

## Xenakis and Grisey on Musical Time

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**Abstract:** *Many composers of the twentieth century have reflected on the topic of “musical time”. Two of them were Iannis Xenakis and Gérard Grisey. In this context, we can discuss some common ground, but also several differences. First, we discuss points of attraction as far as Xenakis’ and Grisey’s attitude towards musical time is concerned. Secondly, we point out the differences that imply Xenakis’ criticisms of integral serialism and the existing contradiction between serial structure and the musical result.*

Key-words: *Xenakis, Grisey, integral serialism, musical time*

### 1. Introduction

Xenakis and Grisey – and actually also the composers of integral serialism – favoured a monistic (and not a dualistic) perspective of musical time. Dualism of musical time can be explained by reference to classical music and Hegel: In classical music, a sound event has consequences; it logically leads to the next event. A monistic attitude towards musical time contradicts to that logic of consequence.

### 2. Common grounds and differences at Xenakis and Grisey

According to Gianmario Borio, there are five main differences between monism and dualism. In a monistic perspective, the dimension of time can be separated from other aspects of composition. Second: The simultaneous perception of different layers of time is not only possible, but also seen as an aesthetic benefit. Third: The process of listening is no longer presented as a linear chain of events. Fourth: The quality of the experience of time cannot be neatly separated from the quantitative components. And fifth: Time can be understood as a process, but also as a constellation, whereby the individual forms of time can be

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traced back to an archetype.<sup>2</sup> Without doubt, these are points of attraction between Xenakis, Grisey and serial composers.

Nevertheless, there are also differences. In his text *La crise de la musique serielle* (1955), Xenakis criticizes integral serialism.<sup>3</sup> He criticizes the fact that serial composers are still attached to the twelve-tone row. In the music of today, Xenakis says, timbre and its potential is forming the core of music, and it is hard to see why composers still work with a series that divides the octave into 12 distinct units of pitches. His provocative question is: Why 12 tones? Why not 13 or maybe 15? These questions remind us of similar questions put forward by spectral composers in the 1970s.

Furthermore, he criticizes that there is a contradiction between serial structure and the musical result we are listening to. While the structure consists of horizontal or vertical structural units, the result we listen to is a mass of pitches, durations and timbres. Xenakis claims that the human being and its capability to perceive should be at the centre of composing.

The orientation towards perception became more important in the 70s and 80s. I would not say that the serial composers neglected perception – of course also Boulez, Stockhausen and Nono reflected on how their music might be perceived –, but in the 70s the reflection on the psychophysical constitution of the human being moved into the centre of theoretical considerations. However, it is striking that Xenakis started very early arguing in that direction.

Besides, Xenakis' harsh criticism of integral serialism can partly also be explained by personal reasons – he did not like the leading figures of serial music, and he associated their dominance with arrogance. He had the feeling that serialism was “on the wrong way”. And in an interview with Bálint András Varga he confirmed: “When I criticized the serial music thoroughly, I did not work on the basis of calculations – these would have been very complicated and at that time the theory of probabilities was still quite unclear to me. I relied on my intuition.”<sup>4</sup>

Gérard Grisey was born in 1947, thus he started one generation later and already found him

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<sup>2</sup> See Gianmario Borio, „Kompositorische Zeitgestaltung und Erfahrung der Zeit durch Musik: Von Strawinskys rhythmischen Zellen bis zur seriellen Musik“, in: Richard Klein/Eckehard Kiem/Wolfram Ette (ed.), *Musik in der Zeit. Zeit in der Musik*, Weilerswist 2000, p. 323: »Die monistische Zeitvorstellung hat ihre Wurzeln [...] in der dialektischen Philosophie des deutschen Idealismus. Kontinuität, Irreversibilität und Dynamik sind für sie unverzichtbare Attribute.«

<sup>3</sup> Iannis Xenakis, „La crise de la musique serielle“, in: *Gravesaner Blätter* 1 (1955), p. 2–4.

