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Abstracts

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SYMMETRY AND MOLDAVIAN MELOS
(measure, scale, mode)

The order of musical language forming has been searched for since antiquity. At that time such elements as sound and its composition, intervals, scales and their typology, tonality, ways of modulation and the rules of melody construction were being developed. They all refer to some extent to symmetry. However, the term itself does not appear in musical treatises of that epoch. Instead such concepts as rationality, proportionality, parallelism repetition, etc. are used. The term symmetry actively penetrates into musicology in the second half of the nineteenth century.

By now musical science has achieved certain results in revealing the symmetry in the structure of musical form, harmony, polyphony, rhythm, melodics and other means of expression. However, they are inadequate and sometimes contradictory. This may serve as an explanation of the fact that none of the existing musical encyclopaedias has the article on symmetry in music.

Measure(taktus) belongs to the number of main categories involved in this problem. Originally it meant a unit of measure. Later it was provided with power properties characteristic of musical language which can not be referred to a unit of measure. We mean the so-called metric times and the ways of distribution of various kinds of accents. Measures introduced alien elements into the natural melodic flow."Hard" and "light" times were more often missing or placed regardless of the rules of measure theory. Due to this reason the second function of the measure, such as the carrier (accumulator) of melodic power properties was rejected in the previous century at least in musical ethnography. The first function that measures and makes melody writing and reading easier causes no objections. But while writing down a melody from a phonogram various measures(bars) are chosen even by higly qualified experts. Which of the bars is the optimum? The solution of the given problem lies on the way of searching for invariant elements of the rhythm of the three syncretic arts: poetry, melos, and dance. They were first mentioned in Aristoxeni "Rhythmicorum elementorum" (IV B.C.). That is chronos protos(primary time) and its derivatives: chronos disemos, chronos trisemos, and chronos tetrasemos, long undeservedly forgotten by musicology.

Oscillographic analysis has corroborated the presence of the above mentioned time categories common for syllabic rhythm of the

singing folk poem and kinetics of folk dance in Moldavian folk-
lore. Their approximate average value is 150, 300, 450, 600 mil-
liseconds. These values are changed in live performance but on-
ly within the range of zonal nature of the tempo and rhythm of
the given genre. They form a symmetric group the basis of which
is arithmetical progression: 1.2.3.4. (correlation of elements).

Various combinations of these times lead to the generation
of invariant formations at a larger structural level. Thus, sym-
metrical binary formulae: chronos disemos + chronos disemos and
chronos tetrasemos + chronos tetrasemos are the bases of Molda-
vian folk dance rhythmics of "Syrba" and "Khangul" respectively.
The other binary formula: chronos trisemos + chronos disemos is
the basis of "Khora" folk dance. It illustrates the symmetry
(equality) of two proportions in golden section when the relati-
on of the whole to a larger patr is equal to that of a larger
part to a smaller one, or vice versa; this can be roughly shown
in a fraction 3/2 (2/3). Isochronous and one and a half (hemio-
lios) correlations are combined in ternary formula: chronos di-
semos + chronos disemos + chronos trisemos, presenting the rhyth-
mics of "De zestre" wedding dance.

The above-mentioned formulae, three binary and one ternary,
are the smallest measures which most naturally dismember the me-
lodies of the respective genres. Their values are determined af-
ter the quantity of primary times (chronos protos). Depending on
the last note designation, a quaver ($\flat$) or semiquaver ($\flat$), for
four rhythmical formulae we will get the following fractions:
4/8, 5/8, 7/8, 8/8 or 4/16, 5/16, 7/16, 8/16. This is a mathe-
matical expression of measures as symmetrical structures.

There are song genres not correlated with dance. They com-
prise such recitative forms as "bochet" (mourning over the de-
ceased), ballads and "doinas". They cannot be divided into bars.
They have a different form of symmetry which appears at a larger
structural level; the subject, song poem, rhyme, strophe, etc.,
which are more or less described in literature.

