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NEW ETHNOMUSICOLOGICAL ANALYSIS TECHNIQUES

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Abstract: *Research in traditional oral music must not carry on today with strictly musical means of investigation, means which, we must admit, have given some clear results so far, but which today, viewed from a generalized perspective, will provide a partial, superficial knowledge of the phenomenon. The lack of its own methodological tools has led to borrowing various models of analysis from linguistics, phonology, experimental psychology and acoustics, in order to understand the relevant criteria that can clarify the articulation means between music and the studied sociocultural context. In a general manner, all these concur to the analysis of the music act and contribute equally to highlight the anthropological dimension of each ethnomusicological approach. Of the many possible approaches that can be applied in the typological classification or in the comparison of the melodic, rhythmic or metrical features in folklore genres, we will hereinafter mention nine.*

Key words: *techniques, analysis, modern, ethnomusicology.*

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1.Terminological explanations

The term ethnomusicology first appeared in 1950, when Jaap Kunst used it as a subtitle for his book, Musicologica [7] with the intention of replacing the term of comparative musicology and to distinguish the new investigation field from the western Europe musicology. The one who spoke about a comparative musicology with ethnographic purposes was Guido Adler, who considers that it "gives itself the task of comparison of the sound products, especially the folksongs of different peoples, lands and territories for the purposes of ethnographic ends, and to group and divide them according to the difference in their nature" [11].

The definitions given to ethnomusicology over time are numerous, sometimes even contradictory. Without having exhaustive claims, we will express some views, in order to understand how this science has been defined.

In the New Grove Dictionary of Music and Musicians, ethnomusicology is defined as "the study of social and cultural aspects of music and dance in local and global contexts" [9].

Jaap Kunst defined ethnomusicology as the study of the music and musical instruments of all non-European peoples, including both the so-called primitive peoples and the civilized Eastern nations [7].

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Constantin Brăiloiu defined ethnomusicology as "l'étude d'une musique qui, intégrée à l'existence de tout un chacun, et qui, concernant l'ensemble de ceux qui en font usage, se passe d'écriture, en connut-elle même une" [2].

According to Cl. Marcel- Dubois, „ethnomusicology is closest of all to ethnology, in spite of its obvious features of musicological specialisation. It studies living musics; it envisages musical practices in their widest scope; its first criterion is to address itself to phenomena of oral tradition. It tries to replace the facts of music in their socio-cultural context, to situate them in the thinking, actions and structures of a human group and to determine the reciprocal influences of the one on the other; and it compares these facts with each other across several groups of individuals of analogous or dissimilar cultural level and technical milieu" [5].

About the ethnomusicologists one can say that they study music in the socio-cultural context, they are not only interested in the music itself and its role in society, but also in the musical behaviour of humans.

The term ethnomusicology is used in some European countries: Ethnomusicologie (France), ethnomusicologia (Italy), ethnomusikologie (musikethnologie Germany), ethnografia muzyczna (Poland) etc. In Russia, Bulgaria and Ukraine there is a distinction between etnomuzïkalnaya (the study of traditional music) and etnografiya muzïkalnaya (musical ethnography). The term ethnomusicology was also adopted by specialists from the Czech Republic, Slovakia and the Netherlands, while in Germany and Austria, some scholars continue to use the term Vergleichende Musik-wissenscha (comparative musicology).

2. Short diachronic incursion

Ethnomusicology has undergone several successive stages of development, due to the emergence of different schools of thought. Over time, many ethnomusicologists dealt with the description of musical styles in the repertory of specific communities, by conducting field surveys and by collecting numerous materials. The initial ethnomusicology research aimed at "three areas of interest in three kinds of music: first, the music of primitive communities, the illiterate (tribal music), then the orally transmitted music in major Asian and Arab cultures and thirdly, folklore music, a specific and particular musical language, which developed in untrained environments dominated by tall crops territories." [6, p.8.]

Referring to the research methodology, in 1909, Ovid Densuşianu said that the folklorist must also include in his field of observation the present and the past, as the present actions can be better understood if we also know those of the past, because between "what there is and what there was, our mind should always extend bridges of light" [4].

Nowadays, the ethnomusicologist's mission is significant, because, as Giuseppe Cocchiara said "the defining issue of folklore is not philological, sociological, psychological, ethnographic etc., but it is historical, which includes and transforms all others". He believes that we cannot deny the importance that the various philological or naturalist subjects have in folklore, which should interfere with it by highlighting each other [3].

