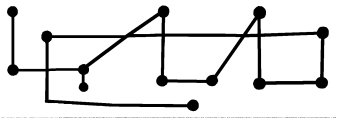
The Radiance of Iannis Xenakis (1922–2001)



Julio Estrada

Rupture and Fusion

Iannis,

To elaborate upon the relationship that our works share, in these pages I will narrate the events that began with our meeting in 1968. Of the preceding period I retain only the lessons of Julián Orbón, whose first class sought to rectify my restless beginner's attitude in the face of the influence of Bartók: "Assimilate, rather than reject influences." This motto of Orbón gives me the opportunity to enter into subjects that touch on your beneficent influence during my formative period, which I will better clarify by going back to your origins.

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Your project of autonomous searching kept you from citing your concrete roots in musicians of the past, making only casual mention of your preferences; for example, dramatic tone in John Dowland, your compulsory memorization of Mozart's *Requiem*, or what you placed at the opposite end of the spectrum, your veneration of Brahms ("I would never be able to make such music," you would claim). Your own absorption of contemporary sources does not impede associating your treatment of strings with Bartók's—*glissandi, pizzicati-sfz* or transformations of collective tone—and with Varèse's by composing the same sounds—material contrary to the idealization of music as language. Said influences have been assimilated and appear intermixed in your music; though you do not cite them, they cannot be denied.

Additionally, in your case, one must refer to antecedents that go beyond the ethnocentric idea of a *European music* (such as the microintervallic scales in Byzantine music) and that explain your interest in *another music*. Or, in a search born in struggle, exile and loss, to the music of the ancient Greeks that your works so frequently invoke—through mythology and your imagination—in order to combat its silence. Added to this accumulation of diverse influences in your music is your scientific vocation—philosophical, mathematical, and technological—that gives an identity to the methods you developed in your compositions. Such heterogeneity of sources prevents placing a label on your work, instead emphasizing from an integral perspective the *stochastic*, probabilistic tone that characterizes it: a cloud of multiple broken voices assembled into a moving mosaic.

Rupture and fusion: the creation that alludes to a break and inquiry as a crossing path that repairs it.

Thus I will recall here a moment of friendly confidence, in which you revealed to me how the noises that appeared in your hearing (after having been injured in Athens in 1945) drove you, through desperation, to attempt to represent them musically. This last idea brings me to your relation with the psychic element: to transfer your loss from the imaginary towards the act of creation. Your rational mind was motivated to share your auditory torture, converting it into the discovery of a new music—much like Beethoven—made of inharmonic material that declares the beauty of imperfection.

The rational-imaginary dialectic appears reconciled in classic form in *Metastasis*, whose discontinuous, calculated part remains in the center, and the continuous, fluid parts in both extremes. The early success of *Metastasis* was an acutely felt challenge to which your balance between investigation and creation responded, purifying certain methods in your evolution and discovering that what you were searching for was to create

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a music that belonged to you, and that the method was only part of this exploration.

As *Persephassa* confirmed in your full maturity, your proposals went beyond the *formal* searching for answers to questions that appeared to have profound origins. Already *Pithoprakta* was letting us see part of that side of you, announcing that it was not an "interesting allusion to geometry"—as a genteel lady at the Parisian Musée d'Art Moderne said. Rather it existed to evoke the "chaotic sonority of the manifestations of protest in Athens"—as a young student in the same location pointed out. But this last part is something you prefer not to mention, allowing one instead to discover, if perhaps one hears more there than just the material.

