregularly. There is no research available which is directly devoted to the typology of musical thinking of various ethnic groups.

The aim of this article is, firstly, to actualize the issue of research of Finno-Ugric ethno-musical systems on the level of the sounding musical material; secondly, to focus on the problem of the comparative study of the Finno-Ugric peoples' music in the aspect of study of its stylistic foundations, in particular, its musical language; thirdly, to determine the methodology and specific research methods for studying ethno-musical systems. This would make it possible not only to identify and define the types of musical thinking inherent to the Finno-Ugric peoples of the world, but also to describe the essence of the artistic universals that define the musical chronotope[3] of the Finno-Ugric culture in general.

2. Materials and methods

The materials for research are expeditionary recordings, which represent ethnic music of the Finno-Ugric peoples. Compilations of traditional musical works have been compiled by Karelian researchers during folk music expeditions in 1969–2015. These materials are stored at the folk music archive of the Institute of Traditional Music of the Petrozavodsk State A.K. Glazunov Conservatory. These musical materials represent an original stratum of the Finno-Ugric peoples' vocal and instrumental musical culture, and are of academic interest as an important source of scholarly research in the field of Finno-Ugric musical studies.

In order to investigate complexly organized sound the author developed a *method of computer analysis of the polyphony*[4]. The method focuses on the study of polyphonically sounding musical material. An essential feature of this method in terms of pitch segmentation is that it makes it possible to present a precise visual image of sounding polyphonic texture, with a subsequent reconstruction of the revealed voice lines (or parts). At the same time, such "unisonous-heterophonic" material of the studied traditional music reveals such compositionally significant essential components of pitch structures, which define the mechanisms of the formation of the musical texture.

Let us present a method which would make it possible to carry out detailed analysis of sounding polyphonic texture, which we shall define as the analysis of heterophones. A heterophone is defined by the author as a "*unit of a heterophonic line, a compound timbral-intonational complex (a batch, a consonance), composed of sounds of different pitches (frequencies), volume (intensity), timbre (spectrum)*" [6, p. 3]. Vocal heterophones, particularly as present in the musical tradition of the Vyatka Mari[5] are implemented in two forms: as a "zone that sounds in simultaneity" [4, p. 112] – *ensemble unisons* – unisonous heterophones, and as a consonance, the framework of which is wider than that of the unisonous ones – *cluster heterophones* [6, p. 3–4]. "This method involves the following steps:

– by means of sound editing programs, the digitization of the original analogue recording of the sampling material and its restoration (noise reduction) is carried out;

– the selection and interpretation of a certain melody (followed by its notation in another

program). Following this, a heterophone is chosen and analyzed;

– a level diagram (which reflects the dependency of the sound pressure from time) of a phoneme (a syllable), participating in the process of the sound production, is created;

– analysis of the articulatory standards (change of consonant and vowel phonemes) is carried out;

– a sonogram of a syllable (with a verbal description of the articulation of a sounding phoneme during speaking or singing) is created;

– a stationary section of the level-sensitive diagram is distinguished for spectral analysis (FFT – Fast Fourier Transformation);

– spectral analysis with the construction of *n* stationary spectra is performed;

– analysis of fundamental frequencies and their dynamic levels and the analysis of the formant areas (the correlation of their dynamic and amplitude parameters) is carried out;

– a spectrogram is created;

– analysis of the formant zones is performed, the correlation of their frequency characteristics with indicators of time (i.e. the changes of the formant areas in time) is determined;

– following the results of the showings of fundamental frequencies, obtained from the analysis of the instantaneous spectra of the stationary part of the level diagrams, a graph showing the dynamics of the principal note within the acoustic zone through time is created;

– next, the minimum and the maximum showings of the fundamental frequencies in hertz are compared, and through a nomographic chart (to convert hertz values to cents) the difference of their deviation in cents is calculated. Thus, we get the zone of the real sound of a heterophone" [6, p. 14–16].

