

Xenakian Cello: Philosophy of Sound and Technique. Performing *Kottos*

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Abstract: *The article concerns Iannis Xenakis' approach to the expressive possibilities of the cello and some aspects of his philosophy of sound and technique investigated from the performer's perspective. To examine these themes, the paper focuses on Kottos for solo cello (1977). As part of the interpretative space, the extra-musical element of the composition relates to the technical style and means of expression: the sound, structural clarity and physicality of playing. The technical aspect and the questions of interpretation are discussed with some references to Nomos alpha – the earlier composition for cello by Xenakis, and in the light of the mythological source and reflections on Hesiod's cosmogony.*

Key-words: *Xenakis, Kottos, contemporary cello, interpretation, extended techniques*

1. Introduction

Commissioned by a prestigious musical event (Rostropovich Competition, 1977), *Kottos* has rapidly established a prominent position in the cellists' concert repertoire. In the same period Xenakis completed several important compositions, among them *La légende d'Eer (Diatope)* and *Jonchaies* for large orchestra of 108 musicians.

Xenakis composed two works for lower strings before writing *Kottos: Windungen*, in 1976 (meaning coils, meander) for twelve cellists placed in a circle, which is notable for the use of the "bridge sound" (a particular sound effect that was later employed in *Kottos*), and *Theraps* for solo double bass (the title means "achievement, level of conscience"). *Nomos alpha* appeared just over a decade earlier, in 1966, when a number of leading composers intrigued by the cello's expressive possibilities, actively explored the so-called extended and "extreme" techniques. However, to some extent, instrument was still perceived within the framework of the traditional cello repertoire. The abstract concepts that

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underpin *Nomos alphaare* embodied in new sounds unexpected from the cello. Confronted with the unknown, the listener was and is still challenged by the work on many levels – the sound, techniques and complexity of the compositional ideas. In the preface to the score Xenakis expounds the mathematical foundation of the piece:

Symbolic music for solo cello, possessing an *extra-temporal* architecture based on the theory of groups of transformations. In it use is made of the theory of “sieves”, a theory which annexes the congruencies modulo z and which is the result of an axiomatic theory of the universal structure of the music. This work is an act of homage to the imperishable work of Aristoxenes of Tarentum, musician, philosopher and mathematician and founder of the Theory of Music; of Evariste Galois, mathematician and founder of Theory of Groups, and of Felix Klein, his worthy successor. Written for Siegfried Palm, it was commissioned by Hans Otte of Bremen Radio (Xenakis, Iannis 1967).

In contrast, the title and a line written by the composer in the *Kottos*’ score prepare for a singular musical experience: “Kottos – one of the three-hundred arms sons of Ouranos (god of the sky) and Gaia (goddess of the Earth)” (Smith 1882).

The composition’s interpretative space encompasses the archaic world of Greek mythology contemplated through the prism of the composer’s artistic temperament and scientific mind – the creative approach configured by the tension within these two polarities. In working on the piece, exploration of the links to ancient Greek mythology and its significance in Xenakis’ musical thinking enlivens and enriches the interpreter’s subliminal associations and creates a physical “bond” with Kottos. Though immersing into the work’s imagined domain of the archaic mythological themes, the performer can open the path towards the heart of the interpretative space of the composition and develop an individual approach to the techniques for expressing these ideas.

2. Mythological source and interpretation

The ancient deities Uranus (Earth) and Gaia (Heaven) emerged from Chaos that, according to the ancient Greek cosmogony appeared from the Void. Among their many children were the giants Titans, the Titanides, one-eyed Cyclops and Hecatoncheires (one-hundred hands and fifty-heads monsters): Kottos (“the striker”), Briareus (“strong”) and Gyges (“the wrestler”).

Arum Park elaborates on Hesiod’s interpretation of the preternatural world:

Hesiod's universe begins with the spontaneous appearance of the four entities Chaos, Gaea, Tartarus, and Eros: first a sexually indeterminate figure, then a female and a male, followed by the embodiment of sex and reproduction, Eros himself: "First came Chaos, and then broad-breasted Gaea, an eternally secure seat for all the immortals who occupy the summit of snowy Olympus, and misty Tartarus in a fold of the broad-pathed earth, and Eros" (Park 2014, 261–83).

