

# IANNIS XENAKIS

Life and work

Marilina Tzelepi  
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# XENAKIS

## LIFE

Iannis Xenakis was born in 1922 in Braila, Rumania. His family originated from Greece, but had migrated to Rumania earlier on. His father was a businessman, who had a profound love for music, and especially Wagner. His mother died at an early age, leaving his father with no choice but to send his three sons away to boarding school. Thus, Xenakis was sent to “Anarghyrios”, a school that had just opened on the Greek island of Spetse. He stayed there until the end of his secondary school studies.

During that period, Xenakis developed a profound love for mathematics, physics and literature. At school, he became acquainted with solfege, notation and singing, as well as with the study of Greek Church music and traditional Greek dances, that were quite popular at the time. His attention was also drawn to psychology and ancient Greek philosophy. He confesses that, although at the age of thirteen, he “discovered God” (as he says), later on he became an atheist, due to various circumstances that occurred throughout his life.

At the age of sixteen, Xenakis left Spetse and moved to Athens, where he continued his musical studies, along with preparing for the entrance exams at the “Polytechnio” (Polytechnic University of Athens). Although music was very important to him since he was a little boy, it was however nothing more than a dream; he was not yet conscious of how much music meant to him. Regarding the conservatory, he says: “I was afraid of the conservatoire, where they taught music “seriously” and made no attempt to enroll”. Around the same time, he met Aristotle Koundourov, a student of the Russian composer Ippolitov-Ivanov and took lessons in harmony, counterpoint and orchestration from him.

The age of sixteen was an important turn in Xenakis’ view on life, due to his interest in ancient civilization; he undertook the study of literature, philosophy, architecture and history and was fascinated by the natural sciences, because of their link to ancient thinking. During the next few years, he devoted himself to readings of ancient philosophers and writers, mainly Plato, and visited various sites of historic importance.

In 1940, he passed his exams for the Polytechnic University; it was on the same day that the Italians entered Greece and the University closed, not to reopen until the following year. At the end of 1941, Xenakis joined the Resistance, by taking part in a nationalist movement that was protesting against the occupation. He was also influenced by the Communist Party and joined it during the same time. Until December 1944, the Resistance’s underground activities helped the Greek armed forces. In 1945, Xenakis, hit by the shell of a German tank, was wounded.

In 1947, Xenakis was sent to a military camp, from which he escaped and, after hiding in Athens for about three months, he fled to Italy. The same year, he obtained a degree in civil engineering from the Polytechnic University of Athens. Soon after, he went to France, under the false name *Konstantin Kastrounis*, with the help of his father. He considered Paris to be the “continuation of ancient Greek civilization”, because of the concepts of freedom that were very strong at the time, as well as because of the philosophical and scientific influences.

In 1948, Le Corbusier, who was then planning the Marseille housing unit, employed Xenakis. His job was to compute the sizes of concrete elements. He worked for Le Corbusier for 12 years (1948-1960), and according to him, it was he who taught him “to think in architectural terms” and got him acquainted with contemporary architecture. During his 12-year employment, he devoted his free time to music. The buildings that Xenakis designed through the years were not only significant from an architectural point of view, but also from a musical aspect, because he used the rules of architecture and the solutions to its problems in his music.

During the late 1940s, Xenakis was still fairly uncertain as to what music path he was going to take; he started getting more involved and acquainted with the Greek Church music and wrote arrangements of folk pieces, as well as other types of pieces, which had a strong tendency to ignore the traditional norms of harmony and counterpoint. At that point, he wanted to continue his music education, so he asked to become a student of Nadia Boulanger, who turned him down. He also had an interesting encounter with Arthur Honegger, who at the time taught composition at the Ecole Normale; he played a piano piece that he had written and when Honegger mentioned the fact that there were parallel octaves in it, Xenakis replied that he liked it, only to get Honegger’s response: “This is no music!”

Xenakis also took lessons with Milhaud for a brief period of time, and proceeded to see Messiaen, taking some of his smaller compositions to him. Messiaen was interested in him and Xenakis attended his courses in Analysis and Musical Aesthetics at the Conservatoire. Messiaen believed that Xenakis should listen to as much music as possible, because, according to him, that was more important than academic training. Messiaen was a genius, in the eyes of Xenakis.

After Messiaen, Hermann Scherchen was the next important figure in Xenakis’ development. He worked with him at Gravesano, where they conducted music experiments, such as performances of pieces with tape accompaniment, the use of a sphere-shaped loudspeaker etc. Scherchen was the only conductor at the time that supported Xenakis’ music and conducted *Pithoprakta* in 1957-58. However, the main contemporary influence was that of the serialists, so Xenakis’ music was not given very much attention at the time.

