
THE SYNERGETIC ASPECT OF EDGARD VARÈSE'S COMPOSITIONAL THOUGHT

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Abstract: Edgard Varèse’s enigmatic figure leaves a lasting imprint on the musical life of the 20th century – an age of bold experimentation and of combining various scientific fields. The tendency towards interdisciplinary exchange of concepts, principles and methods is still highly relevant even today. In this context, the following study aims to introduce a contemporary and innovative interpretation of Edgard Varèse’s concepts. The central element in his compositional thought is the sound – E. Varèse calls his music “organized sound” and as early as the beginning of the 20th century starts forming his musical and aesthetic pursuits of new qualities of the sound, bordering on the abstract and the supernatural – intelligence that is in sound, transmutation of sound masses, four dimensionality, sound-projection and spatiality. He fluently handles concepts from the natural and technical sciences and offers provocative definitions. Through analysis of Edgard Varèse’s writings, this study reveals and develops in a new way his aesthetic and theoretical system. This system includes the totality of concepts and ideas relevant to his specific compositional method; his entire musical vision for “the liberation of sound”. The study reveals the interdisciplinary nature of his concepts, which in turn enables the application of the synergetic paradigm. The synergetics as a scientific branch dedicated to the study of natural systems and processes makes it possible to analyze and interpret the composer’s concepts from a point of view closely related to the natural sciences – and accordingly, to the one of Edgard Varèse himself. In order to achieve that, the main synergetic principles are laid out and juxtaposed to their analogies in Edgard Varèse’s compositional thought. Through the examination of the main synergetic principles and their analogies is reached the main finding in this research, namely, Edgard Varèse’s concepts of the “liberation of sound” form a system, which is synergetic in its essence. This statement is supported by presenting a practical example of synergetics from his composition “Poème électronique” – one of the landmark works by Varèse. The application of the synergetic paradigm by no means is new to the field of musicology, but in relation to Edgard Varèse’s work such an approach stands as innovative. Based on the derived analogies to the main synergetic principles in Edgard Varèse’s concepts (interdisciplinary by their nature), the synergetic approach appears not only logical, but also legitimate. The dynamic development of the forms of musical expression in turn legitimately necessitates the corresponding enrichment of the musical-theoretical apparatus with newer analytical and research means and approaches.

Keywords: Edgard Varèse, synergetics, interdisciplinarity, electronic music, liberation of sound.

1. INTRODUCTION

As one of the boldest experimenters of his time, Edgard Varèse (1883 – 1965) is associated mostly with the inception of the electronic and electro-acoustic music even before its legitimization as one of the bright and most revolutionary musical phenomena, even before “the electric and electronic instruments and devices could enable the new sound creation” (Martináková, 2014). The career of Varèse is the touchstone in the history of electronic music and it “neatly bisects the twentieth century into an early period of prophetic speculation and a later phase of genuine artistic accomplishment” (Patteson, 2016, p. 4). His determination and ingenuity are a “hallmark of composers and inventors alike in the field of electronic music” (Holmes, 2016, p. 5), among them K. Stockhausen, P. Boulez, Y. Xenakis, L. Nono and others. Edgard Varèse’s concepts are represented in a number of works – articles, lectures, interviews etc., crucial among them being the lectures collection “The Liberation of Sound”⁴⁰. The central element in his compositional thought is the sound – Varèse calls his music “organized sound” and as early as the beginning of the 20th century he starts forming his musical and aesthetic pursuits of new qualities of the sound, bordering on the abstract and the supernatural– intelligence that is in sound, transmutation of sound masses, four dimensionality, sound-projection and spatiality. “My aim has always been the liberation of sound – to throw open the whole world of sound to music” (Varèse as cited in Ouellette, 1973, p. 47). The new sonic world of Edgard Varèse is characterized by liberation from the tempered system; the possibility of forming any desired scale or harmonic and sub-harmonic combinations; new timbers, new dynamics and cross-rhythms; a sense of sound-projection in space etc. Due to the problematic status of Varèse’s central concepts and ways of describing his compositional work, their exegesis requires “rethinking of its own theoretical resources to establish new cross-connections to other modes of thought” (Döbereiner, 2014, p. 268). This is also the aim of the following study – to introduce a contemporary and

⁴⁰This edition from 1967 includes excerpts from lectures by Edgard Varèse from 1917 until 1962, compiled and edited with footnotes by Chou Wen-Chung.

innovative interpretation of Edgard Varèse's concepts, unveiling their interdisciplinary nature, which in turn enables the application of the synergetic paradigm.