Kottos with other Hecatoncheires and Cyclopes appear in the myth as the embodiment of brutal force manipulated by the gods who fight among themselves for power. As part of the myth concerned with a succession of Ouranos, Kronos and Zeus, the hundred-handed giants unleash their fury in the proximity of the abyss of Tartarus— the domain in the underworld ruled by Hades. Analysing Hesiod's description of Tartarus in Hesiod's *The ogony*, Hermann Ferdinand Fränkel observes the method of approaching the same phenomena from several angles: "the archaic mode of thought does not deal with an object once and for all, thereafter simply discarding it; rather its habit is to circle around its object, in order to inspect it ever afresh from changing viewpoints" (Fränkel 1975). In David M. Johnson's words, this approach in his description of Tartarus and other themes in the myth constitute "multiple representations of the same underlying reality" (Johnson 1999, 8–28).

The compositional concept of *Kottos* might be thought of as linked to of *La légende d'Eer* in two ways— in sound itself, which is exemplified by the aural effect of "grinding" sound, the differentiations in *sul ponticello* (that according to the composer's instruction, must be "rich with the higher overtones"), as well as the transitions between these two kinds of timbres, and between the stopped notes and harmonics (for example in bb. 4–5 and 7). These tonal characteristics create the impression of electronically produced sound. The "straight lines" of the sustained tones, both single and in double stops played strictly non-vibrato, add to the electronic sound ambience.

The second point of reference is the subject of death – the composer's continuing interest in this theme after *La Légende d'Eer* (Harley 2004, 116). Regarding this subject, Xenakis states:

Death [...] is something I think about all the time. Not only my own passing away, of course, but also in a more general dimension: death in Nature, in human society, in our actions, in the past, which is finished but not completely finished. I have rediscovered for myself Heraclitus who says that there's no difference between life and death. He probably meant that the two are equivalent. Existence is not something in progression and neither is non-existence (Varga 1996, 166).

The myth of Er describes the experiences of a man, who met his death in battle and returns into the world of living with a mission to impart his knowledge of the underworld to the people. The myth elucidates the fundamental inscrutability of the mystery of life and human soul. As underlined by Francesco Benoni, the myth

Highlights the opacity of human life. However, the externals of life – those elements the agent has no control over – are not the only ones that resist full understanding. The analysis of the choices of life demonstrates that most souls lack self-knowledge: they are “opaque to themselves” [...]. The myth illustrates that men are always faced with difficult choices that will hinder or help the pursuit of justice. These choices are influenced by past experiences, which are often painful [...]. The distinctive mark of a truly good choice is the capacity for reflecting on the meaning of the suffering that was endured. This is difficult, because it has to deal with the opacity of the externals of life and, above all, of one’s own self (Benoni 2018, 136–54).

In *Kottos*, the themes of finality of life, the abyss of nothingness and oblivion, and “opacity “of “one’s own self “are confronted and expressed by artistic means – a deeply personal reflection on suffering that had been endured. The mythical fight of the giant with multiple arms and heads could be interpreted as an expression of the inner struggles within human consciousness alluding to the idea of fluidity and permeability of the borders between the notions of human and non-human, and the uncontrollable cosmic forces and the rational mind of a living individual.

G.S. Kirk points to the contradictory strands within the elemental forces – fire, earth and sea – that are interfused in the myth: “fire is both sacred and profane, beneficial and destructive. [...] Water, too, is both life-giving and, in the form of disastrous flood [...] associated with death. Earth is clearest of all, since it is the birthplace of the corn [...] and receptacle of corpses, the place where the stricken souls of the dead descent to the realm of Hades” (Kirk 1974, 85–6).