Another important aspect in the theory of musical language
causing differences in folk-lorists' opinions is the problem
of scale and mode. The absence of complete and clear differenti-
ation comes from lack of knowledge of the symmetric nature of
these atructures.

Thus, the scale is defined as the sequence (upwards or
downwards) of all the sounds used, for example, in a song melody.

This definition is of one-sided character and is not correct in general. It does not alow for the fact that it is the function of the tone that serves as an organising element but not the tone itself as an acoustic factor. With this in view a musical scale is not a pure sequence of tones, but that of tone functions. In a melody tone functions often change. For example, in a folk song after modulation from the major key into parallel minor key one and the same tone material in the first key forms one sequence of functions in the other key it forms another sequence. Such an approach to these structures turns the scale into a symmetrical group , where every interval-function is a sum or a difference of the other two. The number of tonal transitions in a song (up to five in a Molavian song) is equal to the number of symmetry groups,i.e. scales. Up to now it was considered that there is only one scale there.

The symmetrical nature of a scale of any structure gives rationality to music space and turns it into a category of people's musical thinking. Synoptical comparison of over a thousand Moldavian folk songe showed that all of them were grouped around six main tonal systems. Each of them has two invariant elements, i,e, the starting and the finite tonality. The arrangement of the middle tonalities in a melodic strophe varies from one song to another forming a series of congeneric formations, the whole complex of which is named by us as a   m o d e   p a r a d i g m.

Taking as a basis an interval separating the starting tonality of a song from the finite one we can get the following names for each of the six mode paradigms: subfourth, subtonal,of the same name, third (three semitones), fourth and quint, as shown in Fig. I. (The finite tonality is lettered in "G").

Starting tonalities	Middle tonalities	Finite tonality
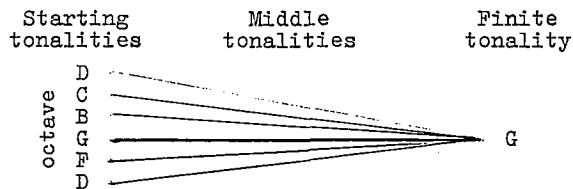
The peculiarity of the system consists in the fact that a melodic line developing in any of the six mode paradigms is sure to come to "G" point of octave golden section. Each of mode paradigm tonalities presents an intonational sphere with a number of standard melodic formulae that were historically created in the melos of the given ethnic unity. They are often interchangeable and that is a condition for variability, on the

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one hand, and the way of symmetry manifestation at the level of syntax formation functions, on the other.

Mode paradigms were formed, as seen from Fig. I., on the stages of anhemitonic scale representing as any other musical scale a group of symmetry. From here follows the symmetric nature of the whole of the tonal system of a folk song.

The system of the above-mentioned rhythmical structures and mode paradigms is the basic element of genetic foundation of the Moldavian melos kept in the people's memory and passed on from one generation to another, orally, just as verbal language.

References

I. Lvov A. O svobodnom ili nesimmetrichnom ritme. Sanctpeterburg. 1858.

2. Tyulin Yu. Naturalnye i alteratsionnye lady. Moskva,1971.

3. Shubnikov A.,Koptsyk V. Simmetriya v nauke i iskusstve.Moskva 1972.

4. Stoyanov P.Ritmika moldavskoi doiny. Kishinev, 1980.

5. Stoyanov P. Moldavski melos i problemi muzykalnogo ritma. Kishinev,1985.

6. Lomanov M. Elementy simmetrii v muzyke./Sbornik "Muzykalnoye iskusstvo i nauka". Moskva, 1972.

7. Aristoxeni. Rhythmicorum elementorum fragmenta. /Aristidis oratio adversus leptinen pro Socrate. Venetiis,1785.

8. Riemann H. Systematische Modulationslehre als Grundlage der musikalischen Formenlehre. Hamb.,1887.

9. Barbaud P. La musique, discipline scientifique. Paris,1971.

10. Czekanowska A. Etnografia muzyczna. Metodologia i metodyka. Warszawa, 1971.