From 1955 and on, he started concerning himself with what he named “Stochastic Music”, “Strategic Music” and “Symbolic Music”. The first term is linked with the conception of “clouds” and “galaxies” of events in sound, as well as the use of calculus and the theory of Probabilities in music composition. The second one emerges later, as he makes use of the mathematical theory of Games, and the latter includes the theory of Sets and mathematical Logic. In other words, Xenakis employs his beloved mathematical principles in the other field that he cherishes as much as science: music.

In 1964, the Ford Foundation offered Xenakis a scholarship, which meant him spending a year in West Berlin, where he wrote, among others, “Eonta”. In 1967, he realized a series of lectures in the United States and Canada, promoting his works and his compositional concepts. The same year, he took up a position at Indiana University, where he founded a center for mathematical and automated music. He described his years in Indiana as “depressing”, and he said that professors as well as music students did not warm up to the concept of “new music”. Eventually he left Indiana University in 1972.

The 1970s were productive for Xenakis; he finally started making recordings of his works, getting commissions, realizing lecture-tours, receiving awards and witnessing Xenakis-festivals. He also finally returned to Greece, after years of exile, and his name was among those of the leading contemporary composers.

Xenakis returned to France, where he became part of the faculty of the *Ecole Pratique des Hautes Etudes* at the University of Paris. Together with a group of scientists (mathematicians, electronic engineers, philosophers etc), they worked on trying to make a mathematical study of the universal constants in music and to produce music through computers and convertors. It was for this purpose the UPIC (Unite Polyagogique Informatique de CEMAMu – Centre d' Etudes de Mathematique et Automatique Musicales) was created, which was a digital to analogue and vice versa converter, in an effort to supply an aid for teaching of electronic and computer music at schools.

Throughout the 1980s and 1990s Xenakis continued his compositional and experimental career. His health, however, was deteriorating, and in February 2001 he passed away. His mark in contemporary music was a significant one; he was compared to the great artist-philosophers and discoverers of history. He used to say that he was born in the wrong millennium, that he missed a lot. Maybe he was right.

## STOCHASTIC MUSIC

The year 1954 was a very significant one for Iannis Xenakis; viewing himself as seriously committed to music and composition was no longer a dream for him, it had become a reality. His diary for that year reveals a lot of information regarding his thought and his music. He made criticisms on serial music, acknowledging its weaknesses and proposing solutions related to calculus, and “actions through probability” (as he employed in his orchestral work *Pithoprakta*). In 1956, Xenakis published a paper on his work, explaining in detail the use of Probability Theory in his music. The fundamental difference between him and the serialists was that he was concentrating on modalities of *change* and *dynamics*, while the serialists were more concerned with the *serial symmetries* and *geometries*, which he viewed as making serial music static. Xenakis believed that music is a medium for thinking and was determined to prove it through his work.

He felt that the ideal description for his music was included in the term *stochastic*. This is a Greek word, which means point of aim, target. It also means “to reflect, to think”, so Xenakis used the term to explain the need for concentration of thoughts on a specific point, a specific target. The term *stochastic* was first used by Jacques Bernoulli, who was one of the inventors of the Calculus of Probabilities, and the first to write about the fundamental law of large numbers. The term “stochastic” was applied in connection to determinism (“the more numerous the phenomena, the more they tend towards a determinate end”, according to him). Xenakis agreed wholeheartedly with this and for this reason he linked the term to music.

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## PIANO MUSIC

Xenakis wrote numerous compositions, using a variety of combinations of musical (and non-musical) resources. His works for solo piano are limited to three: *Herma*, *Evryali* and *Omichles (Mists)*.

### ***HERMA***

This is the first solo piano work composed by Iannis Xenakis, in 1960-61. The name *Herma* means “embryo, union, foundations”, because, according to him, it was the first time he made use of logic calculus, of symbolic logic. Commissioned by the pianist Yuji Takahashi, it was composed in Tokyo, where Takahashi premiered it in 1962. It bears the subtitle “Symbolic Music”.

The reason why Xenakis uses the term “symbolic” to define this work is because it is based on logical operations enforced on pitch classes. There are four of the latter defined in the score, and through the relationships, other pitch classes can be formed “*outside of time*”, as Xenakis writes. Symbols are used to show union, intersection or negation, or to which class each element belongs. The main definition factor for this piece is the pitch; the piece is based entirely on set theory, using R as the universal set, which includes the groups A, B and C.

#### ex. 1

The Venn Diagram shows the Operations of set theory by which pitches are selected in *Herma*

Xenakis says, regarding this piece: “*I used the time as a blackboard: On it, I “wrote”, one by one, in a more or less perceptible manner, the operations I had carried*

out. Time, then, is a means for us to unfold the outside-time structure of the piece". Herma, therefore, is not a demonstration of the stochastic approach.