Based on the data from this graph, a heterophone can be reconstructed in full measure vertically. The analysis of the heterophones, consistently replacing one another in heterophony, makes it possible to restore an entire line – to create a real score of a sound event.

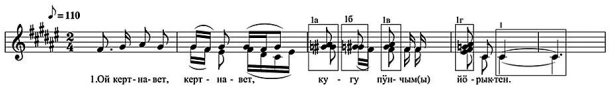
3. Results

According to current scientific research, 24 peoples of the world are Finno-Ugric. These peoples have been living within the territory of Europe for nearly 10 millennia. Nowadays the representatives of the Finno-Ugric ethnic groups (about 25 million people) live in the territory: from Norway in the west to the Ob River in the east and the lower reaches of the Danube in the south. The historical fate and the languages of the representatives of the Uralic language family differ greatly between each other. The latter is usually divided into several branches: 1) the *Finnic* branch – Finnish, Ingrian, Karelian and Vepsian languages (the northern group); Estonian, Votic, Livonian (the southern group); 2) the *Volgaic* branch – Mari (plain, eastern, north-western and mountain dialects) and Mordvin languages (Erzya and Moksha); 3) the *Permic* branch – Udmurt, Komi-Zyrian and Komi-Permyak languages; 4) the *Ugric* branch – Khanty and Mansi, and also the Hungarian languages; 5) the *Sami* branch – the Sami language[7]. All Finno-Ugric peoples share common material and intellectual culture. The ethnic groups live in harmony with nature, the environment and the neighboring peoples. The Finno-Ugric peoples are among the few European nations that have preserved to the fullest extent their traditional cultures up to the beginning of the third millennium.

Preliminary research has shown that the musical traditions of the Sami, Khanty, Mansi, Karelians, and Mari – with certain modifications – may be considered monophonic, because, for example, study of the stylistic foundations of the ethno-musical culture of the Vyatka Mari has demonstrated the heterophonic nature of their musical thinking [6]. Undoubtedly, research of these forms will make it possible to specify their monolayer and multilayer nature [3, p. 85]. In the music of the peoples of the Ugric group there are polyphonic forms present, as well. In general, polyphony of the Finno-Ugric ethno-musical systems is presented in a variety of forms.

The example below shows the analysis of one of the final unisonous heterophones which represent the style of the Vyatka Mari (See: Example № 1[8]).

Example № 1



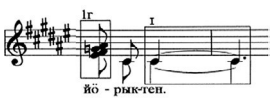
The final heterophone C-sharp – I (see example №1) is sung while pronouncing the word "yörykten". In the final syllable "ten" the vowel "e" stands out, and in the meadow-eastern dialect of the Mari language this is a vowel of full formation[9]. It is characterized by intense articulation. In the articulatory classification, based on the articulatory principle of timbre determination (which states that it is not the timbre itself which is fixed, but the way it is obtained), "the vowels are categorized according to the position of

the tongue and the nature of their formation (this attribute corresponds to a similar one among the consonants). According to the first attribute, the classification is two-dimensional – it indicates the shift of the tongue against a certain middle position horizontally (front/back) and vertically (height). In the simplest case, these characteristics can possess only three levels: front, middle and back for front-ness/back-ness and high, middle and low for height" [7, p. 28]. Of the many features of the nature of the vowel formation "the opposition "tense – lax", that differentiates the vowels according to the degree of the tension of the walls of the pre-epiglottal cavity, is distinguished" [7, p. 28–29].