From thence forth you would prefer to situate your representations in the abstract thematicism of the elegant iconoclast that inaugurates a plural character in new music: use of the computer, duels between orchestras, audiovisual games, or—among other things—a musical architecture that would result in kinetic sound creations. All of that is part of a distinct manner of understanding, of imagining, the world of music. This idea is evident when one observes, for example, your tendency to create "spatial melodies or harmonies"—something that you do not do with your sonic climaxes. This concept first appears in the constant circular motion in a work of yours that I heard in 1969,[1] was developed in *Persephassa* with contrary circular movements, is explored in even more complexity and liberty of motion in *Terretektorh*, and reaches a pinnacle in the *Polytopes*, all of which open up this same conception of "music as multiple space" to a strategy of spectacular motions made of masses of rhythms, sounds, lights, volumes, and of an historic interpretation of space. This is how I remember your proposal, never carried out, of a *Polytope* for the sacred city of the Toltecs, Teotihuacan, whose original sounds also remain in silence.

Solitary Star

The subject of the relationship between my music and the work of Iannis Xenakis makes a brief digression indispensable, allowing me to frame the apprenticeship I previously had in composition:

I studied in the class of Olivier Messiaen, inaugurating the first year in which he taught composition and in which I had been officially admitted as a French student after two years of failed attempts. Upon comparing Messiaen's courses of analysis with those of composition the contrast was disappointing, for in the new class he gave his blessing to those who

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imitated him and ignored those of us who didn't. One other thing (without too much modesty):

> "Sir, that passage can't be *heard*," he told me.
> "Could you please explain this to me, *maître*?" I responded.
> "I don't have time, I'm sorry," he concluded, only to later listen, ecstatically, to a *pastiche* of his own harmony in another student's chords.

Without doubting my own ear at all, and without heeding Messiaen's answer about the hierarchical notion of that which is *heard*, I remember seeking to put down new roots in the Old World instead of waiting for the eventual reaping of a disappointing harvest. Swept up in the wave of student revolutionaries, I abandoned the conservatory in May of 1968, just before the end of the school year, and later entered Jean-Etienne Marie's seminar in the Schola Cantorum on what was then an open topic: music and architecture or music and mathematics which were, among other things, the study materials. It was there that Xenakis appeared giving a pair of lectures where one could hear a novel music, revolutionary in ideas and methods: systematization of the continuum, application of mathematics and use of the computer. Marie appears to have prepared us for such an encounter with certain analytical tools, without telling us anything about the procedures employed by the composer, then unknown to me. Thus I could detect in *Metastasis* the mathematical treatment of a dodecaphonic series outside of the four previously known symmetrical relations—P, R, I, RI.[2] And, within the audiovisual structure at the beginning of the *glissandi*, I could also perceive the proportions of the Fibonacci series with each strike of the wood-block.

I refer to the preceding to emphasize my perception of the thought and the music of Xenakis as a source of unity, in contrast to the lack of correlation between discourse and actual works in other authors of that time. This same originality isolated him in a space that made him appear unrelated to everyone, giving him the fame of a lone star whose peculiar advantage, his singularity, was counteracted by a premeditated exclusion on the part of some of his colleagues. Even when the horizon of my influences as a student included the music of Ligeti or of Stockhausen, my admiration for them was to some extent diminished by the possibility of reproducing them more easily through their dependence upon preexistent musical languages. Xenakis, on the contrary, since his early rejection of the plans Honnegger wanted at one point to impose upon him, and through his anticipatory reflection on serial music, would appear to

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have resolved once and for all to break with these languages (Xenakis 1955).

The absence of dialogue between European models of the past and the present made it more difficult to assimilate Xenakis's music within the notion of *musical writing*, the key of entry to the universe of harmony and counterpoint and the serial system. For Xenakis composition did not begin with *writing* but with a united reasoning that led, organically, into written notation of unedited sonorities. To write like Xenakis was to *think* like him; that is to say, to look for original forms of composition that incorporated instrumental techniques purposely conceived to produce a musical result that kept itself distant from known procedures. His instrumental music, though written down, did not generate a new *musical language*; rather its propositions radically contended against the supposition of music *as* a language, which is one of his most important contributions to modern thought.[3]