In his reflection on Lévi-Strauss’ structural theory of myth, Kirk states: “Greek myth, too, seem preoccupied with the contradictions between natural and human law, between force and restraint, barbarism and civilization” (Kirk 1974, 85). As one of the numerous monsters that inhabit the world of the Greek myth, *Kottos* represents the category of the beings with transgressed appearances expressed by multiplication of the bodily parts – the Medusa (Gorgon), Lado (the hundred-headed serpent), the Chimaira, the nine-headed Hydra and Kerberos and the fifty-

headed dog of the underworld are among such monsters (Caldwell 1985, 152–5)². In psychoanalytical terms, the multiplication of heads might be linked to the early parent-child relationship, with the emphasis on morality (Caldwell 1985, 153–4). Multiplication of the arms could be viewed as a reference to the strong tactile sense of an infant and his instinctual impulse to explore his immediate environment. On another level, the mythical monster, with his fifty heads and one hundred arms might be seen as an avatar of gruesome metamorphosis – fifty individual beings coalesced in one organism; aware of their imprisonment in the inescapable prison of their body, they are tormented by rage. As a deviation from the accepted norms, Kottos could be defined as the “outsider”, the *other*. Richard Buxton remarks, “a monster is chaotic, conforming to no existing class. [...] monsters are not necessarily characterized by the savage violence of a Minotaur or a Medusa. But a monster is always by definition an outsider” (Buxton 1996, 205, after: Syropoulos 2018, 6).

The monster Medusa (Gorgon) is the mythological source for Xenakis’ work for piano *Evryali* (1973). As expounded by Hal Foster,

Medusa is one of the three Gorgons, the winged monsters who, born of the night, reside in a subterranean region near the world of the dead; she is the only Gorgon who is not immortal [...]. According to the classicist Jean-Pierre Vernant, Medusa appears as both figure and mask in Greece. Medusa is a horror of a “blurring of all categories”, of a “return to the formless and indistinct”, and her powers are “the powers of the beyond in their most radically alien form, that of death, night, nothingness” (Foster 2003, 182–3).

The associations with Thanatos, Kottos, Gorgons and other entities in the Greek myth bound to the domain of death are expressed in Xenakis’ sound and a particular energy, and the way these two components are actuated. For the performer working on the piece, this dimension provides a source for exploring the sound colours and the dynamics of their interplay on the musical “canvas”. Ultimately, however, the sound itself embodies the crux of performing the composition. Concerning the question of program in Xenakis’ music (Harley 2004, 119), comments on *Aïs* (1980) that has a strong association with the imagery and ancient texts:

² In other cultures, however, this kind of unnatural deviations is not necessarily a symbol of monstrosity: “in Hindoo mythology Brahma was represented as having four heads and four hands. He was the supreme principle of the universe and of creative energy’ (Lamb1900, 277–91).

There is no sense of resolution in *Aïs*, in the music, the treatment of the text, or the dramatic presence of the voice. This is fitting, considering Xenakis's stance regarding the "meaning" of death: "I didn't want to write programmatic music, in any sense. I wanted the music to be self-sufficient without a need to know what it's about" (after: Varga 1996, 161).

Kottos' sound is certainly self-sufficient without any knowledge of the mythological context, but Xenakis nevertheless includes the reference to the myth arousing questions in regards to this extra-musical dimension. These questions have been approached from multiple angles. For example, Carolina Noguera describes *Kottos* as a "complex character" with "invisible faces". At the beginning of the piece (bb.1–2), Xenakis presents two types of sound: brutal sonority produced by the technique of overpressure (playing on the bridge with indefinite pitch) and pure harmonics in *glissandi*. Noguera interprets the juxtaposition of these two contrasting events – the grinding sound followed by the succession of the harmonics – as a musical depiction of the "rejected giant's" predicament (his banishment to Tartarus) and as an allusion to his freedom expressed by the "playful *glissandi*". John J. Xenakis draws a direct parallel to the composer's political struggles– for him, listening to the performance of *Kottos* evokes associations with the political turmoil in contemporary Greece:

The composer himself describes it [*Kottos*] as follows: "In general: the sounds, except for the harmonics, should not be beautiful or nice in the usual sense, but rough, harsh and full of noise".[...] Its roughness comes because it echoes the conflict between Communists and Nazis in Greece during World War II. In the 1940s, Iannis was a member of ELAS, the Communist-led Greek resistance, helping to drive the Nazis from Greece [...]. In Greek mythology; *Kottos* was giant with a hundred arms and 50 heads. *Kottos* fought in the massive war between Zeus and the Titans. Like Iannis, *Kottos* was imprisoned and exiled. Iannis' cello composition echoes both of those stories (Xenakis, John 2015).