The sets in *Herma* contain elements that are interconnected in some way that is not always obvious. Sometimes, there is an internal structure characterizing the set, and this is why Xenakis proceeded in creating groups of elements. Combinations of the elements in different numbers lead to different operations, such as binary (for a pair of elements), ternary (for a combination of three elements) etc. Furthermore, combination of intervals leads to different pitches, bringing about the so-called "associative property" (combination of two intervals and addition to a third one). Xenakis also identifies different types of intervals: pitch, duration and intensity intervals, which also create a group structure.

The examples below show some of the structural elements in *Herma*. What is very interesting is the sound coloring, which is produced by the vast differences in sound levels (*fff* to *ppp*). To this day, this work is considered to be one of the most difficult piano works in the history of contemporary music.

### *HERMA*

Ex.2: page 18, bar 6

Ex.3: page 19, bars 1-5

### **EVRYALI**

The second piano work of Iannis Xenakis was composed in 1973, and was premiered on October 23<sup>rd</sup> of the same year in the Lincoln Centre of New York City, by pianist Marie-Françoise Bucquet. The name of the piece is Greek and means "wide sea/Medusa".

As Xenakis says, the main problem in composing this work was "how to achieve continuity on an instrument which has an opposite nature". To deal with this problem, he uses a new method, which he applied for the first time, the method of "*arborescences*". He made a sketch (model) of the piece that consisted of trees going from one shape to the next instead of rotate/transform them as he used to do up to this point with previous works. This advancing from one shape to the next resulted in creating new shapes (ex.2).

Ex.4  
Sketch of  
*EVRYALI*

This was an effort to “find on paper the visual equivalent of the musical idea”, as Xenakis says. He believed that the use of traditional notation would be at the expense of continuity and this is why he chose to use the arborescences method.

There are three basic elements to *Evryali*: There are large intervals between pitches, with a slight preference for minor 2nds and 7ths, rhythmic repetitive chords that create a sense of continuous motion and harmony, and both the harmonic and rhythmic traits employed in the composition are combined by being put together in groups of parallel chords that move upwards and downwards on the keyboard. The motion sometimes is chromatic, with the lower part being unaltered, so that the pitches stretch.

The three regions which dominate the piece represent three different interpretations of time: one is flowing in one direction, the second one remains static and the third one creates a strong rhythmic pulsation which is repetitive and has a tendency to modulate. Again the dynamics of the piece are very distinct and help bring out all the above-mentioned elements. In addition, Xenakis liked to use the resonance that is created in the wood of the piano; this sound box effect was also used in his works *Eonta* and *Synaphai* for piano and orchestra.

The following examples show the types of movement and the above mentioned compositional elements employed in *Evryali*.

*EVRYALI*

Ex. 5: page 7, bar 7

Ex. 6: page 26, bar 6

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## MISTS

This work was written in 1981 in Edinburgh, and was premiered at the Edinburgh Festival in August of the same year, by Roger Woodward.

The 1980s was a turning point for Xenakis; there were some changes in his compositional style, which however, according to him, were so gradual as to not be very noticeable. The main new feature in his works is the fact that he emphasized vertical over horizontal concept; in other words, there appear to be many more chords than before, in combination with a more frequent use of clusters and other percussive elements. He was mainly interested in obtaining new sounds from the traditional orchestral instruments. He believed that this way a richer sound could be produced, and for this purpose he started composing in large blocks of sound moving towards the same direction. Each block is different than the next one, although the elements in the individual blocks do not vary.

Another important difference is that his music has become more metrical and simpler than before; he justifies that as having studied rhythms of different countries and trying to experiment with them or integrate their fundamentals in his works. The appearance of glissando has diminished compared to earlier works, and instead he uses more trills.

*Mists* is one of the pieces of Xenakis' "new era", and contains many of the above features. It is less difficult technically than the previous piano pieces. It is a very abstract work, as the title suggests. Xenakis places *Mists* in the category of works that do not express anything beyond music; it is mostly interested in the "science of composition", well loved by the composer.

The two basic materials used for the composition of this work are random walks and arborescences (similar structure to *Evrjali*). There is a mention of the term "sieves", which Xenakis interprets as "scales – durations that aren't periodic and that are produced by means of logical equations". This was a new notion for him and he experimented with it further at CEMAMu. *Mists* is an interesting piece; however, the most popular of Xenakis' piano music is undoubtedly *Herma*. Up to this day, his piano compositions are a technical and interpretational challenge for pianists over the world.

Xenakis: was he a genius or just plain radical? How does his work fit in the definition of "music" as we know and perceive it? There are many questions and many contradictions that still surround him, that will probably be left unanswered and unsettled. Maybe that is what he wished.

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