Even though I attended the masterclasses, short courses or postgraduate university courses taught by Xenakis, I cannot consider myself to be his student in a strict sense because I never studied composition with him. I believe that almost nobody did, either privately or at some institution. Whatever form of instruction I received from Xenakis, the result tended to be fascinating: works, notions, and methods, with a permanent stimulus toward scientific study—an idea reinforced from the first day, counseling me to study mathematics and opening the doors for me so that I might enter the EMAMu.[4] Concentrating on the exposition of abstract methods relating to his works, Xenakis always included his philosophic reflections on music. Not much of a pedagogue, but interested in teaching and in establishing a dialogue with others, he offered to his students not only a musical training, but to the majority in the class, a concrete relationship between theory and *praxis*. I asked him questions intended to break the silence of some difficult topics, after which I obtained well-informed answers, but not those which most interested me. My systematic examination of how, in his stochastic model, he proceeded to convert numbers into notes on one occasion provoked his unexpected wrath during class. It is not that the question was inappropriate, rather that in this area he would not make the slightest concession that dealt with explaining procedures that, even if they were simple, he would still jealously keep private.

While I wouldn't say that Xenakis taught as if from Olympus, since he was always receptive to rational discussion and open criticism, he did opt to be a solitary star, remote from the human and psychic world of his interlocutors. In spite of the cancellation of the subjective in the communication of his ideas, his remoteness was foreign to the patriarchal model

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of *teacher*, displayed under an aura as magnificent as Kronos or as unfortunate as King Laius. Xenakis wanted to be neither father nor son of anybody in composition, a difficult matter to reconcile with his desire to maintain an inspired relation to the past. "He is too modest," Radu Stan would tell me, and he was right, but this doesn't appear to be the only answer. To my understanding, Xenakis identified more closely with the purpose of radiating new ideas.

Such cosmic distance was shortened through the perfect simplicity of his manner on all levels, and particularly that of friendship, a privilege I enjoyed from early on and that, with time, led me to call him *Uncle* Iannis, part of a conspiratorial break with the rigid tradition of the music teacher. I acquired Xenakis's expertise as a teacher outside of class, in conversations loaded with rich messages, during the affability of travels, some through France, others through Mexico. For example, his accurate criticism of the neo-romantic style of my *Canto oculto* contributed to my later break with harmonic language. Standing before the originality of the *arco maya*'s architectural shape, his hypothesis concerning how the monumental dimension of Mexican music from the pre-Hispanic period could help reaffirm my search for historical roots, until then little developed; his observations that distinguished qualities of the individual and of the masses revealed his refined ear with respect to the penetrating murmur of the cicadas in the ruins of Xochicalco; his commentary on the exclusion of *non-octave* scales in my initial model of the theory of the potential of intervals obliged me to expand upon it.

Orbón would quite correctly say that one is only taught to doubt. For me, with Xenakis the questions (as well as the dialogue) would originate from directly confronting his models through the use of the UPIC computer.[5] It was there that I became more fully aware of the individualism of Xenakis, when he proposed equipment in which the user created his own data, from the micro- to the macrostructure, a method contingent upon thinking, exploring, and hearing in order to grow without following rules. In 1980 I came to Lille for the first public presentation of the UPIC; the death of my father some months before had caused me to break from the rite of expressing my sorrow through a musical idiom. In the presence of equipment that imposed no boundaries other than the limits of its own technology, with an unexpected spontaneity I composed *eua'on* (Example 1) in fifteen days, a Requiem made of my bellowing voice, converted digitally into the singular timbre of the machine. Through the dialectic interaction between drawing and listening, I explored previously untested intuitions, whose confirmation contributed to a revolution in my music from that time forward. Working with such a continuous musical universe revealed to me an unsuspected analogy