Nouritza Matossian (2005, 56) points to the development of the artistic direction in new music after the war in relation to the sound – for example, the composers such as Berio, Stockhausen and Xenakis who lived and struggled through the World War 2 had vivid recollections of extraordinary sounds "of sirens, explosions, bombing". Inextricably with this understanding of Xenakis' music as an expression of his experience of facing death and the trauma of injury, there is also a dimension of universal nature that transcends immediate circumstances.

Many interpreters involved in performing Xenakis' music highlight the physical aspect in realisation of his works. A particular instrumental athleticism in

playing Xenakis' music is recognized by many instrumentalists as being central in their approach to the composer's "utopian" writing that borders on the "impossible". However, in my view, the required athletic virtuosity must function as the means to reveal the undercurrents of the works' structure that animate the "choreography" of playing. In this regard, I feel that naturalistic expressiveness obscures the process of connecting to the heart of Xenakis' sound. The energy can be evinced through the inner intensity and pure presence of the performer – *pure* means the performer's impetus to serve the artistic idea aiming to match the composer's vision and the total immersion into the work's sound world that encompasses the complex meshwork of ideas and spiritual intensity. Xenakis challenges the performer to transcend his self-consciousness and virtuosity itself. As asserted by Anya Peterson Royce, "the highest level of artistry achieves a transparency in performance such that the audience and the piece come together as if the performer were not there" (Royce 2004, 24). At the same time, in live performance of *Nomos alpha* and *Kottos* there is an element of theatricality inherent in the corporeal gestures required by the expressive range of these works. At times, the cellist must face the dilemma of a choice in prioritising a particular expressive detail and clarity of structure over the precise instructions for *tempi* or pitches, when these parameters appear to be in a certain conflict with the physical reality of playing. For example, following the tempo marking for the final section of *Kottos* (bb.87–93), the effect of the irregular accents, which infuses the repetitive pattern of the "archaic" motif with visceral ebullience, would be diminished. Even the "impure" sonorities and "the noisy sound" demand focused attention and consideration on technical and conceptual levels. In *Kottos*, the cellist must aim to refine the balance between the degrees of "noisiness" and tonal clarity through his control of dynamic levels, bow pressure and its precise placement, and other technical means that will differ for each performer. When the idiosyncratic "grinding sound" is utilised as part of the structural development and the aural representation of cosmic reality, the music reveals the "invisible" nexus of ideas that becomes "visible" in live performance. A pioneer of abstract art Wassily Kandinsky (1866–1944) encapsulates this principle in his theoretical work *Point and Line to Plane* (1926): every phenomenon can be experienced in two ways. These two ways are not random, but bound up with the phenomena – they are derived from the nature of the phenomena, from two characteristics of the same: External/Internal (Kandinsky 1979)³.

³ Xenakis expressed his interest in Piet Mondrian's theories of abstract paintings (eg. Bois 1967, 21). The subject of the link in Xenakis' music with the abstract art is beyond the scope of this article.

2. Structure and sound

As elucidated by Harley, “*Kottos* is a richly detailed composition, built from a clear succession of sections but with numerous details of transition, recall, and variation beyond the parametrical manipulation of the basic sonic entities”⁴. For clarity and practicalities of learning, the composition can be demarcated as blocks of textures: bb. 1–21, bb. 22–30, bb. 31–40, bb. 41–45, bb. 46–54, bb. 55–62, bb. 62–73, bb. 74–82, bb. 83–94, with transitions between the sections of shorter or longer durations. In contrast, *Nomos alpha* is structured as a succession of fragmented micro-events, which Matossian describes as “a crazy quilt in which patches do not join up to form shapes and parts of a bigger pattern but remain distinct and separate in their shape and colour, while time is powerless to drive the events into continuous motion, for the abrupt changes of speed and duration break up the unity of perceptual time and pace” (Matossian 2005, 238).

