Meta-Xenakis

New Perspectives on Iannis Xenakis's Life, Work, and Legacies

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21. Seeing Music and Listening to Architecture: Iannis Xenakis and La Philharmonie de Paris

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Introduction

Iannis Xenakis has created architectural, musical, and visual works, and his architectures are true spatial transpositions of music. With Jean Nouvel (b. 1945), we conceived of an innovative type of concert hall in La Philharmonie de Paris (inaugurated in January 2015), offering a new musical experience, where both audience and musicians are immersed in a harmonious blend of space and sound. Xenakis's extraordinary way of linking space and music opened up new avenues for reflection and research. As an architect, I discovered, long after La Philharmonie de Paris concert hall was completed, some connections, filiations, and differences between Xenakis's approach to space and music, and our work on La Philharmonie de Paris.

Personal Thoughts and Experiences

Xenakis's artistic legacy is marked by an unprecedented relationship between architecture and music, evident in key works such as the Philips Pavilion (1958), the *Diatope* for Beaubourg (1978), and his project for the Cité de la Musique competition (1984).[1] A brief overview of some Xenakis's projects related to music and architecture,

1 Xenakis, 2008, Chapters 3.08–9.

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put in perspective with our work for La Philharmonie concert hall, highlights two different conceptual approaches yet interwoven threads of thought and imagination, as well as some parallel paths with similar goals in creating spaces for music: how to create an experience that is both musical and visual, allowing one to "see music" and to "hear architecture."

Xenakis knew how to transpose his innovative graphical implementation of hyperbolic paraboloids—initially used in engineering for calculating bridges—into his scores for music, and then into architectural forms, such as the Philips Pavilion and some of his Polytopes (1967–78).

After a long experience with the two current concert halls formats—Jean Nouvel's 1998 "shoe box" Concert Hall in Luzern[2] and the 2009 Copenhagen "vineyard" Concert Hall[3]—we wanted to invent a twenty-first century, new type of hall that would reflect the musical culture of our time. Our goal was to go beyond, add to, and blend the specific qualities of both the shoe box and the vineyard types of halls.

The Philips Pavilion at the 1958 Brussels World's Fair: "Volumetric Architecture"

The artistic director at Philips at the time, Louis Kalff, asked Le Corbusier (1887–1965) to create "A bold demonstration of sound and light effects where technical progress could lead towards the future." Le Corbusier answered, "I will not create a pavilion, but an electronic poem: with light, color, images, rhythm, sound, organic syntheses accessible to the audience."[4]

Le Corbusier created the "poem" and entrusted Xenakis to create his electronic poem's venue, which, for the former, could have no significant architectural existence as he saw his own creative work as being the core of the project.

Shortly before that, Xenakis was working on his score for *Metastasis* (1953–4), based on his drawings of hyperbolic paraboloids and conoids, much like those he had used as a student in engineering to calculate bridges.[5] He then used these types of surfaces for the Philips Pavilion, creating a freestanding structure without any supporting poles, and allowed this architectural revolution to be what he called "volumetric architecture,"[6] departing from conventional, two-dimensional architecture based on squares, rectangles, or circles… vertically translated.

Xenakis affirmed that parallel plane surfaces created detrimental reflections for sound, light, and color, and that curves with a variety of radii were excellent for sound.

2 See Conway Lloyd Morgan, "Lucerne Culture and Congress Centre (KKL)," *AJN*, http://www.jeannouvel.com/en/projects/centre-de-culture-et-des-congres/
3 See Jean Nouvel, "Danish Radio Concert House (DR Koncerthuset)," *AJN*, http://www.jeannouvel.com/en/projects/salle-symphonique-de-la-radio-danoise/
4 Xenakis, 2008, p. 105.
5 Ibid., p. 4.
6 Xenakis, 2008, p. 111.

Xenakis and Non-orthogonal Architecture

Xenakis wrote in 1958:

> [T]he referential system for the human body will no longer be the right angle and flat surfaces that are horizontal and vertical. Its sensibility will be shaped by curved surfaces. From the psycho-physiological point of view, this is a new and enormous enrichment, with yet unforeseeable consequences.[7]

Within the Philips Pavilion, one does not reason its geometry, one is subjected to the influence of its curvatures. The Pavilion's free and non-orthogonal approach marked a significant shift, inspiring future architectural developments, further aided by modern 3D software, that flourished decades later.

The *Diatope* for Beaubourg: "Music to Be Seen" in 1978[8]

Xenakis's *Diatope* (1978), for the inauguration of Beaubourg (aka Centre Georges-Pompidou) invited audiences to a multisensory journey, integrating the arts of sight and hearing. Xenakis wanted the arts and sciences to be treated as "alloys."[9] Through his pioneering "total art" works combining architecture, music, lights, and graphic arts, Xenakis invites us to experience unheard-of sound and light experiences.

The Cité de la Musique Project: "A Musical Jewel Box" (1984)[10]

Xenakis's proposal for the Cité de la Musique competition project carried forward his previous work on spaces for making music. He wanted that the music and the audience both be placed—absolutely—in all three dimensions. He proposed a flexible floor layout, allowing for various configurations with hills, islets, and valleys, where the audience could be face-to-face or back-to-back.