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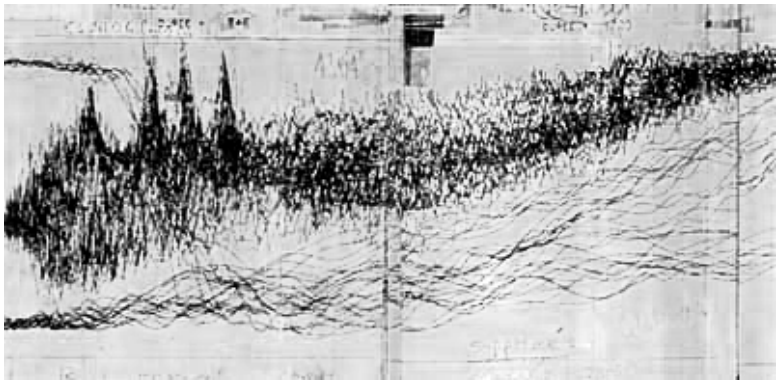

EXAMPLE 1: *EUA'ON*

between *seeing* and *hearing*, a fundamental point of departure for me that began a rejuvenating process in my understanding of the musical representation of ideas. Although I had observed the relationship between graphics and the heard *glissandi* of *Metastasis*, the experience of using the UPIC system made the conversion from abstract knowledge to actual practice into a musical truth for me.

More than the exercise of using his methods in the construction of my music, this early encounter with Xenakis left me with the example of his application of the "create/investigate" duality. I never learned how to compose stochastic or symbolic music, nor how to program an algorithm in composition, topics that were a central occupation of my curiosity to know how they were carried out in practice. From this research, I developed a deep affinity with Xenakis, and also with other composers whose searches resonated with my interest in tapping into the musical revolutions of the 20th century. At the end of my studies in France, still without my own groundwork, I studied symmetries in scales from the theory of finite groups, with the help of Jorge Gil of the Instituto de Investigaciones en Matemáticas Aplicadas y en Sistemas de la UNAM (Estrada/Gil 1984); from thence came *Melódica*, a didactic game,[6] and *Canto mnémico* (Example 2), a fugue in four Boolean dimensions, unique among my works that apply some kind of theory. With a similar origin, *Canto naciente* distributes the musicians inside the symmetries of a three-dimensional physical space, while their *chorale*, inspired by the vertical conversion of the *thāts* of music from India (Jairazbhoy 1971), led me to a new search: as soon as the work was finished I proposed to investigate the combinatorial potential of the harmonic section of the *chorale*, a result that influenced my later discovery of something greater than the

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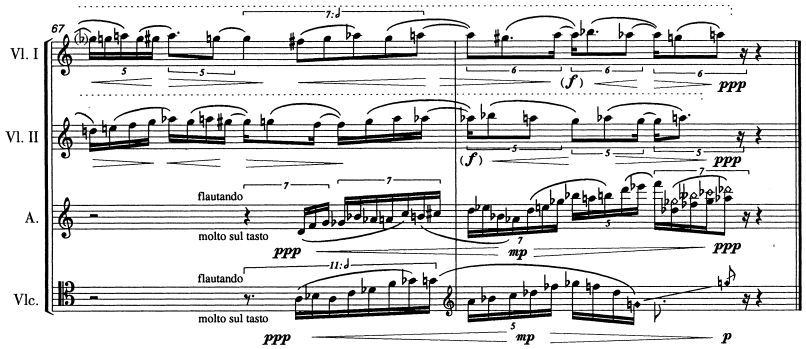

EXAMPLE 2: *CANTO MNÉMICO* (1974, REVISED 1984), STRING QUARTET: FINAL SEQUENCE, FLUID TRANSFORMATIONS OF THE IDENTITY AND ITS OPERATIONS

system I had designed: a general theory of the potential of intervals in scales (Estrada 1994d).

That process influenced me so much that I gradually adopted, as an essential part of my theory of composition, an understanding of the "imaginary" as the origin of all investigation. This aspect has characterized my work ever since, where the structure of dreamlike—even delirious—messages should be the liberating material explained through the theory. Through this my notion of music theory continued to grow, in order to understand the imagination with categories similar to those of the physical reality of musical material. From there I could see that the nebulous or almost real qualities of the imaginary cannot escape the qualities of the world of physics, which demands that fantasies be confronted with an attitude of full awareness (Estrada 1994d).