The strategy of examining the composition from both micro- and macro perspectives aims to attain the objective of integrating the score on intellectual, intuitive and physical planes. From the architectural angle, the key to solving a task is to see the problem from the viewpoints of both the detail and the global whole. Employing this method in working on *Nomos alpha* enhances the process of internalising the score. In relation to the whole, each event is a micro unit that can also be perceived from “above”, with its own nucleus and inner dynamics; the assemblages of these micro-events that are combined into larger patterns form in turn, their own centres. In *Kottos*, however, the extended events are advancing on a horizontal plane as if laid out on a flat surface. *Nomos alpha* represents a multidimensional image of a rotating cube, while *Kotto* depicts a progression of blocks of textures whose surfaces are occasionally “pierced” by the invasion of “cosmic noise” – as if this sonic entity exists in a perpetual continuity behind the “row” of these blocks. The beginning and the ending of *Kottos* are linked by similar textures: the grinding sound (bridge sound), *glissandi* in artificial harmonics in a variety of durations and trajectories, and *tremolo – sul ponticello* at the beginning and, in the final part, as a chord played in *ataxi* with irregular alterations of pitches. At the opening of the piece, the bridge sound establishes a high level of energy and sonic brutality as if the cellist is throwing massive aural “rocks” at the listener; at the end, this force dissipates abruptly, as if vanishing into cosmic recesses. The cellist Rohan De Saram recalls: “when working on *Kottos* with Xenakis, he mentioned the fact that the grinding noise at the beginning of the work, which recurs several times during the piece, was the sound of earth and rocks

⁴ See Harley 2004, 92–4 for a detailed analysis of the composition’s structure.

as Uranos thrusts Kottos into the ground” (de Saram 2005). Regarding the intensity of richly textured events at the opening of *Kottos*, Harley states: “in eight measures [...] the music has moved through four sonic entities along with transitional material” (Harley 2004: 92). In contrast to *Nomos alpha*’s combinatorial techniques that involve a high rate of velocity in switching between and within the micro-units, in *Kottos*, a specific technique dominates each structural component—such as extended lines of *glissandi*, rapid or gradual changes in the extreme levels of dynamics, and wide-ranged “leaps” on the fingerboard assembled into complex rhythmical patterns, etc. The main challenge here is the ability to sustain the levels of intensity, rhythmic clarity and tonal quality over the longer sections. The abrupt transitions between the two sections when the material is momentarily “compressed” demand dexterity in switching to a new pulse or texture.

4. Techniques

In this part I will discuss some aspects of the extended techniques employed in *Kottos*, with references to *Nomos alpha*, focusing on these works’ technical features – overpressure, *glissandi*, harmonics and dynamics.

4.1. Overpressure

This bow technique is used for tonal distortion that can be obtained by moving the bow close to the bridge and applying forceful motion to produce a dense tone that is rich in overtones. The lighter pressure produces *sul ponticello* effect, and the heavier force – a compressed, coarse sonority. Within these two methods, an array of colours can be created by varying the degrees of pressure. *Kottos*’ characteristic feature is the use of this technique that Xenakis describes as the bridge sound: “a grinding sound, bowed normally, irregular to the ear, and without definite pitch”⁵. To avoid definition in pitch, the bow must be forcefully pressed in to the string using the entire ribbon of the bow hair. Applying overpressure on a particular string as marked by the composer in the score, produces subtle variations in the colour and density of the “noise”: bb.1, 2–3 are to be played on the C string, b.17 on D, bb.18–19 on D, and b.20 on both G and C strings. The “grinding” episodes in the first part of the piece frame the section the moment of stasis, the open space

⁵ The effect of distortion can be also created by the applying extra pressure away from the bridge. De Saram relates the composer’s suggestion for achieving the sound that he wanted, with deeper colour and with more of the lower overtones, which is to place the bow nearer to the fingerboard (Kanach 2010, 300).

of “otherworldly landscapes” in natural harmonics. The third episode occurs in the final part of *Kottos* (b. 86), as if emerging from the chaotic *tremolando* chord played “in no special order” (in *ataxia*); in this case, the bow is placed on the A and D strings at first, and on the C and D strings in the second part of the bar. Thus, the seemingly straightforward technique demands much attention to detail and involves intense listening to the array of the overtones generated by the friction of the bow hair against the string just above the curvature of the bridge, where the full spectra of audial hues are produced. At the same time, *Kottos*’ “grinding noise” must be viewed within the context of the whole – as a structural tool and as a developing sound entity in itself.

