

Aspects of the relationship between music, geometry and number in the own work, “O”

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Abstract: The present research proposes an introspection on my own work „O” for trombone and percussion, both in terms of: (1) the symbolic content originating from the interaction of the domains mentioned in the title, (2) the form, as sound architecture, (3) as well as a possible decryption of the act of creation, as a result of the first two, viewed from and through the interiority of the composer in the process of mental-theoretical preparation that generated the actual composition, sprinkled on journey. To begin with, a few considerations will be presented on the relationship between music and the geometry and symbolism of numbers, especially the sign in the title and a few of its interpretations. There will be a brief analysis regarding the segments and structures that make up the form, with the mention of some scales, melodic, rhythmic, timbral particularities, viewed in correlation with the script and (possibly) originating from the script. From the beginning of the process of creating the piece, I had in mind the possibility of presenting the piece as an abstract instrumental theater, with choreographic inlays.

Keywords: geometry, number, symbol, musical shape, circle, zero, sphere.

1. Music, numbers and geometry

The choice of the title "(o)" as a sign, which is open to a variety of graphic and symbolic interpretations, may, it is acknowledged, initially perplex the reader. This endeavour is driven by an aspiration to explore the potential of geometry and mathematics in generating musical compositions, thereby unveiling novel avenues for the artist's compositional expression. In the plethora of sources of inspiration for the music I have composed, this particular direction occupies a significant position in my creative process, giving rise to some of the most idiosyncratic and innovative compositions I have ever produced. It is widely acknowledged that since the 20th century, composers have concurrently engaged in the act of creation and initiated the development of a theoretical foundation derived from diverse spiritual domains. This phenomenon has been observed by Aurel Stroe, who has asserted that music serves not only as a medium for expressing emotions, but also as a conduit for conveying ideas.

Prior to delving into the connotations of O, it is imperative to undertake a retrospective analysis. The following text was published in issue 2/2008 of the

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magazine from Cluj, which was published under the auspices of the "Gh. Dima", *Intermezzo*:

“In the realm of geometry, I began with the concept of space. I thought of space as a 'sphere' of harmony derived from the symbolism of geometric figures. I considered the relationship between the space 'inside' and the space open to our gaze.

Due to a certain number of sides, angles and facets, geometric figures are closely related to numbers and the symbols they contain. These thoughts mainly reflect the stage of personal interrogation on the relationship between the compositional process and the symbolism of numbers and geometric figures.” (Pop, I., 2008, p. 33)

Restless youth. On revisiting the article, I am struck by the interesting dialogue I have had with myself over time. In the course of this research, I will revisit some of the ideas from that time.

The piece “O” was written in 2006 and performed at the Toamna Muzicală Clujeană festival that year, with the addition of trombone, percussion, and piano improvisation during the concert, performed by me.

This piece is only the first in a trilogy: the second piece, “Δ”, was written the following year; the third piece, “□”, is currently in progress.

1. Returning to the O, it can be interpreted as a sign that contains cosmic connotations, related to the universe and its genesis through form and symbolism; this geometric figure that can mean the number 0, circle, egg, sphere, planet and probably many others, seems to be as old as the dawn of time.

Concerning the numeral 0, it can be posited that it is a: “Word derived from the Arabic sifr, which can be translated as 'void'. The numeral sign is devoid of inherent value; rather, it serves to substitute for absent values in numerical expressions. Its representation, historically, has been attributed to the image of a shell or a snail. It is known that the snail is itself a symbol of periodic regeneration. [...] It also symbolises the object which, without having value by itself, gives value to the others only through its position. In this sense, the object in question can be regarded as a multiplier, thereby augmenting the values of the numbers positioned to its left by a factor of ten. It thus approaches the initiatory significance of the Fool of the Tarot, the only blade among the major arcana which is not numbered but which can give value to or cancel the others according to its position or the + or - x or : sign preceding it.” (Chevalier, J. & Gheerbrant, A., 1994, pp. 490-491)

It is unfortunate that the limited length of this article precludes a full exploration of the fascinating Tarot deck under discussion and the symbolism it embodies.