<sup>4</sup> Bálint András Varga, *Gespräche mit Iannis Xenakis*, p. 77: “Als ich die serielle Musik einer gründlichen Kritik unterzog, arbeitete ich nicht auf der Grundlage von Berechnungen – diese wären sehr kompliziert gewesen, und zu jener Zeit war mir die Wahrscheinlichkeitsrechnung noch ziemlich unklar. Ich stützte mich auf meine Intuition.”

self as an integral part of a movement that focused on psychophysics and perception. Still, like in Xenakis' case, his first paths as a composer were initiated by a critique of serialism and the structural concepts of musical avant-garde. Therefore, these two composers share a thorough critique of serialism. Still, it is very interesting to analyse the differences between them. Xenakis and Grisey both share a monistic attitude towards musical time. However, they interpret the relation between musical perception and structure in a different way, and thereby they also use different terms.

One of the special and widely discussed terms Xenakis uses is "Hors-Temps" (in English: "Outside of Time"). It is interesting to learn about how he came to use this term. When Xenakis dealt with questions of time, his wife drew his attention to the writings of the Swiss psychologist Jean Piaget.<sup>5</sup> Piaget had showed that time has a certain structure and that time intervals can be joined and interchanged. From this Xenakis drew the conclusion that time is nothing more than a mathematical structure, and that this structure is not dependent on the flow of time, but it rather structures music independently of its temporal constitution. Time can therefore be represented as points on a straight line.<sup>6</sup> Following these insights, Xenakis published several texts where his attitude towards time was explained.

In his text *Arts/Sciences: Alloys* (1976), he writes: "In order to understand the universal past and present, as well as prepare the future, it is necessary to distinguish structures, architectures, and sound organisms from their temporal manifestations. It is therefore necessary to take "snapshots", to make a series of veritable topographies over time, to compare them and bring to light their relations and architectures, and vice versa. In addition, thanks to the metrical nature of time, one can furnish it too with and outside-time structure, leaving its true, unadorned nature, that of immediate reality, of instantaneous becoming, in the final analysis, to the temporal category alone."<sup>7</sup>

And in his final article on Time (*Concerning Time, Space and Music*, 1981), Xenakis also speaks about temporal events as "landmark points in the flux of time":

1. "We perceive temporal events.
2. Thanks to separability, these events can be assimilated to *landmark points* in the flux of time, points which are instantaneously hauled up outside of time because of their trace in our memory.

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<sup>5</sup> See *ibid.*, 81.

<sup>6</sup> See *ibid.*, 82.

<sup>7</sup> Iannis Xenakis, *Formalized Music: Thought and Mathematics in Composition*, revised edition, compiled and edited by Sharon Kanach, Stuyvesant / New York 1992, p. 192.

3. The comparison of the *landmark points* allows us to assign to them distances, intervals, durations. A distance, translated spatially, can be considered as the displacement, the step, the jump from one point to another, a nontemporal jump, a spatial distance.
4. It is possible to repeat, to link together these steps in a chain.
5. There are two possible orientations in iteration, one by accumulation of steps, and the other by a de-accumulation.”<sup>8</sup>

Xenakis’ theory of landmark points in the flux of time implies that it is also necessary to memorize these points. If we forget about them, the architecture of music that is structured independently of the flux of time does not exist anymore for us listeners. Markings leave traces in our memory, and through memory we perceive the flow of time.

Let us imagine that the dimension hors-temps might also slip out of our memory. In this case, only inner time itself remains. Of course, there is a certain quality of time we perceive just in the moment of listening. However, in Xenakis’ theories and writings, this inner time has no theoretical place. In his opinion, the realm of Inside-Time eludes systematization: We cannot speak and theorize about Inside-Time. This is exactly the point where he does not agree with Grisey. In order to focus on this difference, let us continue with a short introduction to Grisey’s concepts of musical time.