Xenakis on the Relationships between the Audience and Audio Sources [11]

Xenakis emphasized the importance of geometric architectural forms tailored to fit each particular audience-source relationship. For him, architecture had to be conceived of as a "jewel box" for music or light, like a high-quality instrument. Until then, except for ancient and Roman theaters, few new and valid forms, or musical instruments, had been created; parallelipedic or polygonal forms dominated. However, modern technologies, theories, and the quality of materials were far in advance, allowing for

7 Ibid., p. 118.
8 Ibid., Chapter 4.20.
9 Xenakis, 1985 (indeed, the title itself of his *Doctorat d'État* in 1976 at the Sorbonne).
10 Xenakis 2008, Chapters 3.08–9.
11 Ibid., Chapter 2.08.

the production of truly adaptable and interesting geometries; yet these were practically ignored at the time. Xenakis stated in this lecture nearly forty-five years ago(!):

> [...] shells and thin casements have been practically ignored. They are capable of being easily modeled in a vast variety of forms, allowing for new geometries that would be truly well-adapted to their use, in addition to being interesting. It is by the use of these membrane shells, and thanks to their free forms and curves, that a new palpable quality of acoustic space (or visual "jewel-box") can be created, comparable to the wooden forms of a Stradivarius. [...] Without excluding planes and right angles, curved surfaces could underline and increase the intimate characteristics of a receptacle or the mysterious characteristics of a cavern-hall with thousands of reflections. Sound would find itself naturally alive with warm resonances from the wall surfaces especially since there would be no acoustical corrections necessary, except under dire circumstances. This has been my experience and remains my profound conviction, demonstrated in the Philips Pavilion and the *Diatope*'s architecture.[12]

Noting the mediocrity of concert halls of the time, he remarked on the necessity to invent an architectural form that would eliminate the inconveniences of, and serve to liberate collective listening. La Philharmonie de Paris Concert Hall[13] seems, in fact, to be one answer to Xenakis's dreams, arrived at through different paths but with a common goal: to create a new 'architectural form' serving both music and collective listening.

La Philharmonie de Paris Concert Hall

As architects of La Philharmonie de Paris Concert Hall, and as music lovers, our vision was to create a musical instrument allowing musicians and audience to be immersed in space and music, echoing the spatialized contemporary music of the twentieth and twenty-first centuries, including Xenakis's.

The competition brief demanded an "enveloping" hall. In architectural and acoustical terms, that means a hall where the audience surrounds the musicians on stage, like in the Hans Scharoun Concert Hall in Berlin,[14] now called the "vineyard" type. This is to be compared with the more common, rectangular "shoe box" type of hall. We decided to go further and to "envelope" the audience with space—space being the medium for sound.

Acousticians generally impose, from the beginning, strict data to be followed: heights, widths, lengths, mass, and weights of materials for sound reflections. Architects, generally afraid of creating a hall that does not have a good sound, usually precisely follow their acousticians' briefs. For La Philharmonie de Paris, thanks to our

12 Ibid., p. 154–5.

13 See "La Philharmonie," *Philharmonie de Paris*, https://philharmoniedeparis.fr/fr/decouvrir/philharmonie

14 See Ralf Bock, "Building for Democracy," *Berliner Philharmoniker*, https://www.berliner-philharmoniker.de/en/stories/memory-of-hans-scharoun/

previous experience on the two mainstream types of halls cited above, we started on a reverse concept: our starting point was *music*; sound which travels through space and voids. Forms, shapes, and matter came later. We put the audience (seats on main floor and balconies) around the musicians (stage), enveloped the audience with space, and then, later, we put surfaces around and above for sound reflections. The flow of conceptual thoughts followed a fluid musical movement. Inspiration came from music itself. We wanted to create an "instrument," serving both musicians and audience, with eyes following a musical movement in space through architecture.

Every surface was thought of and designed in 3D. The angles of flat planes given by acousticians, imposed by necessary quality sound reflections, were blended into architectural 3D surfaces, put into space in a long, fluid, musical movement. After these conceptual intentions came the deep and long work with the two acousticians, Sir Harold Marshall[15] and Dr. Yasuhisa Toyota,[16] coming from the two different schools (the "shoe box" and "vineyard" schools) to ensure that our architectural innovation would fulfill the requisite acoustical qualities. Architectural innovation was accompanied by an acoustical one. Extra space around the balconies, as well as "clouds" and "ribbons," were used as sound reflection spaces or devices, participating in the creation of La Philharmonie de Paris as being a true "musical instrument." This very long and steady work allowed the very special visual and musical experience we can now experience in La Philharmonie de Paris Concert Hall.

In conclusion, Xenakis's profound exploration of the relationships between space and music has influenced further generations of musicians *and* architects. His influence, even though not directly, through our common culture, experiences, exchanges, can be seen in La Philharmonie de Paris Concert Hall, which stands as a new architectural form much like Xenakis dreamed of, and that serves both music and collective listening, allowing us to embark on a unique journey of "seeing music and listening to architecture."

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15 See "Sir Harold Marshall," *Marshall Day Acoustics*, https://fr.marshallday.com/people/sir-harold-marshall/

16 See "Dr. Yasuhisa Toyota," *Nagata Acoustics*, https://www.nagata-i.com/1977/01/01/dr-yasuhisa-toyota/