The pioneering ideas about the physical unity of the rhythmic-sonic continuum proposed by Cowell in the early twentieth century (Cowell 1996), put into practice with his Rhythmicon—and later with the player piano of Nancarrow, were the sustenance of my investigations into *macrotimbre*.[7] More than just associating timbre only with harmonics or with instrumental or vocal *color*, the notion of *macrotimbre* means that the sonorous components of frequency, amplitude and harmonic timbre are nothing other than, respectively, the duration, attack, and the rhythmic microdurations (Estrada 1994a, 1994c). From the notion of *macrotimbre* I proposed to unify the theoretical treatment of rhythm and sound in the case of musical materials of a discontinuous or continuous type (Estrada 1994d). In the case of the continuous, I had recourse to the method of graphic representation of pitch height proposed by

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Xenakis, and I extended it to the representation of any and all components of *macrotimbre*. Having as an objective a greater approximation to the structural richness of hearing in the imaginary, I designed the computerized system *eua'oolin*[8] for three-dimensional graphic recording of sonorous components and their written representation as a score (Estrada 1994b).

Creating and investigating in parallel caused my music to enter a free universe where new ideas could be established, more closely resembling their actual *being* than in how those objects are represented and known by and through cultural conventions. My music began to be shaped in an intuitive fashion, with no other rationality other than what was necessary in response to the messages of a creator cloistered within the confines of musical notation. From that time my work has revolved around the notion of *macrotimbre*; the *yuunohui* (Example 3) for strings propose an alternate *transcription* allowing one to hear the same music—either separately or simultaneously, but with distinct components—as if the same energy were perceived. In *yuunohui'tlapoa* for keyboard I integrate my searches of intervallic potential in the continuous transformations of a discontinuous *microtimbre* with those of an open form in combination with the other *yuunohui*, thus proposing that one hear the same idea in both fluid and solid representations. In *eolo'oolin* (Example 4) for percussion[9] and in the string quartet *ishini'ioni* I even more closely integrate qualities of nature into a two-dimensional physical space as part of a *macrotimbre*. In i*shini'ioni* (Example 5) I propose the free rotation of three-dimensional trajectories, a form of *topological variation* of a *graphic identity* that sets a sound form in continuous motion. In *miqi'nahual* and in *mictlán*, parts of my opera in progress *Pedro Páramo*[10]—a opera that interprets the book as concerning the destruction of the indigenous Americans (Estrada 1990)—the *macrotimbre* integrates the complexity of frequencies such as noise, or of amplitudes such as distortion, to form a new harmonic content that contributes to the search for greater realism in drama.

Another Constellation

—Contrary to your discreet reserve about personal matters, the opening to the subjective, hyper-expressive universe has been an essential part of my own compositions. I am happy to know that I can musically translate psychological experiences, something that I still aspire to perfect, within the methods I have been designing. My scientific vocation—unsuspected when I decided to be a musician—originated in the certitude that

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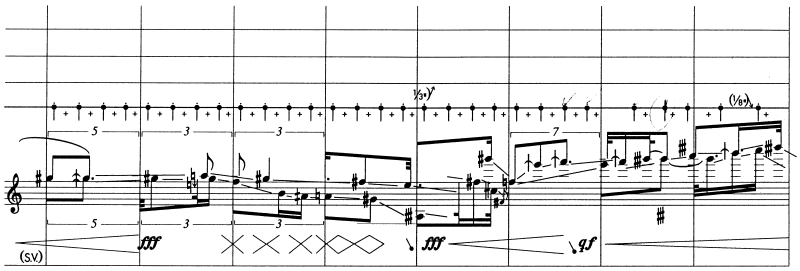
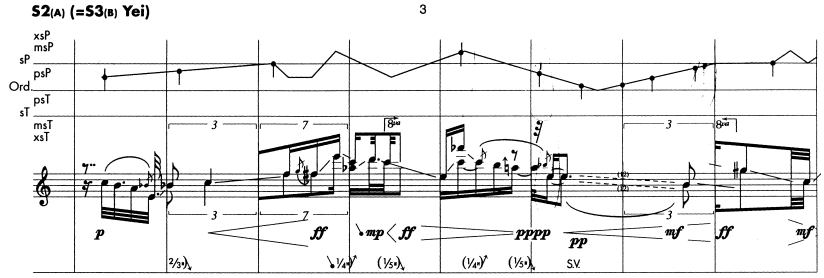