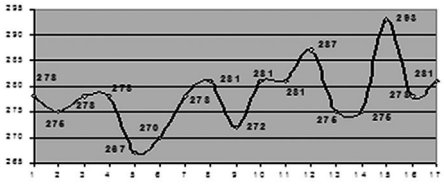
In the classification of the vowels, the phoneme "e" is described as a front vowel (when speaking of the position of the tongue), the height of the vowel is at mid position, and the vowel is unrounded. In this case, a change in the position of the vowel phoneme "e" (it moves from the front to the mid position, the height remains the same) can be observed. As a result of this it becomes even tenser. Such tense articulation of the Mari vowel phoneme "e" according to the acoustic standards moves it closer to articulating "e" [э] in the Russian language. According to Vladimir Mazepus, ethnic intonational cultures widely use various kinds of extra-linguistic sound systems, for e.g., certain minimal segments in singing – syllable-notes – that may acquire additional timbral color, not specified by the language. These "segmental" features are defined according to their timbre – perhaps, differently – separate segments, without disturbing the overall intelligibility, clarity of the text [7, p. 33]. The phoneme "e", when being sung, possesses the following acoustic characteristics. The pitch level of the syllable "ten" is determined by the frequency of 278 Hz, which corresponds (with minor deviation) to the C-sharp sound (277.12 Hz).

Example № 2

Musical representation



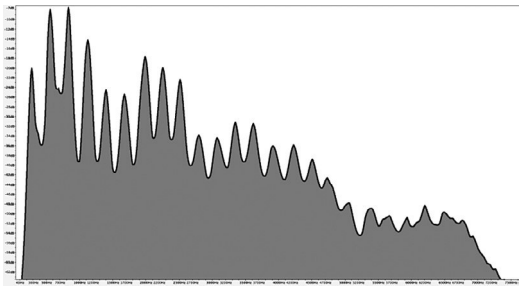
Graphic table



This phonation is fixated all three of the computer graphs (see Graphs: 1a, 1b, 1c): the first one, being a spectrogram of a sound signal, shows the correlation of the sound level in decibels (vertically) with the oscillation frequency in Hertz (horizontally); the second one, being a spectral sonogram, demonstrates the actual range of the audio signal, including the formant areas (vertically), time reckoning (horizontally); and, finally, the third one shows the level diagram. From the level diagram (of the temporal pattern), i.e., the dependency of the acoustical pressure level from time, three phases can be identified: the attack of the sound (the establishment process), the stationary part and the process of the decline. Generally, time intervals of these phases differ significantly in different instruments (voices), depending on the way the sound is generated. In order to build the necessary spectra in the stationary part of the level diagram, a time segment is picked out, and calculations of an average spectrum in this segment are made. According to Irina Aldoshina, "Such stationary spectra possess individual traits specific for each musical instrument, and depend on the mechanism of the sound generation in it" [1, p. 182]. The level diagram also reflects the acoustic processes caused by the difference in the means of the sound production of vowels and consonants. Let us examine the graphs consistently.

Graph 1a describes the spectrogram of a final unisonous heterophone C-sharp – I, the level of which is marked up to 7400 Hz. It should be noted that the average frequency range is 100–7000 Hz (for male voices 80 – 5000 Hz, for female voices 220–7000 Hz) [1, p. 413].

Graph 1a

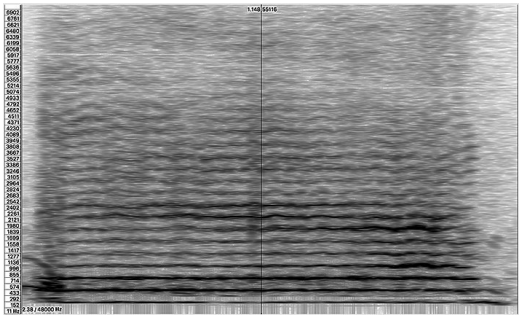


The fundamental tone oscillates with the frequency of 278 Hz. The sound spectrum contains four well defined formant areas in the form of accumulations of peaks. The first formant F_1 of the vowel "e" – 440 Hz is related to the position

of the height of the tongue (the higher the body of the tongue regarding the hard palate (the closer/higher the vowel), the lower the frequency of the first formant) [1, p. 406]. The second formant F_2 – 1800 Hz is associated with front-ness/back-ness (the position of the body of the tongue in regard to the boundaries of the oral cavity, the lips being chosen the reference point – the closer to the lips the articulation of the vowel is, the higher the frequency of the second formant) [1, p. 406]. The third formant F_3 – 2500 Hz is combined with the second formant. The fourth formant – 3200 Hz – is the singing formant.