In the first half of the twentieth century, in comparative musicology, the role of the comparison and the place of the musical object, as main research objective, changed. In the second half of the twentieth century, ethnomusicology

included among its preoccupations the methodologies of a growing number of subjects, trying to support the disciplinary independence of their field of investigation, even when that meant distancing ethnomusicology from the subjects with which hitherto it was intersected through methodology, institutional structures - musicology, anthropology and folklore.

In the last decades of the twentieth century, postmodern and postcolonial orientations in ethnomusicology attach great importance to the ethnographic materials collected and the research methods specific to the social sciences. Psychological theories that treated music as a product of nature are replaced by theories specific to cognitive sciences, according to which music is the result of human mental processes. In this respect, the American anthropologist and ethnomusicologist Alan Merriam believes that music is only one of the three study objects in any research, the other two being represented by ”behavior” and ”conceptualization”, thus following the two anthropological directions, psychological and aesthetic [8].

3. New ethnomusicological analysis techniques

The lack of its own methodological tools has led to borrowing various models of analysis from linguistics, phonology, experimental psychology and acoustics, in order to understand the relevant criteria that can clarify the articulation means between music and the studied sociocultural context. In a general manner, all these concur to the analysis of the music act and contribute equally to highlight the anthropological dimension of each ethnomusicological approach. Of the many possible approaches that can be applied in the typological classification or in the comparison of the melodic, rhythmic or metrical features in folklore genres, we will hereinafter mention nine.

3.1. Descriptive statistics deals with the collection, classification and presentation of numerical data and inferential statistics deals with the interpretation of data offered by the descriptive statistics and use them to draw conclusions.

3.2. Cluster analysis (grouping cases or variables) is a descriptive technique used for grouping similar entities from a data set or equally for highlighting entities that show substantial differences from a group. It includes two types of methods:

3.2.1. Non-hierarchical methods, of which the most well-known is **the k-means method**, which is based upon the k values (usually random) and based on them clusters are formed.

3.2.2. Hierarchical methods, which can be *agglomerative* (it starts from *n classes* (the number of cases) and leads to *a class* that *includes* all the other *preceding* it) and *divisive* (it starts from *a class* and leads to *n classes* (the number of cases) *included* in the starting class).

3.3. Fuzzy logic is a precise logic of imprecision and approximate reasoning. More specifically, the fuzzy logic can be viewed as an attempt of formalization / mechanization of two remarkable human capabilities. First, the ability to converse, to reason and make rational decisions in an environment of imprecision, uncertainty, incompleteness regarding the information, conflicting information, partiality of truth and partiality of possibility - in short, in an environment of imperfect information. Secondly, the ability to perform a variety of physical and mental activities without any measurements or calculations. In fact, one of the main contributions of fuzzy logic - a contribution that is not widely recognized - is its great power of precipitation. The fuzzy logic is much more than a logical system. It has many

facets. The main issues are: logical, fuzzy-set-theoretic, epistemic and relational. Most of the practical applications of fuzzy logic are associated with the relational aspect. [10]

3.4. Fourier analysis is applied and used in particular to problems of analysis of repetitive data sets from different areas: acoustics, statistics, geology, telecommunications etc. We add an example done by using the software "*EmapSon*" in which we see how the Fourier analysis highlights the complexity of the musical sound by the fairly large number of harmonics that accompany the fundamental frequency (see the next exemple).