EXAMPLE 3A: *YUUNOHUI'SE* (1989), FOR SOLO VIOLIN: TWO PART SECTION. AT THE BEGINING OF UNIT 5, SQUARE 1/3" INDICATES THE SPEED AT WHICH THE BOW NEEDS TO CHANGE (VERTICAL LINES) FROM ONE STRING TO THE OTHER. A PARENTHESIS WITH AN ASCENDING ARROW INDICATES AN ACCELERATION OF THE BOW SPEED ALTERNATIONS. REACHING 1/8" IN UNIT 8. THE LEFT HAND PIZZICATO ALTERNATES WITH THE BOW ATTACKS. PITCH ALTERNATIONS USE THIRDS AND QUARTER TONES.



EXAMPLE 3B: *YUUNOHUI'SE* (1989), FOR SOLO VIOLIN. ON THE UPPER PART, BOW COLOR IS INDICATED ACCORDING TO A SCALE OF NINE DIFFERENT REFERENCE POSITIONS (*EXTREMO SUL PONTICELLO*, *MOLTO SP*, *SP*, *POCO SP*, *ORDINARY*, *POCO SUL TASTO*, *SUL TASTO*, *MOLTO SUL TASTO*, *EXTREMO SUL TASTO*). BOW ATTACKS ARE INDICATED BY VERTICAL LINES ATTACHED TO THE STRAIGHT OR DIAGONAL LINES (CONTINUOUS CHANGE OF COLOR). AT DURATION UNITS 6 AND 7 THE DESCENDING MINOR SIXTH, G TO B, SHOULD BE EQUALLY DIVIDED INTO TWELVE SEGMENTS. ON THE LOWER LINE, VIBRATO IS INDICATED IN THE FRACTIONS OF A SECOND (1/3", 1/4", ETC.) WITHIN A CONSTANT FLUCTUATION OF SPEED.

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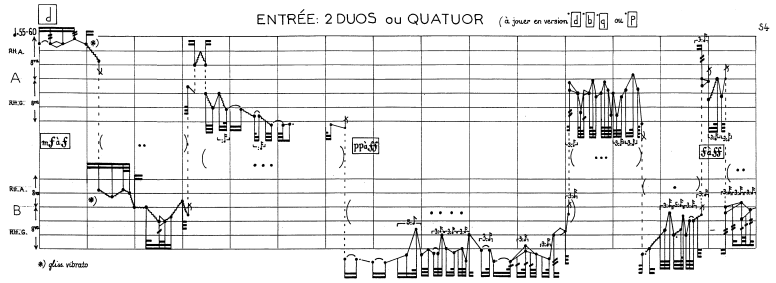
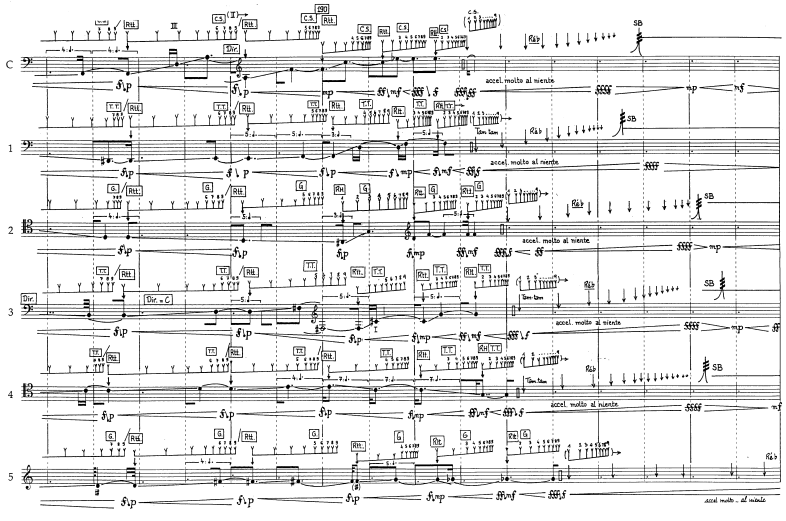