Graph 1b shows the sonogram of the sound of the final development of C-sharp – I through time. Cis1 – I lasts for 2,338 seconds. Here the transitions from the consonant phoneme "t" to the vowel phoneme "e – [э]" and further to the consonant "n" must be mentioned.

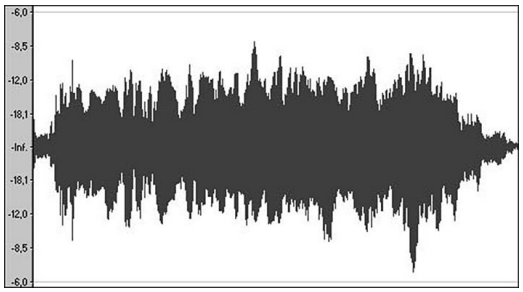
Graph 1b



The sound "e – [э]" is *compact*, because the first and second formants are situated close to the speech center. The dark areas on the spectrogram (see Chart 1b) – the reflections of the formants may lie in clusters and in the center. If one of the formants of the sound lies close to the "center" of the speech range (about 1000 Hz), and the other one lies not very far from it, then the sound is *compact*. Its formants were concentrated close to the center and at the same time relatively close to each other, forming clusters. The sound is *diffuse* if at least one of these properties is not present. At the same time, the vowel [э] is situated midway between the diffuse and the compact. However, if the following criterion is introduced: the compact sounds are the ones with the upper formants not further than 1000 Hz from the center (the center being 1000 Hz), and the bottom formants – not further than 500 Hz, then [a, o, э] form the class of compact sounds [9, p. 54].

The next level diagram (see: Graph 1c) reflects the dependency of change of the sound pressure in time, and also the process of the phonation of vowels and consonants, defined by the difference in sound production methods in real-time mode.

Graph 1c



The analysis of the acoustic zone of the heterophone C-sharp – I was made by us according to a certain algorithm. Throughout the sounding section of the syllable "*ten*" 18 instantaneous cuts were made. After taking down the parameters of all the indicators throughout the fundamental frequency the diagram was built (see: example № 2, the graphic picture), showing the minimal deviations of the fundamental note of C-sharp – I – 278 Hz in the phonation process. Thus, the area of the final unisonous heterophony C-sharp – I is 155 cents.

As a result of the acoustic and phonological analysis of the heterophones, performed on the Mari material, it turned out that the difference of the acoustic zones of the final unisonous heterophones in cents is as follows: in the Malmyzh local style – from 74 to 216.5 cents (recording time – from 0,938 to 2,554 sec.), in Vyatskiye-Polyany style – from 91.5 to 127.5 cents (recording time – from 1,603 to 2,252 sec.). The diagrams reflecting the heterophones through time, during the process of timbre intonation, show how the fundamental tone oscillates, each time "conquering" the space of the musical texture differently. At the same time the acoustic analysis demonstrates a certain homogeneity in their perception. This is achieved due to the fact that the heterophones are usually rather extended and homogeneous in their timbres. Since "the fundamental attribute of our hearing is its ability to summarize quantitatively diverse sound phenomena according to certain characteristics" [10, p. 9] and, thus, "... the zonal nature in fact describes all aspects of sound perception" [Ibid., p. 26], then in this case, in our opinion, we are

dealing particularly with this very psychoacoustic phenomenon. At the same time, one can observe a difference: the acoustic zones having a smaller range in cents, reside in the songs of the Vyatskiye Polyany style, and a wider range – in the songs of the Malmyzh style. The analysis also revealed the selectivity in the use of certain phonemes in the last syllables of the final words by the performers [6, p. 20]. All in all, the finalises can be characterized as "zones which sound in simultaneity" in a rather lengthy time continuum with an increase of the dynamic level towards the end of the stationary segment of the acoustic signal.