4.2. *Glissandi*

Xenakis’ use of *glissandi* opened up the fertile domain of the expressive means for instrumentalists. *Nomos alpha* is a repository of *glissandi*—a source for technical knowledge beyond the boundaries of the expressive territory cellists inhabited before Xenakis’ music for cello⁶. The composition is saturated with fluctuating sonorities of *glissandi* in a variety of angles, speeds, dynamics, rhythms and textures – *pizzicato* and *arco*. They are combined with *tremolo* or *battuto*, long (over one bar or more) and extremely brief; mini- *glissandi* within *glissandi* “clusters” and numerous other variations of textures and techniques. Working on this singular expressive aspect in *Nomos alpha* prepares the performer for the multifaceted gamut of technical challenges in contemporary and new music cello repertoire. In *Kottos*, this expressive tool in its various levels of densities and shapes is used extensively in the first half of the piece. The succession of quick coruscating *glissandi* arranged in rhythmical patterns features the first type of *glissando* (bb. 1–2, 16 and 95).

The composer delineates the exact parameters of this technique: “the small notes at the end of the *glissandi* are not to be attacked, prolonged, or emphasized – merely touched upon and left quickly”. It is evident that reaching the exact pitch at the end of each *glissando* (some written in quartertones) in the prescribed tempo is not practically possible. Most cellists choose to prioritise the rhythmical

⁶ My own understanding of the cello’s technical and expressive potential has considerably expanded through my experience of performing *Nomos alpha* and *Kottos* (particularly, with regards to the *glissando* technique). For example, working on *Parjanya-Vata* for solo cello (1981) by James Dillon (b.1950) – the composer who was strongly influenced by Xenakis’ compositional concepts – I employ my developed sense of tactility and the exactitude of *glissandi* parameters (the speed, dynamics and pitch ranges) and their interrelation with the bow techniques. The programmatic ideas of *Parjanya-Vata* also echoes Xenakis’ *Kottos*.

clarity in articulating the condensed energy of the particles that are “shooting” upwards, over exactitude of the pitches aiming to emphasise a contrast to the sonority of the undifferentiated, “primitive” noise of the grinding tone. The second type is the longer line of *glissandi* in single notes or in double stops, firstly combined with other textures (*sul ponticello*, *tremolo*, extreme dynamics), interrupted by “noise” (bb. 16,17,18) and the second line combined with accented notes (b. 40), and as the formidable sonority of a four-bar, upwards and downward double stops slide with a duration marked by Xenakis as “absolutely continuous” (bb. 31–34). An idiosyncratic type of *glissando* technique is the one-finger chromatic lines (bb. 41–42, in the low register, and 54 – the middle register) that links two contrasting sections. The most notable use of *glissando*, which could be described as Kottos’ “brutal dance” (bb. 22–30), emerges from the sound of formless chaos (a medley of harmonics, *sul ponticello* and the overpressure in bb.16–21) preceding this section. Subjectively, the variety of *glissandi* is felt under the fingers as if they are constructed from a particular physical material– an “elastic rod” (bb.22–30), the metallic sparks emerging from “cosmic noise” (bb.1–2) and the inorganic substance of the longer lines moving in parallel (bb.31–34).