EXAMPLE 4A: *EOLO'OOLIN* (1981–3), FOR SIX PERCUSSIONISTS AT THE CENTER OF A PENTAGONAL SPACE: FOR DUO OR QUARTET, ONE OF THE GAMES BEING THE OPEN FORM OF THE SCORE. LETTERS **d**, **b**, **q**, AND **p** INDICATE THE POSSIBILITY OF FOUR ALGERBRAIC VERSIONS OF THIS PART OF THE SCORE.



EXAMPLE 4B: *EOLO'OOLIN* (1981–3), FOR SIX PERCUSSIONISTS AT THE CENTER OF A PENTAGONAL SPACE: COLLECTIVE AND INDIVIDUAL ACCELERANDI OF A RHYTHMIC PATTERN. THE SCORE IS CHRONOLOGICALLY PROPORTIONED, WHERE EACH DURATION UNIT LASTS FOR ONE SECOND.

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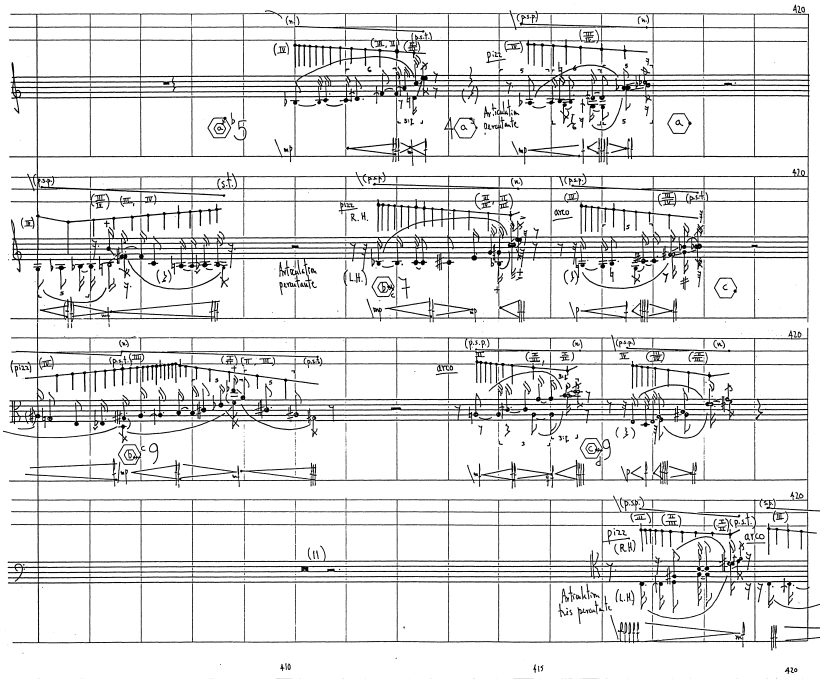

EXAMPLE 5: *ISHINI'IONI* (1984–90), STRING QUARTET: TOPOLOGICAL VARIATION OF A TRIDIMENSIONAL MACRO-TIMBRAL IDENTITY MADE OF PITCH, AMPLITUDE, COLOR (DIAGONAL LINES INSIDE THE THREE UPPER PARALLEL LINES), AND BOW ATTACKS (VERTICAL LINES ATTACHED TO DIAGONAL LINES). HEXAGONS INDICATE PHYSICAL MOVEMENTS OF THE PERFORMERS. THE SCORE IS CHRONOLOGICALLY PROPORTIONED.