2. INTERDISCIPLINARITY AND EDGARD VARÈSE

Interdisciplinarity is inherent to both Edgard Varèse's life and creative aspect. With an educational background in engineering, he retains his interest to diverse scientific fields and various technological aspects of musical arts over the course of his entire life journey. This interest is transformed into the concept of music as an "Art – Science", which is also apparent in his practice – on one hand, in Varèse's experiments with new technological tools and his collaborations with numerous scientists and inventors of electronic musical instruments, and on the other, in his sustained lifelong attempts to create a specific musical laboratory. In relation to Edgard Varèse's compositional work, the interdisciplinarity has its obvious manifestations. One of them is the composer's goal to create "a total work of art" or a "Gesamtkunstwerk" – the blending of different arts in one work (one of R. Wagner's goals throughout the 19th century). Another apparent manifestation is the development of a specific theoretical apparatus. Varèse's ability to "wield fluently concepts from the natural and technical sciences and to offer provocative definitions" (Benova, in-press), reveals his individual perception of the expression methods of his artistic ideas – i.e., the interdisciplinarity is immanent to Edgard Varèse's compositional thought. In fact, his entire musical vision, philosophy and aesthetics are built on an interdisciplinary scientific platform, based on spatial metaphors. The interdisciplinarity in the post-modern art and its perspectives are the subject of Emilia Kolarova's treatise, in which she researches "the dialogue (or synthesis) between music and technologies as an experiment and energy for the future" (Kolarova, 2013, p. 173). According to Maria Kostakeva "the trend to general "metaphorization", through which processes and phenomena from completely unrelated fields are not only being matched to each other, but are also providing mutual explanation, obtains the status of a paradigm in the modern era" (Kostakeva, 2019, p. 6). This trend is not just apparent in Varèse's works, but also defines to a great degree his specific expression. Another phenomenon, that according to M. Kostakeva characterizes the New Music, is that "the principles of its organization are getting increasingly close to the organic processes and natural events" (Kostakeva, 2015, p. 12). Hence the new, based on the synergetics, approach to Edgard Varèse's concepts and their interpretation finds its basis in the context of the thus described model of musical thinking due to the apparent interdisciplinarity in his works.

3. THE SYNERGETICS – A NEW APPROACH TO THE CONCEPTS OF EDGARD VARÈSE

The following study uses the term "Synergetics" according to the definition and meaning, attributed to it by the German physicist Hermann Haken (Haken, 2004) as an "interdisciplinary scientific branch, studying the interaction of multiple subsystems working together, which results in the emergence of a structure and its relevant functioning on a macroscopic scale". It deals with complex systems, i.e. systems that are composed of many individual parts that can spontaneously form spatial, temporal or functional structures by means of self-organization. Originating in the framework of the exact sciences, the synergetics apply in other scientific fields as well. Hermann Haken himself states that "its most important possible applications would address the specific humane and social processes" (Haken, as cited in Knyazeva, 2006, p. 11). According to M. Bushev, the culturology is amidst the areas where self-organization phenomena may be observed. He's providing examples of such phenomena as "spontaneous inception of schools in arts and science, inception of a new paradigm" (Bushev, 1992, p. 71). The synergetics imply various methods of application and interpretation of one or another problem in the musicology. For example, A. Klyuev perceives music "in the unity of its variations as a self-developing system in the framework of the general global evolution of the sound structures" (Klyuev, 2012, p. 145-146). A. Koblyakov (Koblyakov, 2002) studies through the prism of the synergetics the juxtaposition of intuition and logic, of practice and theory, of creativity and science, aiming to define a "universal creative model". E. Goryachkina (Goryachkina, 1995) aims to draw analogies and to discover the relationship between the processes of self-organization in the natural, cosmic and musical matter.