4.3. Harmonics

Xenakis employs natural harmonics in the expansive soundscape that follows tumultuous opening of *Kottos* (bb. 8–15), and suggests particular fingerings on the G string. This points to the composer’s preference of the timbre –the natural harmonics on the lower strings in the higher positions produces “grainy” texture. Some cellists play the harmonics in double stop on the A and D strings for a “cleaner” tone and secure intonation, but this way the “earthy” timbre of the lower strings will be missing. To evince the sound image of a mythical expanse, the movement of the bow must be continuous and even, unperturbed by its changes, which should be seamless. This is the only section, where, in my subjective view, the dynamics range expresses the spatial dimension – for example, in b. 8, where the upper tone is played *pp* in contrast to the *f sans diminuendo*, on the C drone.

4.4. Dynamics

The dynamics in *Nomos alpha* present a significant technical challenge– the rapid oscillations between the extreme levels in combination with other technical elements (such as *battuto*, *sul ponticello*, artificial harmonics, *pizzicato*, *glissandi* of various ranges and velocity and extreme registers) occur within the utopian pulse. The range and the rate of their changes express the multi-dimensionality of the

macro- and micro universes; thus, precision in executing the kaleidoscopic oscillations of the dynamics within the temporal pulsation, is the key technical aspect of *Nomos alpha*. The cello, by its nature, is limited to a relatively narrow dynamic range –to some extent, the scope of dynamics can be enhanced and expanded in recording. In live performance, however, it is the physicality of playing and performative gestures that compensate this limitation. In relation to performing *Nomos alpha*, the cellist Christopher Roy asserts: “with the cube, Xenakis has a 3D vision, which must be heard. The whole dynamic of the piece (the nuances) is translated into distance and proximity” (Solomos 2019, 122). If in *Nomos alpha* the dynamics are tools for creating proximity and distance in a multifold space, in *Kottos*, this expressive feature embodies physical weight, mass and densities. Finally, the tempo is an important element in interpretation. In the score, Xenakis writes: “the metronome markings are approximate” – approximately crotchet=54, then crotchet = 46, and returning to the slightly faster speed in the final part, which intensifies the culmination of the energies. The indicated *tempi* are utopian (although not to the same extent as in *Nomos alpha*) and are, at times, determined by the composer’s instruction to use certain bowings, such as down-bow demisemiquavers (bb.55–73) sustained for a prolonged period. Even though this is technically achievable at the required speed, the *fortissimo* dynamics and the evenness in articulation will be compromised; the solution in this case is a slightly slower tempo.

5. “Sound has colour”

Nomos alpha is known as a composition that demands a high level of technical dexterity and mental focus. “The crazy quilt” of the multitude of events challenges the interpreter to develop a way of revealing the architecture of the composition by shaping the global structure. The performer is occupied by simultaneously focusing on multiple planes, both internal and external and their relationships: the whole – the sections (levels) – the patterns of the events – the individual events. The key to the integration of the parts, in my view as a performer, is the rhythm. In live performance, although the kaleidoscopic succession of multi-directional events can obscure the rhythmical grid, the attention to metrical divisions in *Nomos alpha*, will clarify the time parameters of the evolving structure. As the beginnings of the events falls frequently in between the bar lines, the subtle accent on the strong beat of the bar will create the clear rhythmical pulsing within the temporal momentum. In the linear development of *Kottos*, five sections have distinctive rhythmical characters: bb.22–30; bb.46–53; bb.55–61; bb.62–73; bb.74–93. In the fourth of the group (bb. 62–73), the cellist encounters the problem of executing