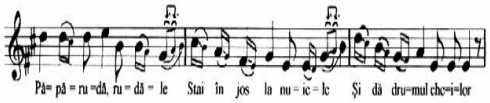

Fig. 1. *Example*

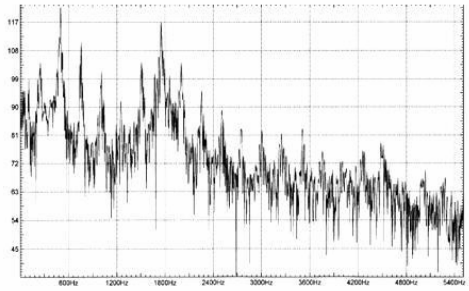

Fig.2. *Fourier analysis in detail*

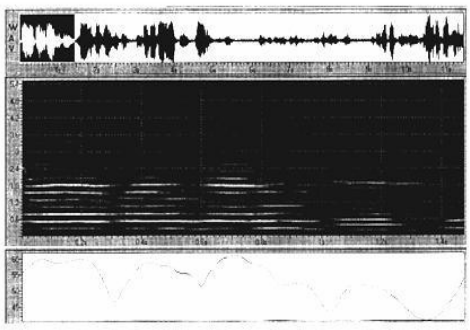

Fig.3. *General spectral analysis*

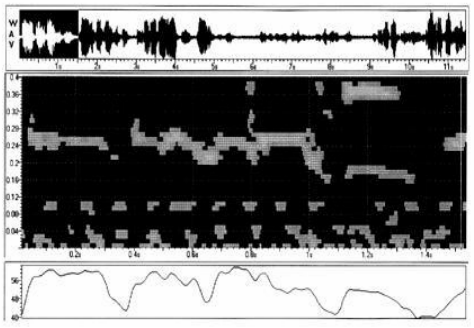

Fig.4. *Analysis spectral melodic*

The Fourier transformation enables us the representation of a repetitive song in another space than the height of each sound, i.e. the n-dimensional space of the period duration

3.5. Markoff chains method, created by the Russian mathematician Andrei Andreyevich Markov, starts from the arbitrarily premise that the height of a sound is determined directly or indirectly by the previous sound. In reality, the network of causality can be more complex and can be determined by an interference algorithm of the structure from the M.C.M.C. category (Markov Chain Monte Carlo), i.e. the Metropolis-Hastings algorithm.

3.6. Bayes networks analysis method is a classification method with both predictive and descriptive potential and owes its name to the British minister Thomas Bayes (1702-1761). It allows the analysis of the relationship between each independent variable and dependent variable by calculating a conditional probability for each of these relationships. When a new issue is intended to be classified, the prediction is achieved by combining the effects of independent variables on the dependent variable.

3.7. Fractal dimension. The hypothesis of the fractal structure of language was formulated in 1992 by Ludek Hreb Ieek, who observed the superstructure of the

sentences in the literary texts, an idea of a significant importance in quantitative linguistics. Language is based on rules and it is symbolic. Approaches from the category of music creation can benefit from fractal theory, which allows control over the complexity in order to adapt it to the human capacity for creation, interpretation and perception.

3.8. Golden Ratio, the irrational number known since ancient times and used in plastic arts to calculate proportions is obtained by dividing into two a line segment so that the length of the long side divided by the length of the entire segment is equal to the length of the short part divided by the length of the long part. The golden ration is equal to 1.61803398874989. The Golden ration is also linked to another important structure for proportions, the Fibonacci sequence, defined as: $x_0=1$, $x_1=2$, $x_{n+1}= x_n+x_{n-1}$

A melody can be divided into two, according to the highest point, usually regarded as the highest note.

3.9. Wavelet analysis is an objective method with a good theoretical basis for deduction of approximations in a song. It can be applied with superior results for longer songs - ballads, melancholy songs or instrumental songs, where they are obvious, from where they can be quickly lost in time [6, p.149].

In addition to these techniques from the field of mathematical analysis, we can also mention the contribution of the English anthropologist and ethnomusicologist John Blacking, who has directed his research towards biology. Blacking reasoned "music-making" in several important works, based on the human body, in both structures, genetic and physical, interpreting music as "a species specific practice within nature". Thus, culture is not particularly a context for music, but rather a product of musical practice, as a component of the fundamental human activities [1]. Blacking's provocative call to the biological sciences has stimulated interest in relating the musical phenomenon to the physical fundamentals, but failed to theorize a set of biological parameters for ethnomusicological investigation before his death in 1990.

4. Conclusions

In folklore music, one operates quantitatively on written substitutes of the interpretive act, classifying as a result of the analyses made and the comparison of alternatives. Research in traditional oral music must not carry on today with strictly musical means of investigation, means which, we must admit, have given some clear results so far, but which today, viewed from a generalized perspective, will provide a partial, superficial knowledge of the phenomenon.

It is clear that for the greatest possible objectivity and scientific relevance, it is important to correlate knowledge in ethnomusicology with the contemporary achievements in other fields, such as mathematics, physics, chemistry, biology, genetics, psychology, linguistics. Each of the analysis techniques proposed in this paper will develop much more consistent examples from the music field in the future.

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