—Xenakis @ UCSD—

From April 3rd through 9th, 1990, the Music Department of the University of California, San Diego sponsored *Xenakis @ UCSD*, the most ambitious presentation of the composer's work yet attempted. Nineteen compositions were heard in a variety of venues while an exhibition of his architectural projects and musical sketches (assembled by the Régie Autonome des Transports Parisiens) was on display. Mrs. Muriel Gluck was the patroness for Xenakis' Distinguished Residency.

1.	*Aïs* (1980) for amplified baritone, solo percussionist and large orchestra The La Jolla Symphony Orchestra Philip Larson, baritone Steven Schick, percussion Thomas Nee, conductor	15:29
2.	*Gendy3* (1991) for computer generated sound	18:45
3.	*Taurhiphanie* (1987-88) for computer generated sound	10:46
4.	*Thalleïn* (1984) for 14 instruments The SONOR Ensemble of UCSD Rand Steiger, conductor	17:44
	Total Time	63:08

—Four Perspectives—

—*Sublime Extremes*—

Iannis Xenakis. His music contains human dimensions only knowable to one whose identity has been breached by the indiscriminate violence of shrapnel. It manifests a knowledge of materials and an awareness of structure natural to an engineering graduate of the Athens Polytechnic Institute. Bridging the humane and the calculated, it asserts the comprehensive, integrative vision of the architect, a perspective nurtured by years of working near Le Corbusier. Xenakis celebrates in *his* time the conceptual consonance between music and science first remarked in ancient Greece.

Notable in his way and work is an improbable equipoise between the sternly rational and the flagrantly emotional. Whatever the methodologies he embraces, the strategies he employs, his intent is both immediate and metaphysical:

> *Art, and above all, music has a fundamental function, which is to catalyze the sublimation that it can bring about through all means of expression. It must aim through fixations which are landmarks to draw towards a total exaltation in which the individual mingles, losing his consciousness in a truth immediate, rare, enormous, and perfect. If a work of art succeeds in this undertaking even for a single moment, it attains its goal.* [**Formalized Music**, page 1]

One strains to embrace the amplitude of this vision even while marveling at its starkness. Does another similarly elevated credo come to mind? His standard results in music that is inimitable, but also in a voice whose range and character are not suited to every purpose. There are limits here. Nonetheless, I have recognized in him moments of tender, even vulnerable sensibility—heard him relish, fleetingly, a homely melody. One is not likely to detect these facets in his music, however, and when they are to be caught at instants when the tautness of the musical fabric loosens briefly, they are rather incidental indicators than generous explorations. He admits a potential but does not indulge it.

Xenakis' impulses, though broadly informed, find their realizations in a music that is, as a rule, harsh-voiced, urgent, implacable, insistent, imperious. They call out (or are carried upon) sonic textures that seem elemental, unreasoned in their massive inevitability. It is this manifested energy—often compellingly, though not explicably, dark in mood—that more than anything else arrests the listener's ear and mind, I think. And *massiveness* in Xenakis

turns out to be by no means the sole province of large forces. No, to one's amazement, a solo cello or clarinet is as able as a 100-piece orchestra to evoke this inimitable impression of an inertial directionality that is not to be resisted.

I first encountered Xenakis in Berlin in the Spring of 1964, and we have met often since then, in Europe, Asia and the United States. He remains quietly consistent in every context. Sometimes, as a momentarily detached observer muses on it, this man seems an implausible source for music of such sublime extremes. As director of the *Xenakis @ UCSD Festival*, I concluded my opening remarks at the opening with the following comments. They still feel like an appropriate offering to someone about to embark on the voyage of the present disc:

> *Prepare yourselves for musical experience that is at once elemental and sophisticated, diabolical yet divine, eliciting acts of musical heroism from its performers and leaving its listeners in a state of astonished grace.*

At this remove, the words too seem extreme . . . but no less true.

—Roger Reynolds

—On How to Talk About Music—

It is a gift of nineteenth century romanticism that topics smacking of science or technology are studiously avoided by typical students of the arts. Reading Iannis Xenakis' book *Formalized Music* therefore presents significant stumbling blocks to many musicians, for Xenakis uses mathematical concepts as freely as most authors use words. Does this mean that Xenakis writes "mathematical music"? Or that he wishes to show how music is really just a form of mathematics? I think neither, for Xenakis' book deals in reality with fundamentally aesthetic relationships that can be described or expressed either mathematically or musically. More important is that Xenakis does not shun the elegant and powerful tools of thought catalogued in the lexicon of mathematics in order to forge a path towards an expanded insight into music.