4. Discussing the Results

As is known, sound recording of traditional folk music by means of technical equipment currently serves as the foundation for transcription into scores of the folk music. In rare cases we encounter multichannel recordings of the music carried out by special multi-track audio tape recorders, or a corresponding number of stand-alone tape recorders. Undoubtedly, such audio recordings are not too difficult to decipher and notate, which makes it possible to create detailed scores. Unfortunately, in the present day many of the recordings of folk songs originally were been made in multichannel format. In the present-day conditions of extinction, and at times even disappearance of certain strata of ethnic cultures and, in this connection, the impossibility of the audio fixation of their musical heritage, development of methods of research for the study of polyphony in folk music becomes particularly relevant.

The musical transcriptions of vocal heterophones in terms of their pitch are rather undifferentiated and almost indistinguishable, due to the fact that the musical notation captures sounds collectively, and in terms of intonation it is too imprecise and does not specify the nuances occurring in the real sound. When exploring the pitch and timbre of the sounds, we are really dealing with barely perceptible, small acoustic range fluctuations, which provide that multitude of diverse sound realizations. Therefore, it is important to take into account the phonetic components represented by combinations of consonant and vowel phonemes, when different consonants, preceding vowels, shade them acoustically in different ways each time, which makes the musical form generally alive and pulsing, which results in the appearance of the scarcely noticeable sound diversity, which is hardly explainable at first sight.

5. Results

Thereby, the method of the computer analysis of polyphony solves the main problem – the inadequacy of analysis and scholarly description of folk singing and instrumental music by using the traditional "aural" method (when interpreting phonograms, the recording of the music of the oral tradition, as a rule, takes place in the system of the musical temperament, common for European music) – the results of such work do not reflect the real picture of the sound event, and sometimes even distort it. The study of the musical language of various ethnic cultures, correlated with the study of the sounding musical material, particularly, with the definition of the pitch system, the specifics of timbral intonation and articulation – is possible today only by means of the achievements of musical acoustics and the use of computer research technologies with the appropriate software to carry out detailed analysis of the temporal structure of any musical signal.

6. Conclusions

This study is carried out within the framework of the scholarly project "Research of the Stylistic Foundations of the Ethnic Music of the Finno-Ugric Peoples of Russia by Means of Present-Day Information Technologies", supported by the Russian Foundation for the Humanities.[10] As part of the project, for the first time in world scholarship, acoustic measurements of verbal, vocal (monophonic and polyphonic) and instrumental sounds from different genres of the folk music of the Finno-Ugric peoples, their acoustic-phonological analysis and the creation (on the basis of the received data) of an electronic database of the Finno-Ugric timbres (verbal, vocal and instrumental) and timbre-articulatory models that form the basis of the ethnic style of the cultures under investigation, are carried out. The work on computer decoding and the acoustic analysis of the elements of the musical language intonational forms of the joiks of the Sami and the Karelians, the improvisatory prichet (lamentation) forms of the Vepsians and the Karelians, the improvisatory forms of the Izhma Komi, as well as the other genres and forms of the Finno-Ugric peoples, is carried out. The data, obtained from the decipherment, will make it possible to identify the timbre-articulatory models of the ethno-musical cultures and to specify the types of musical thinking of the Finno-Ugric ethnic groups that characterize these ethno-musical systems.

The project will introduce the computer pitch transcriptions of audio recordings which are of scholarly interest as a previously unpublished source for the study of the traditional folk music of the Finno-Ugric peoples into scholarly use. Created within the framework of the project, the multi-genre multimedia resources, especially the electronic database of the Finno-Ugric timbres, will provide a further stable development and popularization of the musical tradition of the Finno-Ugric peoples.