As mentioned before, Grisey (like Xenakis) started his career with harsh words about the musical avant-garde of the 1950s. In his text<sup>9</sup>, *Tempus ex Machina. Réflexions d’un compositeur sur le temps musical*, he criticizes the irreversible rhythms of his teacher Messiaen. He states that the distinction between reversible and non-reversible rhythms or rhythmic symmetry and asymmetry mostly has no perceptual value. According to Grisey, the concept of irreversible rhythms shows to what misunderstanding of perception these composers had arrived. He continues that only a ‘superman’ of music could be provided with both a memory and a foreknowledge which would enable him to listen backwards and forwards at the same time. And he adds that this is only the business of a specialist who reads scores. According to him, such distinctions only take on a phenomenological value in a limited number of cases. Only short and simple rhythmic cells allow such a classification. Finally, he concludes: “Quelle image spatiale du temps musical mais aussi quelle anthropocentrisme que l’image

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<sup>8</sup> Ibid., p. 264f.

<sup>9</sup> Gérard Grisey, *Tempus ex Machina. Réflexions d’un compositeur sur le temps musical*, in : Gérard Grisey, *Écrits*, ed. by Guy Lelong, Paris 2018 (second edition).

d'un homme, milieu du temps, auditeur figé au centre même de l'œuvre qu'il écoute!"<sup>10</sup>

Several pages further, Grisey introduces his own theory, and for this purpose he uses different notions of musical time. One of these is the "skeleton of time"<sup>11</sup> – markings of time that structure the flux of music. At first sight, this term strongly reminds of Xenakis' dimension of Outside-Time. However, there is a main difference. Grisey does not speak only about the skeleton of time, but he wants to show us possible ways from chronometric to inner, pure time. According to Grisey, the process that leads from chronometric to pure time follows certain principles.

On this basis, Grisey develops the second dimension: the "flesh of time"<sup>12</sup>. This term refers to the relationship of sounds between which time can contract or expand. By these processes of contraction or expansion, the state of "pure time" can be achieved in two directions. On the one hand, the slowing down of a sequence of events creates a sort of expectation in the emptiness of presence. If the gaps between musical events become greater and greater, it gets harder to compare them with one another. The listener cannot decide between the pulse of his own biological time-flow and the slowing down of musical time. As a consequence, he gets tired, and in the end he possibly loses his musical memory.

Thus, Xenakis and Grisey come to different conclusions, as far as the role of musical memory is concerned. In Xenakis' theory, memory is a basic condition to achieve an architecture that is structured independently of the flux of time. In Grisey's case, the possibility that the listener might lose his memory is part of the game. This process of losing one's memory leads into the presence of time, into so-called pure time. This state of mind is achieved when time intervals are enlarged, so that we are not able to compare them to one another, or it can happen the other way round: If time intervals become smaller and smaller, we accelerate into the thickness of the present. In both cases we enter – according to Grisey – into another time, a "phenomenological time" that makes the inaudible audible. Grisey speaks of a sacred<sup>13</sup> dimension, and he goes with Stravinsky and Messiaen in saying: Music is nothing without time.

As far as different dimensions of time are concerned, in the late 1970s, 80s and 90s another aspect came to the fore: In 1975, the mathematician Benoit Mandelbrot (1924–2010) introduced his concept of fractal thinking. Fractals are figures where each part of the figure is a smaller replica of the figure itself, creating an endless pattern. Fractal phenomena are also found in nature, but as an

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<sup>10</sup> Ibid., p. 65.

<sup>11</sup> Ibid., p. 61.

<sup>12</sup> Ibid., p. 79.

<sup>13</sup> Ibid., p. 88.

approximate model with finite repetitions like the crystallization of snowflakes. In the context of music, this idea seemed promising: On the one hand, this concept was entirely new, but on the other hand, it could also be interpreted as a fulfilment or a realization of an old dream of avant-garde: the systematic connection between small and large. This aspect of fractal similarity between small and large can be exemplified by showing two examples in works of Xenakis and Grisey.