There are at least two basic ways in which such a treatise can be approached. The first involves asking the question, "How can I translate all of these involved mathematical arguments into terms I can easily understand and readily use?" The second starts by asking, "To what extent must I enlarge *my* thinking so as to be on a level with what is expressed?" The first is the pragmatic question of the practitioner seeking "user-friendly" tools and

concepts. It is likely to fail in this case, for the book is—both implicitly and explicitly—about musical philosophy, and it is the second question that belongs to the philosopher.

While Xenakis uses mathematics with the aplomb of a master carpenter using hammer and saw, reading *Formalized Music* is *not* like a lesson in carpentry (though there is a little of that), for Xenakis' primary concern is *not* technological. It is rather like listening in on the thoughts of a master carpenter who is well on his way to inventing architecture. Mathematics in this case is merely one means—though an important one—by which thinking about music can be accomplished. Without such means the architect is reduced to the status of a dreamer about forms. With such means, Xenakis shows how the musician can approach musical realms that hover beyond the reach of imagination.

In his writing pertaining to *Achorripsis*, Xenakis demonstrates mathematics as Muse (in the best tradition of ancient Greece): a simple stochastic "seed" (the "mean density of events") is toppled into a complex structure that it characterizes without delimiting. In other words, the connection between the mathematical impetus and the musical result is shown to be logical without being confining. Statistics, which is the mathematics of large collections of individually differentiated objects, can be a double-edged sword leading either analytically from complex behavior to tractable simplification, or synthetically from simplified principle-cum-unifying force to composition.

In the section of *Nomos Alpha*—taken from the most overtly philosophical part of the book—Xenakis raises the issues he calls *in-time* and *outside-time*. Today's musician is likely to interpret these concepts as analogous to the contemporary distinction between real time and—for perennial want of a better antonym—*non-real time*. This, however, would be an unfortunate oversimplification. A better analogy would be the difference between the path between two arbitrary points in space with the special property of traversing the shortest distance—a straight line—versus all the other possible paths connecting two points. Thus we can see in *in-time* behavior the same linear, temporal actuality that allows music to exist, while *outside-time* behavior is comprised of the sum total of the imagination, logic, presumption, irrational association, mathematics and, of course, mere coincidence that allows musical thought to exist.

—F. Richard Moore

—A Voice of the Inexplicable—

I first met Xenakis in Tokyo, perhaps in 1960. Since 1961 I have been playing his piano pieces, *Herma, Eonta, Evryali* and *Synaphaï*. In Berlin in 1963, I became his composition student. When I showed him my piano piece, he pointed at two sections in the piece, and offered me an eraser. Another time on the way to the post office, he explained the history of ancient Greek philosophy—Pythagoras, Parmenides, and all the rest. Those were the few lessons I had. Later I translated two of his books, *Music Architecture* and *Xenakis/les Polytopes*, into Japanese, and conducted the performance of *Oresteïa* in Tokyo.

Now I can still feel those notes of *Herma* at my fingertips, but I haven't played it for a long, long time. Performing *Herma* I discovered the gravity-free state of the sound. It was the feeling of lightness, rather than the violent movements other people surmise from the pianistic virtuosity. And from performing *Synaphaï* I learned to distinguish simultaneous multiple lines by differentiated touches and fluctuating time. Since then as a composer I am always interested in these fugitive elements, the undefinable and unstable timbre changes and intentionally uneven timing which are difficult even to indicate. Then music becomes more improvisational and fragile. After all, this may still be a performer's point of view rather than a composer's.

Although I feel I have come far from his concepts, the mass of sound, the *outside-time* architecture, intense expressions, all those elements which seem to have become a style and method in recent European music, I like to listen to his music. I hear through those hundreds of notes, and sense at unexpected moments something like a voice, or voices, of the inexplicable. I am thinking of the lone observer in the vast space-time of Einstein watching the fleeting light.

—Yuji Takahash

—Iannis Xenakis: a vision that listens—

I met Iannis Xenakis in 1967 in Paris, during a series of lectures in which he presented both his compositions and his works on music theory. At that time, I was a student for whom music seemed to be in a cul-de-sac, and meeting with this visionary caused me to come directly into contact with a part of the future, different from that one pointed to by other musical works, authors and theories. From the first lecture, several blackboards were

insufficient to illustrate his long exposition on the mathematical background of his conceptions. Until that very moment, I had always thought of music as a world on the most opposite side of, even as the field that would save me from mathematicians, which in my father's family was a sort of plague. I had never had any interest whatsoever in mathematics and the presentation given by Xenakis reminded me too much of the numerical tone of family talks.