Conflicts of interest

The author declares no conflict of interest in the submitted data.

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NOTES

[1] See: [5].

[2] This most likely occurs due to the presence of the multistage strata in the ethno-musical culture of the Finno-Ugrians.

[3] The term *chronotopos* (M. M. Bakhtin) is associated with the most important categories: space and time. The concept of their interrelation forms the basis of the view of the world of any ethnic group.

[4] This method was first tested in the author's thesis work "Stylistic Foundations of Vyatka Mari Ethnic music: Timbre-Intonation and Instrumental Articulation" (2011).

[5] The Vyatka Mari are one of the ethnic groups of the Meadow Mari, who form the population of the territory of the downstream of the Vyatka river and along its right bank (Kirov District regions).

[6] See: Yadne N. Krylya vodyanoy ptitsy [The wings of a waterbird]. URL: http://proza.ru/2010/09/25/310 (Accessed: 16 August 2016).

[7] Refer to: Serebrennikov B. A. Lingvisticheskiy entsiklopedicheskiy slovar. Uralskie yazyki [Linguistic Encyclopedic Dictionary. The Uralic languages]. URL: http://tapemark.narod.ru/les/537d.html (Accessed: 16 August 2016).

[8] The wedding song "Oj kertna vet, kertna vet" was recorded in 1974 by O. M. Gerasimov in the Kugu Ketek village of the Malmyzhskiy region, transcription by S. V. Kosyreva.

[9] Vowels of full formation in linguistics are considered to be vowels that are articulated with intensity, i.e. during their pronunciation the organs of articulation are tense.

[10] Project manager and author of the concept – S. V. Kosyreva.

REFERENCES

1. Aldoshina I. A., Pritts R. *Muzykal'naya akustika: uchebnik* [Musical Acoustics: Textbook]. St. Petersburg: Kompozitor, 2006. 720 p.

2. Volodin A. A. Rol' garmonicheskogo spektra v vospriyatii vysoty i tembra zvuka [The Role of the Harmonic Spectrum in the Perception of Sound Pitch and Timbre]. *Muzykal'noe iskusstvo i nauka* [Musical Art and Science]. Vol. 1. Moscow, 1970, pp. 11–38.

3. Galitskaya S. P. Monodiynaya faktura kak aktual'naya teoreticheskaya problema [Monodic Texture as an Actual Theoretical Problem]. *Muzykal'naya kul'tura kak natsional'noe i mirovoe yavlenie: materialy mezhdunar. nauch. konf.* [Musical Culture as a National and International Phenomenon. Proceeding of the International Academic Conference]. Novosibirsk, 2002, pp. 84–87.

4. *Garbuzov N. A. – muzykant, issledovatel', pedagog: sb. statey* [Garbuzov N. A. – Musician, Researcher, Teacher: Collection of Articles]. Compilers: O. Sakhaltueva, O. Sokolova. Editor: Yu. Rags. Moscow: Muzyka, 1980. 303 p.

5. Zemtsovskiy I. I. Apologiya "muzykal'nogo veshchestva" [Apology of Musical Substance] *Muzykal'naya akademiya* [Musical Academy]. 2005. No. 2, pp. 181–192.

6. Kosyreva S. V. *Stilevye osnovy etnicheskoy muzyki vyatskikh mari: tembrointonirovanie i instrumental'naya artikulyatsiya: avtoref. dis. ... kand. iskusstvovedeniya* [Stylistic Foundations of Vyatka Mari Ethnic Music: Timbre-Intonation and Instrumental Articulation: Thesis of Dissertation for the Degree of Candidate of Arts]. St. Petersburg, 2011. 27 p.