The application of the synergetic approach in this study allows reaching a new interpretation of Edgard Varèse's concepts. Through analysis of Edgard Varèse's writings, this study reveals and develops in a new way his aesthetic and theoretical system, the elements of which exhibit key main synergetic principles. Hence the following thesis can be stated: **Edgard Varèse's concepts of "the liberation of sound" form a system which is synergetic in its essence.** With the thesis thus formulated, two crucial points need to be made. The first is the clarification of the term "system". In this case it is being used in the meaning of "a set of things working together as parts of a mechanism or an interconnecting network; a complex whole"⁴¹. Therefore, "aesthetic and theoretical system" here is supposed to mean the totality of concepts, relevant to Edgard Varèse's specific compositional techniques, his musical vision, his idea of the sound and its liberation. The distinct elements of his compositional thought are unified in a complex

⁴¹ Lexico Dictionary, by Oxford. Retrieved from <https://www.lexico.com/definition/system>

whole, organized by and subject to respective principles. Thus comes the second clarification – it refers to the main synergetic principles, which can be found in Edgard Varèse's compositional thought and to which this system is subordinate.

4. MAIN SYNERGETIC PRINCIPLES AND THEIR ANALOGIES IN VARÈSE'S CONCEPTS

The following study introduces these principles using the “key notions revealing the synergetics’ essence” (Haken, as cited in Knyazeva, 2006, p. 5) according to its founder Hermann Haken and reveals their analogies in the composer's concepts:

Principle 1. The systems being examined consist of several or multiple uniform or diverse parts which are interacting with each other.

Analogy: The musical form as a resultant – the result of the process of the interaction of various elements. Organized sound.

In his writings Edgard Varèse makes an interesting analogy between the formation of his compositions and the phenomenon of crystallization (the crystallization process is synergetic in its essence): “There is an idea, the basis of an internal structure, expanded and split into different shapes or groups of sound constantly changing shape, direction, and speed, attracted and repulsed by various forces. The form of the work is the consequence of this interaction. Possible musical forms are as limitless as the exterior forms of crystal” (Varèse, 1967, p. 203). Varèse defines his music as “organized sound”: “music as spatial – as bodies of intelligent sound moving freely in space” (Varèse, 1967, p. 204). “Varèse speaking of ‘the intelligence that is in sound’ attributes intelligence to living sonorous materiality itself” (Döbereiner, 2014, p. 285). Clearly the conclusion is that the sound possesses its own internal intelligence and motion, independent and not subject to man, i.e., a process of self-organization is observed.

Principle 2. These systems are non-linear.

Analogy: The music of Varèse is non-linear – it has voluminous qualities; sound masses and sound-projection; three- and four- dimensionality.

The specific compositional techniques of Edgard Varèse are of fundamentally non-linear nature – the idea of voluminosity and spatiality is substantial to his musical legacy: “When new instruments will allow me to write music as I conceive it, the movement of sound-masses, of shifting planes, will be clearly perceived in my work, taking place of the linear counterpoint. (...) We have actually three dimensions in music: horizontal, vertical, and dynamic swelling or decreasing. I shall add a fourth, sound projection” (Varèse, 1967, p. 197).

Principle 3. Where physical, chemical and biological systems are observed, these are considered open systems.

Analogy: If Varèse's music is perceived as a physical system, then it is an open one.

This synergetic principle at first glance seems non-applicable in the current context, since it relates to strictly natural processes. “But when you listen to music do you ever stop to realize that you are being subjected to a physical phenomenon?”, Edgard Varèse asks (Varèse, 1967, p. 199). Therefore, it is perfectly acceptable to examine Edgard Varèse's music as a physical system and this system stands as an open one. The composer's following statement attests to that: “I think of musical space as open rather than bounded, which is why I speak about projection in the sense that I want simply to project a sound, a musical thought, to initiate it, and then to let it take its own course. I do not want an a priori control of all its aspects” (Varèse, as cited in Varèse & Schuller, 1965, p. 36-37).