Xenakis' *Jonchaies* for orchestra was written in 1977, two years after Mandelbrot had published his fractal theory. It consists of five main sections and examines the fractal relationship between individual and collective movements. The title *Jonchaies* is derived from botany. Bulrushes, scientifically known as *Juncaceae*, are a grass-like plant that grows in clumps. If blown by the wind, each strand of rushes can react, but from the observer's perspective, it is also viewed as a distinct entity that responds to the wind.

One can describe this music as heterophonic. The melodic structure relates to pitch elements taken from scales that are formed on the basis of minor seconds and major thirds. These units are extra-temporal elements that can be followed in different dimensions.<sup>14</sup>

In section 1 (mm. 1–65), three layers of fractals can be seen in the instrumentation. This concept is combined with climaxes, turning points and impressive mass movements. The overall form is not strictly bound to this fractal concept but shaped according to the imagination of the composer. This central impact of imagination was confirmed by the conductor Arturo Tamayo who knew Xenakis well: "I am not certain that all of the calculations he used, which he never mentioned again once a work was finished, were indeed the matrix of his composition or whether he used them to channel and control his insuppressibly musical fantasy".<sup>15</sup>

In Grisey's works of the late 70s, there is another concept of musical form. In works like *Modulations* (1978) – the 4<sup>th</sup> part of *Les Espaces Acoustiques*, a big orchestral cycle –, the relation between small and large is structured more consequently. Part D of this work is composed as a 20-part polyphonic movement, realized in four groups of five instruments each. A brass instrument takes the leading role within each group. The individual phrases of the instruments relate to each other – they are permutations of the leading brass lines. The groups A, B, C

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<sup>14</sup> It is possible to associate this idea with Ligeti's Piano Etude No. 7 ("Galamb borong"). In Xenakis' and Ligeti's pieces, melodic units are derived from the pelog scale of Indonesian music. Another cultural connection between Xenakis and Ligeti can be identified in behalf of the notion 'heterophony': Ligeti grew up in the area of today's Romania, as did Xenakis.

<sup>15</sup> Arturo Tamayo, "Notes on the Interpretation of Iannis Xenakis' *Jonchaies*", in: Sharon Kanach (ed.), *Performing Xenakis*, New York 2010, p. 363.

and D are acoustically derived from each other by using brass filters. In the beginning, part D sounds complex and almost chaotic.

Gradually, however, the voices are synchronized. And from this process emerges the homophonic 13-note figure that underlies the cycle. In other words, there is a fractal relationship between single melodic lines and large figural units. Altogether, this process which leads from a chaotic towards a homophonic texture can be heard as an expansion of time. Thereby, the composer consciously attempts to shape the listener's inner experience.

Of course, in Xenakis *Jonchaies* it might also be possible to perceive and analyse processes of acceleration and deceleration of time. Nevertheless, in contrary to Grisey, these inside-time fluctuations were not reflected theoretically by Xenakis. He left this important aspect to the listener.

In his last text "Vous avez dit spectral?"<sup>16</sup> (1998), Grisey reflected on fractal thinking in pointing to the simultaneous emergence of spectral music and fractal geometry. Indeed, fractal structures gain more importance in Grisey's works of the 1990s. As an example of a fractal relation between figure and form, the first movement of *Vortex temporum* (1994–96) can be exemplified. Here, a wave figure from Ravel's *Daphnis et Chloé* is quoted and projected onto form. In the third movement, this figure is confronted with compressed and enlarged variants that are supposed to lead the listener into the realm of pure time.

### 3. Conclusion

Such a consequential connection between different dimensions of time Xenakis only realized in his electroacoustic works – a genre which is entirely missing in Grisey's Œuvre. This is another difference between these two composers who nevertheless both reflected intensely on the mysteries of musical time.

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<sup>16</sup> Grisey, *Écrits*, p. 127–30.

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