very large intervals – some of them are playable on two strings simultaneously and others can only be reached by breaking the chord either on the parallel strings or across the string between the two pitches (marked in the score as *arpeggiato* intervals/chords). These irregularities in rhythm add a certain comic effect of the monster’s “limping” gait. In my subjective view, the rhythmical patterns at the mid-section of *Kottos* (bb.46–53) echo the energy and sound of the avant-garde free improvisation style of the 1970s, namely of the American jazz pianist Cecil Taylor (1929–2018). As an indirect reference, it animates and enlivens my approach to the piece –in these rhythmically rigorous eight bars I hear the inflections of Taylor’s rhythms and organisation of sound. As far as it is known, Xenakis did not make any comments regarding jazz, but notably, the composer asserted: “all paintings, music, all the works of every age must meet at some point. One is continually discovering parallels to a greater or lesser degree, confirmations, common sensibilities...” (Bois 1967, 61). In the musical world of Xenakis, the energy of multifactorial rhythms and the intricacies of harmonic progressions can be appreciated in the way of the “common sensibilities” in the ambience and structural ideas in contemporary jazz. Xenakis’ scores are designed on the basis of mathematical logic that is expressed through the finely wrought notation, which suggests a strict precision in their realisation. Paradoxically for the interpreter, an effort to match Xenakian rigour through the combined powers of physical and intellectual effort, releases the force of Dionysian spirit rendering a possibility of “improvisation” in a sense of spontaneous discoveries and intuitive insights erupting within the firm parameters of predetermined rules. In the improvised music of Taylor, the two elements of composition and performance are united in the organic “becoming” poised on the fine line between the states of freedom and discipline, amalgamating the urban noises and cosmic processes. Taylor is recognised as a poet and philosopher of performance – “the epitome of the jazz avant-gardist [...] whose art and philosophy are inextricably intertwined” (Westendorf 1995, 294). In this regard, the pianist’s depth of artistic vision is comparable to the interdisciplinary nature of Xenakis’ artistic style and philosophical enquiry. In his message on receiving The 2013 Kyoto Prize, Taylor reflects on meeting the young percussionist, a student of Xenakis, who showed him the score notated in the unusual signs and symbols. Seeing this “nomenclature” as expression of the “sound from within”, he comments:

Once I saw that it was easy... easy because if you invent your own nomenclature, it comes from wherever it comes, but it facilitates whatever: music, artistic passion – things that come out of the body [...]. The music proceeds from within; the note is merely a rather uninteresting symbol that equates to the sound. The sound is always with us. It’s like, who is God? (Taylor 2014).

For Taylor, music is part of nature, the cosmic processes: “there are all of the forces that have to do with the Earth rotation and an invisible sound. Sound has colour” (Taylor 2006).

6. Conclusion

In Xenakis’ music these diverse threads are intertwined to create sound that express the purity of perceptions unencumbered by rational divisions between the real and mythical, archaic and contemporary, cultivated and ‘primitive’– in juxtaposition of the notions of the ‘chaotic’ and the ‘organised’. The idea of Kottos, the mythological hero of the preternatural drama, finds audial expression in the layered textures of the abstract, corporeal and spatial– the dimensions of Hesiod’s underworld. Tartarus may be perceived on various levels: the chasm – as the image with which Hesiod ‘illustrate the beginning of the physical world’, as a prison for the Titans – ‘a walled enclosure from which there is no escape’, and as the ‘house’ that represents “the image of the cyclical phenomena of night, day, sleep and death. [...] Tartarus mediates between linear and cyclical phenomena, imaging both the beginnings of things and their present state [...]. Tartarus is the place for the past and the repeating present. In this sense it is about time as it is about space” (Johnson 1999, 8–28).

Xenakis interrogates the subject of death from the perspective of his own personal ordeal of the confrontation with the reality of annihilation – the event that conceivably had a profound impact on his perceptions of the mystery of death and the “opacity of life”. These phenomena can partially be grasped by the human mind through scientific and artistic research, but in essence, are fundamentally unfathomable. In the score for *Charisma* (1971) for cello and clarinet, the composer writes the line from the *Iliad*: “then the soul like smoke moved into the earth, grinding”. The piece begins with the grinding sound – the idiosyncratic bridge sound that will feature later in *Kottos*. The sepulchral tone evokes the abyss of Hesiod’s prison for the monsters – the space with no doors, where these beings belong both as inmates and the guards. *Kottos* might be understood in the light of the myth, as Xenakis’ Tartarus, the imagined space where the souls of those fallen in a combat are “grinding” on entering the thorax of the earth. The ancient myth of Er could be interpreted as a parable about a possibility of return from the chasm of the underworld to the world of living – Xenakis’ music embodies such transformation through the revitalising energies of artistic effort. The linearity of the composition’s structure subsumes the cyclic phenomena as a manifestation of

the “repeating present”, asserting indestructible life force and the cathartic nature of the “monstrous” that emerges in Kottos’ will for redemption and escape.

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