Principle 4. These systems are subjected to internal and external fluctuations.

Analogy: The phenomena of penetration or repulsion

The phenomena of penetration or repulsion is the result of collision of the sound-masses, during which their specific qualities come into interaction. In this process the separate elements expand, creating the impression of growth. This concept of sonic formation's growth supports Varese's perception of sound as living matter. The movement of those sonic formations and their interaction (or collision) is also a key factor for shaping the form.

Principle 5. The systems can become unstable.

Analogy: The unstable sonic formations of Varèse.

The analogues to unstable systems can be discovered more specifically in the sonic structure of Varèse's music. Timothée Horodyski pays special attention to the construction of the sound of Varèse. According to her, Varèse has a specific approach to effecting diverse timbres, and she points out that “in his play with the notes, he is filling the sound space with sonic matter in tension, intensifying or attenuating its partials in order to create sonic formations prone to instability or quiescence” (Horodyski, 1998, p. 208). Jonathan Bernard concurs that the sonic formations in Varèse's music can be unstable and thus “accounted for by movement which occurs on a level distinct from that of immediate succession” (Bernard, 1981, p.6).

Principle 6. Changes in properties occur.

Analogy: Transmutations

The changes in sonic matter's properties occur during the so-called transmutations. Transmutation is the process, over the course of which through penetration of the specific properties of a given sound mass in another, certain properties of both are changed. "In the moving masses you would be conscious of their transmutations when they pass over different layers, when they penetrate certain opacities, or are dilated in certain rarefactions" (Varèse, 1967, p. 197).

Principle 7. In these systems can be observed newly emerging properties.

Analogy: Oxygenation, new harmonic splendors, new dynamics, new timbres.

Those emerging properties in Varèse's music are: the oxygenation of the sound or the "spatiality of the sound, its enrichment or lightening; refreshing of the sound" (Benova, 2017, p. 142); a new harmonic splendor, possessing individual character – "building his individual system, Varèse is ambiguous in relation to centricity and acentricity, to the modal and (quasi) tonal approach" (Maklygina, 2018, p. 113); new dynamics, new timbres and new sonic combinations.

Principle 8. Spatial, temporal, spatial-temporal or functional structures emerge.

Analogy: On a micro level – sound masses and planes, zones of intensities, sound-projection. On a macro level – the form, the overall structure of the piece.

The emerging of such structures in Edgard Varèse's music can be examined on two levels. On a micro level (within a certain piece or a section of it) specific sonic formations appear. These formations are as follows: *Sound masses* – the vertical organization of the musical material, a totality of sounds with specific qualities; *Planes* – the horizontal organization of the musical material, sonic formation with a melodic function; *Zones of intensities* – the dynamic organization of the musical material, differentiated by various timbres or colors and different loudness; *Sound-projection* – spatiality of the sound, its ability to flow continuously with constant volume, the fourth dimension in music.⁴² According to Edgard Varèse's concepts those newly emerging structures are the four dimensions in music. They represent the organizational elements of another structure that emerge on a macro level – that is the musical form, the entire construction of the musical piece. This structure is defined by Edgard Varèse as "melodic totality" (Varèse, 1967, p. 197).

Principle 9. Structures can be ordered or chaotic.

Analogy: Chaos and order in Varèse's works. Rhythm.

The rhythm is an element that in Varèse's works can be simultaneously of chaotic and ordered nature. To the composer, the rhythm is the element of stability – "the element in music that gives life to the work and holds it together. It is the element of stability, the generator of form" (Varèse, 1967, p. 202). In a thusly presented definition of rhythm, it is logical to assign it to order rather than chaos. But Varèse offers several explanations straight after this: "In my own works, for instance, rhythm derives from the simultaneous interplay of unrelated elements that intervene at calculated, but not regular, time-lapses. This corresponds more nearly to the definition of rhythm in physics and philosophy as 'a succession of alternate and opposite or correlative states'" (Varèse, 1967, p. 202). This lack of relation between the elements and the irregularity of the time-lapses should rather be assigned to chaos. In other words, in Varèse's, music there can be simultaneously both order (stability, consistency) and chaos (instability, lack of relation, irregularity).