research was the most appropriate tool for teaching me how to respond to the anguish of not knowing how to give voice to the music that I had heard since I was a youth. Your admonition about the futility of explaining music outside of what it could contain, without a doubt reinforced my search of more efficient methods, and of more precise ideas with which to speak of it and understand it. At first I put off responding—through my investigations—to the question of that which was *heard*, that Messiaen could not explain without arguments. Later I delayed resolving the nebulous nature of my own hearing, to make audible the imaginary games that, in private, confirmed a calling that no one previously wanted to accept with too much certainty. I haven't stopped being a perfectly lyr-

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ical dreamer, and the little scientific training I have stems from not allowing myself to repeat what others have already done.

Yes, to you I am a romantic, but I cannot doubt the fraternal nature of your gestures. Once you said that I somehow remained apart, alone in the background, listening to you faithfully, and that you, with equal fidelity, would not stop speaking as long as I continued to listen. You recounted detailed memories from years back, and I knew then that you identified with my restlessness as if it were your own.

In conclusion, your teaching, as essential as your work, embodies the philosophic concept of art and of the science of composing, and it emanates from your production of musical ideas. From this same solitary point, located in the depths of my own self, it is your light inspiring many other stars, perhaps still far away, to whom your example has left something formidable, fundamental, that deserves to be remembered here: to believe and to create according to one's own light.

—Translated from the Spanish by Brandon Derfler

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Notes

The translator would like to extend his sincere thanks to Chris Shultis and Rob Carroll for their insightful suggestions in the preparation of the English version of this paper.

1. The performance of this composition—whose name I do not remember and I cannot find reference to in catalogs—took place in 1969 in the Maison de la Radio de Paris, directed by Charles Munch, in the center of a large circle without public seating located in one of the studios.
2. Twenty-five years later the musicologist Radu Stan confirmed my intuition, showing me Xenakis's own notes on the transformation of the series, the identity of a group of twenty-four operations, a contribution to the development of serialism that passed unnoticed by the composers who were experts in the matter. [The author's original symbols for the four standard row transformations, **d**, **b**, **q**, and **p**, are not abbreviations but rather visual symbols that illustrate the effect of the operation on the prime form of the row, **d**. This convention is unique to the author, who notes that the symbols "have been well received since they are applicable not only to pitch rows but to any algebraic transformation of musical materials."]
3. It is impossible to ignore Cage here in the context of European music, as his scores sometimes refer to an additional code that breaks with the linear character of the traditional notion of writing, one that requests that a text be *interpreted* in the same sense that it was *composed*. In contrast, musical writing, such as Nancarrow's compositions for player piano, even if one sets aside their execution, would still allow one to comprehend the structural complexity of its *polytempi*: in Nancarrow's case the writing acquires a feeling similar to the notion of language in Wittgenstein, as integrally part of the system of knowledge (Estrada in Gann 2001). In a recent text I undertake a more extensive critique of musical language (Estrada 1998, 536–42).
4. At that time, the Équipe de Mathématique et Automatique Musicales, Paris.
5. UPIC: Unité Polyagogique et Informatique du CEMAMu.

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6. Or *mechano*. In general, a *mechano* is conceived to teach children to construct objects, from buildings to cars. This kind of game was first produced in Germany and in the United States.
7. Much later, Stockhausen would independently confirm Cowell's idea, although without practicing rhythmic-sonic unity in his instrumental music to the degree found in, for example, the music of Conlon Nancarrow. (Stockhausen 1957).
8. In Náhuatl, *eua*, to take flight; *oolin*, movement.
9. Excerpts of which can be heard at:

   <http://www.prodigyweb.net.mx/ejulio/julio.htm>.
10. Based on Juan Rulfo's novel (Rulfo 1987).

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