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# Iannis Xenakis: a composer's perspective

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Although music uses sound as its medium of conveyance, music is not just sound. Although musical structures rely on the acoustics of sound-generating devices (instruments) and conveyances (concert halls, loudspeakers) and on the way the body senses the sound waves generated and transformed by these (psycho-acoustics), theories of musical composition can work both with and against these principles. Music is involved in sonic discourse, sonic rhetoric, if you will, and history shows us that because of this it is a sociocultural phenomenon which reflects the times in which it is composed.

So, whilst the works of Iannis Xenakis (composer and architect, b. 1922 in Romania of Greek parents) contain some of the most incredible listening experiences in the music of the twentieth century, in this article I wish to concentrate on his importance both technically and philosophically to the activity of composing. Following the 'collapse' of functional harmony as a prime structuring principle, composers of Western art music in the first half of the twentieth century were consumed by the need to find a new language, an alternative way of structuring musical ideas. For Xenakis, this was fundamentally wrong:

I do not think that any attempt to consider music like a language can be successful. The sub-structure of music is much closer to the sub-structure of space and time. Music is purer, much closer to the categories of the mind. (Matossian 1986: 89)

So, at a time when many composers were exploring the ramifications of serialism as enunciated by the second Viennese school, Xenakis, though applauding the reintroduction of abstract thinking into musical composition, was lucidly critical:

Linear polyphony destroys itself by its very complexity; what one hears is nothing more than a mass of notes in various registers. The enormous complexity prevents the audience from following the intertwining of the lines and has as its macroscopic effect an irrational and fortuitous dispersion of sounds over the whole extent of the sonic spectrum. There is consequently a contradiction between the polyphonic linear system, and the heard result, which is surface or mass. . . when linear combinations and their superimpositions no longer operate, what will count will be the statistical mean of isolated states and of transformations

of sonic components at a given moment . . . The result is the introduction of the notion of probability, which implies, in this particular case, combinatory calculus. (Xenakis 1955)

Whilst other composers, in order to free up the determinism of serial composition, introduced chance into their compositions in the form of 'multiple choices' for performers, Xenakis considered this an abrogation of responsibility – a substitution of authors – and an abuse of chance. His approach was to tackle the issue as a historio-philosophical one to be dealt with by the laws of probability and by the mathematical functions that formulate that theory. It was thus that he introduced the use of stochastic processes into musical composition.

Xenakis' first major contribution, then, was to suggest a means of controlling sonic structures using more basic principles than the more narrowly focused efforts of the serialists, using the mathematics of sets, groups, discrete and continuous events, sieves, games, and the use of stochastics to control drifts between order and disorder. His early works are sonic realisations of his explorations in these fields of thought.

Through his extensive study of ancient Greek and Byzantine music, together with his studies with Olivier Messiaen, Xenakis became aware of the importance of outside-time structures (such as scales) which he was able to reintroduce to his music in a multi-modal way using sieve and group theory:

The final stage of the evolution, atonalism, prepared by the music of the romantics at the end of the nineteenth and beginning of the twentieth centuries, practically abandoned all outside-time structure. This was endorsed by the dogmatic suppression of the Viennese school, who accepted only the ultimate total time ordering of the tempered chromatic scale . . . Naturally the loss was felt, consciously or not, and symmetric relations between intervals were grafted onto the chromatic total in the choice of the notes of the series, but these always remained in the in-time category . . . This degradation of the outside-time structures of music since late medieval times is perhaps the most characteristic fact about the evolution of Western European music, and it led to an unparalleled excrescence of temporal and in-time structures. In this lies its originality and its contribution to the universal culture. But herein also lies its impoverishment, its lack of vitality, and also an apparent risk of reaching an impasse. (Xenakis 1971: 193–4)

As one of the ‘fathers’ of computer music, Xenakis also made some highly original contributions. His explorations into new ways of synthesising complex waveforms using stochastic functions has encouraged many to explore alternatives to simple additive synthesis, which he saw as another *reductio ad absurdum* of deterministic thinking. His Free Stochastic Music Program was one of the first to codify a minimum set of rules for composition and helped to establish the field of algorithmic composition, which has provided some major challenges to musical thinking in the last century. His founding of the Centre d’Études Mathématiques et Automatiques Musicales in Paris, where he has developed, amongst other things, his UPIC composing system with its emphasis on direct input to the computer using a drawing tablet, has contributed much to the development of composer interfaces to computers and to the exploration of fundamental compositional and pedagogical issues.

Early in his career he became noticed as an architect through his work on the facade of the Tourette Convent in 1954 and the Philips Pavilion for the Brussels World Fair in 1958. In his visual and theatric *Polytopes* he has continued to find intimate connections between music and architecture:

One thing I learned from architecture . . . is to consider the overall shape of the composition, the way you see a building or a town. Instead of starting from a detail, like a theme, and building the whole thing up with rules, you have the whole in mind and think about the details and the elements and . . . proportions. (Matossian 1986: 69)

In architecture, Xenakis observed a formal principle which posed an alternative to the organic model (of Schoenberg, Boulez, etc.); juxtaposition and collage – ‘placing them so nextily’ as Gertrude Stein said. As Matossian observed, for Xenakis the quest is to find the correct form which will permit the dynamic forces in the work to appear as audible processes in the music. In other words,

Xenakis exposes the dynamic processes so that the listener is not the recipient of the end-result in some complicated compositional process but is able to participate in the conflict of opposing forces at work in the music. (Matossian 1986: 64)

This architectural approach is lucidly revealed when Messiaen asked:

And all the other permutations? I can’t write out the millions and millions of permutations . . . and yet I must write them out in order to know them and to love them . . . In your case, a machine will give you the millions of permutations within a few minutes: it’s a cold and explicit list. How can you choose directly from within this immense world of possibilities without intimate knowledge or love? (Xenakis 1985: 31)

and Xenakis replies:

When I look at a starry sky, I love it in a certain way because I know it in a certain way; . . . Consequently, I can handle the concepts of things themselves without being in direct possession of them, under the condition that I may conceive of them and feel them from within in some way . . . [E]ven if I am incapable of dominating a certain phenomenon, I am capable of obtaining a truth which is inherent to the conceived or observed phenomenon, thanks to a kind of immediate revelation. Henceforth, I can accept and use this, in and as itself. (Xenakis 1985: 32)

Whilst many of Xenakis’ concerns have been about fundamental and technical issues in musical thinking, it would be a mistake to conclude that his music is somehow abstract and unconnected with the direct experience of music: the reverse is the case. At a time when the music of many post-WWII composers appeared abstracted and alienating, Xenakis’ music has had a certain fundamental directness which speaks to people not concerned with academic discourse and which has assured him a wide listening public. At a time when there is no one dominant musical style, when commercial pop and romantic sentimentalism have flooded the media with their attention-seeking antics, Xenakis, perhaps the most natural successor to Varèse, has shown in a most remarkable way that music composition can again make an original contribution to thinking and feeling in the complex and multicultural world of the early twenty-first century. Vale Iannis Xenakis, 1922–2001.

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