I revisit with delight the notes that were made some years ago on the symbolism of the zero and the circle. The fervent pursuit of knowledge and the joy of discovering new things. The concept of the zero digit, which can be

defined as the *absence of numerical value*, is a complex subject to comprehend. It is theorised that the zero digit, this *nothingness* - when added to any of the nine digits, multiplies the result by ten. I discovered then:

“The term «zero» is derived from «the Medieval Latin of the thirteenth century»: the term *Zephirum*, the accusative of *Zephirus*, which is used to denote the spring wind that blows from the west, so weak that it is considered «a wind of nothing»: but it also comes from «the cipher, which in turn comes from the Arabic word *sifr* - and meaning 'nothing', and is crossed with the Old Spanish word *zero*.» (Devoto, G., 1967, pp. 80, 464) According to some authors, the etymology of the number in question is Arabic in origin, with the digit being directly derived from the Arabic numeral. It has been established that the Arabic word *zerret* signifies «thing of nothing.» (Boncompagni, 2004, p. 17)

As previously mentioned, further connotations can be discovered to the number 0:

“In the mythology of the «Popol Vuh», this figure «corresponds to the moment of divine sacrifice, which is linked to the cycle of the maize crop.» It is a sacrifice that is understood as a moment of passage from one life to another, or, in other words, as a transition from one stage to another in the universal evolutionary cycle.” (Boncompagni, 2004, p. 19)

In this manner, the zero value is indicative of the disintegration of the seed in the earth and the transition from the latent embryonic stage to the germinating embryonic stage, in which life manifests itself anew. It is the contention of this paper that such a perspective engenders the possibility that the universe was not, in fact, brought into existence, but has instead been continuously “reborn”.

“Having reached this point, it is not difficult to discover the close connection between the symbol of zero and the archaic symbol of the shell or the snail, the spiral, the pine cone, and most notably, the egg. The figure zero, in its most primitive graphic form, is arguably representative of an egg. Consequently, the ancient doctrine concerning the egg can be identified with the symbolic meaning of the figure that is the focus of this chapter.” (Boncompagni, 2004, p. 20). Death and (re)birth in both the vegetable and human worlds, as well as the opening of the imaginary universe towards forms in nature that resemble the number zero, these are the beneficial meanings that emerge from the meanings that *the image* of the number zero opens up in a fan of meanings. For the performance of the piece, the percussion instruments were arranged in a circular formation, with the trombone positioned centrally.

The following discussion will address the symbolism of the egg. The following excerpt is taken from the work *Mythology of the Egg* (1992) by Marin B. Marian:

“«In this world, when without brightness and light it was enveloped in darkness on all sides, there appeared from the beginning of (that) yuga

[millennial epoch], as the first cause (of creation), a giant egg, the eternal seed of all beings, which is called Mahadvya.» (Mahabharata, Book I Adiparva, I, 27-34)” (Kernbach, V., 1978, pp. 57-58). The egg is presented as the material and spiritual matrix of all things, representing an enigmatic emergence of its own power from the primordial blackness.

In order to establish a foundation for the subsequent discussion of the egg's significance in ancient texts, it is necessary to first consider the symbolism of the circle in relation to ritual and dance.

“The straight line, the curved line and the circle also suggest the figures of the magical ritual dance of the savage peoples, for whom the circular and circular arrangement are traditions which, through rhythm, acquire power, a sacred element and a frenetic, emotion-filled movement capable of making us believe that circular movement could conceal within itself «who knows what great mystery of life» (Lindsay, J., 1965, p. 152). Thus the circular motion of the percussionist would be invested with sacred powers that open the "strings" of creation. A series of observations on the monad, as found in Iamblichos' book *The Theology of Arithmetic*, are also left for future research.” (Iamblichos, 2006)

It is important to note that the information presented here constitutes merely a fraction of the existing material on the subject. However, it is important to note that the transition to music should be gradual, and the initial steps taken should be in a direction that echoes the origins of the world, as previously described:

“«In the beginning was nothing but water, a sea of water. These waters wanted to spread. They toiled and practiced asceticism (tapas). Then a golden egg hatched in them. It floated on the waters for a year. After a year, a man was born from them. This was Prajapati. He broke the golden egg. But at that time there was no state. That's why the golden egg floated, carrying him for a year. After one year, Prajapati sought to speak and uttered 'bhuh', and this (word) became the earth; 'bluvah' and this became the sky.» (Satapatha Brahmana, XI, 1, 6)” (Simenschy, Th., 1978, p. 49)

2. From the sound of F# to the architecture of form

Returning to “O”, let's detail some elements of construction:

- the starting sound that generates the entire discourse is F# (I1). We couldn't say why. Perhaps it is because it is in the augmented fourth of the C sound, which the tonal-functional system has ingrained so deeply in our habit, or simply because of its graphic appearance and coloring?

- the sounds of C (the antipole of F#, suggesting the birth of a universe by attraction and repulsion at the same time) will be employed in I2, E (as the seventh over the octave of F#, the central point so far) in I3, and then B (which, together with F# and C, will form the chromatic tritone B-C-F#), which will be

conveyed in I4. It is evident that in I5, the appearance of the sound $D\#$ and melodic permutations is in addition to the already existing ones.