7. Mazepus V. V. Artikulyatsionnaya klassifikatsiya i printsipy notatsii tembrov muzykal'nogo fol'klora [Articulatory Classification and Principles of Timbre Notation of Folk Music]. *Fol'klor. Kompleksnaya tekstologiya: sb. nauch. statey* [Folklore. Complex Textology: Collection of Articles]. Moscow, 1998, pp. 24–51.

8. Nazaykinskiy E. V. *O psikhologii muzykal'nogo vospriyatiya* [On the Psychology of Musical Perception]. Moscow: Muzyka, 1972. 384 p.
9. Panov M. V. *Sovremennyy russkiy yazyk. Fonetika* [Modern Russian Language. Phonetics] Moscow: Vysshaya shkola, 1979. 256 p.
10. Rags Yu. N. Kontseptsiya zonnoy prirody muzykal'nogo slukha N. A. Garbuzova [The Concept of Zonal Nature of Musical Hearing of N. A. Garbuzov]. *Garbuzov N. A. – muzykant, issledovatel', pedagog: sb. statey* [Garbuzov N. A. – Musician, Researcher, Teacher: Collection of Articles]. Compilers: O. Sakhaltuyeva, O. Sokolova. Editor: Yu. Rags. Moscow, 1980, pp. 11–48.
11. Chekanovska A. *Muzykal'naya etnografiya: Metodologiya i metodika* [Musical Ethnography: Methodology and Methods]. Translated by G. D. Bleyz. Moscow: Sovetsky kompozitor, 1983. 190 p.
12. Bose F. *Musikalische Völkerkunde* [Musical Folklore]. Freiburg im Bresgau: Atlantis, 1953. 197 S.
13. Stumpf K. *Tonpsychologie* [Tonal Psychology]. 2 Bände, Leipzig, 1883/90.

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ЛИТЕРАТУРА

1. Алдошина И. А., Приттс Р. Музыкальная акустика: учебник. СПб.: Композитор, 2006. 720 с.
2. Володин А. А. Роль гармонического спектра в восприятии высоты и тембра звука // Музыкальное искусство и наука. М., 1970. Вып. 1. С. 11–38.
3. Галицкая С. П. Монодийная фактура как актуальная теоретическая проблема // Музыкальная культура как национальное и мировое явление: матер. междунар. науч. конф. Новосибирск, 2002. С. 84–87.
4. Гарбузов Н. А. – музыкант, исследователь, педагог: сб. статей / сост. О. Сахалтуева, О. Соколова; ред. Ю. Рагс. М.: Музыка, 1980. 303 с.
5. Земцовский И. И. Апология «музыкального вещества» // Музыкальная академия. 2005. № 2. С. 181–192.
6. Косырева С. В. Стилевые основы этнической музыки вятских мари: темброинтонирование и инструментальная артикуляция: автореф. дис. ... канд. искусствоведения. СПб., 2011. 27 с.
7. Мазепус В. В. Артикуляционная классификация и принципы нотации тембров музыкального фольклора // Фольклор. Комплексная текстология: сб. науч. ст. М., 1998. С. 24–51.
8. Назайкинский Е. В. О психологии музыкального восприятия. М.: Музыка, 1972. 384 с.
9. Панов М. В. Современный русский язык. Фонетика. М.: Высшая школа, 1979. 256 с.
10. Рагс Ю. Н. Концепция зонной природы музыкального слуха Н.А. Гарбузова // Гарбузов Н. А. – музыкант, исследователь, педагог: сб. статей / сост. О. Сахалтуева, О. Соколова; ред. Ю. Рагс. М., 1980. С. 11–48.
11. Чекановска А. Музыкальная этнография: методология и методика / пер. с польск. Г.Д. Блейза. М.: Советский композитор, 1983. 190 с.
12. Bose 1953 Bose F. Musikalische Völkerkunde. Freiburg im Bresgau: “Atlantis”, 1953. 197 S.
13. Stumpf K. Tonpsychologie. 2 Bände, Leipzig, 1883/90.

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