Principle 10. In many cases mathematization is possible.

Analogy: Usage of mathematical methods in Varèse's body of work.

The relationship between Edgard Varèse and the mathematics is evident in several respects. On one hand, to him mathematics is a source of inspiration (whether in relation to his compositional techniques or e.g. with regard to the titles of his works): "I often borrow from higher mathematics or astronomy only because these sciences stimulate my imagination and give me the impression of movement, of rhythm" (E. Varèse, as cited in L. Varèse, 1972, p. 228). On the other, in both the composer's music and concepts the application of a number of geometrical principles is clearly apparent – Michael Sprowles (Sprowles, 2004) examines form and pitch structure in Varèse's piece *Déserts* entirely through the prism of geometry, and Ivanka Stoianova (Stoianova, 2007) defines "the sonic geometry" of the composer as an element of his concepts and discoveries, that forms a model, appropriated by numerous composers in the second half of the 20th century.

5. THE SYNERGETIC ASPECT – PRACTICAL MANIFESTATION IN EDGARD VARÈSE'S WORK.

The synergetics has as well its practical manifestation in Varèse's work. A clear example is his piece "Poème électronique". Along with materializing the composer's vision (Benova, 2019), "Poème électronique" embodies both the notion of "complex system" and the concept of a "total work of art" – "a complete experience – the

⁴²The definitions of the terms are according to Benova, A. (2017).

Gesamkunstwerk” (Laudadio, 2016, p. 4). Several key aspects of the synergetic aspect manifestation in this work should be marked. According to Martin Flašar, “Le Corbusier embraced architecture as an integral part of a multimedia unit, a complete work of art, as part of a structure where interaction between individual elements starts” (Flašar, 2012, p. 15-16). In his treatise dedicated to the Philips Pavilion and “Poème électronique”, Mark Treib defines the work as a “conglomerate greater than any of its constituent parts” (Treib, 1996, p. x). In the so described by M. Treib complex structure it is also necessary to point out what it reveals: “In the Philips Pavilion the curving interior planes disappeared in the darkness of the interlude or beneath the projected colors and recognizable imagery of the “Poème électronique”. In response, the exterior of the building was forced to condense the symbolism necessary to carry the entire project; form, if intuitively derived, was mathematically tempered. Geometry, the creation of the mind, governed the architecture that contained a poem to humankind. Body and geometry; humanism and technology; chaos and order; despair and ultimate hope, remain the underlying oppositional messages of the poem and its pavilion” (Treib, 1996, p. 2). This quote clearly outlines several of the crucial synergetic principles, firmly supporting the study’s statement that Varèse’s concepts of “the liberation of the sound” form a system which is synergetic in its essence.

6. CONCLUSION

The application of the synergetic paradigm by no means is new to the field of musicology, but in relation to Edgard Varèse’s work such an approach stands as innovative. Based on the derived analogies to the main synergetic principles in Edgard Varèse’s concepts (interdisciplinary by their nature), the synergetic approach appears not only logical, but also legitimate. The synergetics, as an interdisciplinary scientific branch dedicated to the study of natural systems and processes, makes it possible to analyze and interpret the composer’s concepts from a point of view closely related to the natural sciences – and accordingly, to the one of Edgard Varèse himself. It’s also important to mention in this interpretation the relationship between these concepts and the electronic musical instruments as the “medium that can liberate the sound” (Benova, 2019). A relationship like this incorporates an opposition of sorts – synergetics and electronics, nature and technology, animate and inanimate matter, man and machine. But this opposition is only superficial. The pair of antipodes nature – technology is actually transformed by Varèse in a dualistic entity, in which (in his own words) “the entire work will flow as a river flows” (Varèse, 1967, p. 197). Edgard Varèse does not use natural processes and principles in order to embrace the technology; on the contrary, he is using technology as means of reaching a natural, inner harmony – be it in the shape of a river, a desert or a hyperprism⁴³.

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