- the musical composition and the performers' gestures will be linked to the circle. The ideational foundation of the piece begins with creation, suggesting the emergence of a universe (perhaps from an egg) through the demiurgic effort of the two deities (see the drawing with the movement indications at the end).

The image shows a handwritten musical score for Trombone and Percussion, titled "O" for trombone and percussion, p. 1. The score is divided into five systems (I-5) and features a variety of percussion instruments including Conga, Tom, Bongos, Marimba, Cow Bells, Chans, Triangles, and Timpans. The notation includes rhythmic patterns, dynamics, and articulation marks. Circled numbers 1 through 11 are placed throughout the score, likely indicating specific points of interest or intervals. The score is written on a grand staff with a treble clef for the Trombone and a bass clef for the Percussion.

Fig. 1 „O” for trombone and percussion, p. 1

The intervals that are born between the sounds that appear in turn in the scene, namely the augmented fourth, the minor seventh, the major seventh (major second), and the perfect fifth, are not foreign to the tensions supposed to have existed at the beginning of the world. The symbolism of the figure 5 (I 1 5) is linked to the five elements in the Chinese tradition, but not exclusively.

The initial page of the score for the trombone and percussion instruments, ranging from I1 to I5, provides a clear illustration of the aforementioned points (Fig. 1).

This is followed by a transition segment (bridge) to the second structure, which heterophonizes in dialogue the sounds *A-Fb-Eb*, later and *B*, as well as their transposition to *D* (*D-G#-A-E*).

The second structure, from II, comprises five segments that have been modelled on the first structure, thereby developing the ideas from the former. This is followed by a new transitional segment, a link to the third structure, which represents a development of the material in the previous bridge.

The third structure (III) is based on the idea of the *ostinato*, originally built on five repeating sounds, three of which are fixed (*C-B-C#*), while the remaining two are subject to variation. This structure has three segments that flow from one another, following *the snowball technique*.

The fourth structure (IV) consists of two segments, of which the first one variationally resumes the theme of the bridge and the second segment introduces a welcome tranquillity (*tremolo* on three and four chords on the bass marimba), before the last structure which contains, as a surprise, a second climax of the work, namely a final *catharsis*.

The fifth structure (V) also has five sections (actually one section, divided into three segments), which are repeated four times in different keys. The percussion is based on the *aksak* rhythm, which increases with each incoming segment, respectively 12/16, 15/16, 18/16.

The general outline of the form will be:

I	II	III	IV	V
a c d e tranz.	e1 d1 c1 f f1 tranz (f2)	f3 f4 f5	f6 g	d2×5

It is evident that the structure under consideration is a pentapartite chain form, with repetitive implications that reach a culmination in the third section. The fourth section is characterised by a sense of calm, while the fifth section marks the resumption of new tensions. We notice among other things that harmony is frequently derived from melody, the incorporation of glissandos, the manifestation of heterophony, the diversity of musical concepts, and the dialogs between instruments.

There is a close relationship between spelling and musical meaning, both syntactic and morphological. The space (i.e. the staff, the system) determines the music and the musical writing determines the space, probing this bilateral relationship from within.

The circled figures situated above the second staff in each system are indicative of the change of instrumentation on percussion. In the third

chapter, the reader will also observe the score, including the movement elements that the trombonist is invited to perform. The piece could be performed without the instrumental theatre-dance elements, but the overall experience for the viewer would be significantly diminished. It is evident that the execution of the movement by the trombonist introduces a heightened level of complexity and technical intricacy. A more extensive discussion of the symbolism of the figure five would be required, but the length of this article precludes such an undertaking. It is recommended that further insight be sought by means of Eugen Bindel's book, *The Mystique of Numbers*, from which the following brief quotation is provided:

“Do we not engage in the same practice today in the field so close to the world of numbers and music, when we establish the polarising influence of the number five as the number that forms intervals? The distinction between two types of tones, the masculine or major mode and the feminine or minor mode, is produced by the opposition of two thirds, the major third and the minor third. The two thirds are based on the number five, which is linked to the major third by the number four and to the minor third by the number six; a string twisted $\frac{4}{5}$ of its length produces the major tone of the fundamental chord of the string and vibrates $\frac{5}{4}$ times faster than the whole string. The same is true for the minor third with a ratio of $\frac{5}{6}$.” (Bindel, E., 2008, p. 35)

3. The compositional intentions

Regarding a possible deciphering of the act of creation, seen *from* and *through* the interiority of the composer in the process of mental-theoretical preparation, and subsequently how this process gave rise to the composition itself, I will make a first reference to a reference author for me, namely Jung:

“The collective unconscious is a part of the psyche that can be negatively distinguished from the personal unconscious in that it does not owe its existence to personal experience and is therefore not a personal gain. [...] The collective unconscious is not formed during the lifetime of the individual, but is inherited. It consists of pre-existing forms - the archetypes - which can become conscious only in a mediate way and give the contents of consciousness a well-determined form.” (Jung, C.G., 2003, pp. 53-54)

Despite the passage of nearly two decades since the composition of the song “O”, the intellectual and musically-sentimental atmosphere in which I was living, and the discovery of such things, remains vivid in my memory. A reactualization of that mood is welcome. Although the leaning towards geometric figures is only one of the directions in which my composing has evolved, I can say that (the direction) is among the most meaningful, philosophical, mysterious.

satisfaction. The piece is not at all written to align with the audience's preferences, as it is characterised by its unpolished nature. Nevertheless, it proved to be a resounding success among musicians specializing in contemporary music.

Following the theoretical documentation, which established the underlying climate that served as the foundation for the composition of the piece, the abstract aspects of numerology and geometry were superseded. Instead, the focus remained on cosmogonic mythology (deriving from Romanian mythology), conceptualised within a constructivist framework, as a creative ritual enacted by two youthful deities (*Fârtatul* and *Nefârtatul* in opposition to the trombonist and the percussionist), executed with a quasi-playful demeanor. (Vulcănescu, R., (1985, p. 343)

I mentioned about the possibilities of instrumental theatre that unfold in music written on the basis of numbers and geometric figures; here is a fragment from the score of the work “O”, which indicates elements of movement (Fig. 2).

The numbers along the way must be correlated with the final percussion scheme, from which will result for each moment the percussionist's placement on the stage and the instrumentation he will use. This is how the idea and the image of the circle are used not only as a graphic suggestion for the composition of the music, but also for the circular movements of the trombonist, as well as for the circular path that the percussionist will follow throughout the piece.

At the time of the performance I created *ad hoc*, improvising on the basis of the existing elements, a piano part, which can be seen (the composer being at the piano) as a dialog of the creator with his own work.

“First of all, we must ask ourselves whether certain basic geometric shapes should not be considered as archetypes that have always existed and are the fruit of a common universal heritage, gradually rediscovered by all the intelligent creatures that populate the universe. And if so, when and where exactly did man discover them? The most ancient peoples of the world have always practiced a kind of divination that should perhaps be regarded as the earliest example of the art of predicting the future: geometry - understood as the magical practice of interpreting «points, lines, figures or circles of obscure meaning, and then making predictions». This practice was particularly appreciated and «used by the Persian magicians who are considered the first geomancers»¹ (Premoli, P., 1928, p. 80). Is it possible that geometry - after having lost its magical and symbolic significance and acquired only an applied character, as Euclid intended - may also have its origins in the practices mentioned above?” (Boncompagni, 2004, p. 148)

¹ The term „Geomanzia”.

4. What are the benefits that can be derived from this?

What more could be added? Perhaps what Blaga said about himself: "I am nothing but a hand writing a message from the universe". As much as we want to make ourselves important in this world, influenced by our ego, we are nothing but the emanation of a cosmic energy that manifests through us.

In place of conclusions, I return to Solas Boncompagni's opinion: "To plunge into the study of numbers after starting from the number zero - the number that gave birth to them - is like going down a road without an end, because the number system is infinite and so are the meanings that justify their reason for existing through a very rich sacred symbolism. (...) This is why the language of numbers is universal; it precedes ideographic writing and the creation of the alphabet" (Boncompagni, 2004, p. 27).

Each number is a universe in itself. The variety of meanings that numbers suggest is astonishing. What is important is that they penetrate deep into the severes of history and human civilization, constituting a self-generating germ of perennial meanings, closely linked to sacredness.

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Handwritten musical score for percussion instruments. The score is divided into three systems, labeled III, IV, and V.

System III: Features TRB (Tom Tom) and GUIRO. The TRB part includes dynamic markings like *sfz* and *sf*, and rhythmic patterns with accents. The GUIRO part consists of rhythmic patterns with accents.

System IV: Features TRB, VIBR (Vibraphone), and GLOCK (Glockenspiel). The TRB part includes markings like *c. sord.*, *5:3p*, *sfz sfz*, *full secco*, and rhythmic patterns with accents. The VIBR part includes markings like *Mar.*, *b. metal*, and *104*. The GLOCK part includes rhythmic patterns with accents.

System V: Features TRB, MAR BASS (Maracas/Bass Drum), VTRB (Vibraphone), and IRC (Iron Chimes). The TRB part includes markings like *mf* and *mf*. The MAR BASS part includes markings like *mf* and *mf*. The VTRB part includes markings like *1. mf*, *2. f*, *3. ff (full)*, *4. fff (full)*, and *5. f*. The IRC part includes rhythmic patterns with accents.

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