[. . .]

Right after those lectures, I began to put a good amount of effort into studying, in a systematic way, the works and postulates of this musician, mathematician, architect, and philosopher, whose ideas and realizations offered an original vision, together with a revolutionary solution, to both the thinking about and the creation of music. The works of this distinct musician, lying on the antipodes of every other music so as to offer an authentic, novel idea, was thus the beginning of a renovating stage in my professional and artistic career.

[. . .]

At the end of 1983, I attended Xenakis' courses at the Université de Paris to inquisitively interrogate him on the concrete way in which he put into practice in a score his theories and composition methods. This was the occasion in which I most arduously tried to know "how the method actually works," yet I did not achieve my goal. I wanted to know his answers with precision because in the Spring of 1984, I was going to give the first seminar ever on the formal analysis of his work to the doctoral students of composition at the University of California, San Diego. I must say that the solution to the problem was to approach it from the angle formed by my knowledge of his formal propositions and my own intuitions.

—Julio Estrada

[Excerpted from an extended manuscript with the same title;
translated from the Spanish by Rafael Liñán]

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—Program Notes—

Aïs (1980) for amplified baritone, percussion soloist and large orchestra

This work is concerned with "the domain of the dead, Hades of the shadows." For it, Xenakis selected two fragments from the *Odyssey* relating to Ulysses' visits to the land of the dead. He offers the following comment:

Odyssey, chant XI, verses 36-37:
into the pit; the blood was flowing like black clouds, and from the depths of Erebos
gathered the souls of the [irrevocably] dead.

and verses 205-208:
To embrace the soul of my [irrevocably] dead mother. Three times
I hurled myself; all my heart longed for that. But three times from my hands
like a shadow or like a dream, her soul flew away; and in my heart
more sharp the distress became.

These fragments express the irreversibility of death, and they are even more terrible since the being most cherished by Ulysses, his mother, is impalpable, a dream that flies away in spite of three attempts to take her in his arms. So small, so miserable are the remains of the living. This is what is reflected by the funerary stele of the Vth and IVth centuries B.C., where tender and melancholic farewell smiles still bind together the already dead with the living, themselves shadows to come.

Then I took a fragment from Sappho, in that beautiful Aeolian dialect, where the desire to live is mixed with a nostalgia for death as if to conjure it:

From Sappho, fragment 95:
To die, a longing holds me, and to see the shores of Acheron
full of lotuses and dew.

Finally, a fragment of the *Iliad*, portraying the ignominious death of the beautiful and valiant Petroclos, struck down in his youth and ardor by the conjugated wills of the gods and men:

Iliad, chant XVI, verses 855-857:
as soon as he ceased speaking, the death end covered him.
The soul flew away from the limbs and went to Hades,
weeping for its destiny, having abandoned force and youth.

The texts are set into prosodic ancient rhythms, except for the text of Sappho which is treated in a freer way. Phonetically, my presumption is the ancient one. The prosody of the Homeric verses is like a kind of *kataloghè* (recitative) of the tragic poets. The orchestra underlines or invokes the feelings, the sensations of the dead-living couple which we are, and in which these feelings and sensations are fitted without any possible escape.

—Iannis Xenakis

Aïs was commissioned by the Bayerischer Rundfunk and premiered by its orchestra under Michel Tabachnik on 13 February 1981 at Musica Viva in Munich.

Gendy3 *(1991) for computer generated sound*

In the *Achorripsis* (1956-57) chapters (I and V) of *Formalized Music* [revised and expanded English translation edition, Pendragon Press, 1992], Xenakis established a "background canvas," for the creation of sounds primarily by stochastic functions. *Gendy3*, entirely produced with a computer program written by the composer in 1991, is the most recent and most thoroughly stochastic instance in this quest. Both the macrostructure (the form) and the sonic materials themselves are stochastically generated. The overall form is mosaic-like, based on the superimposition of several "routes," or stochastically determined successions of fields. Each field in the several layers may be silent or not. The composer intends to create an interesting musical composition by what is, objectively, "an arbitrary chain of these field sequences."

An elastically bounded process Xenakis calls "general dynamic stochastic synthesis" [hence the title "GenDy"] is responsible for generating the sonic content of the piece. Polygonal waveforms are computed using one stochastic law while others govern the timing and amplitude fluctuations. "The challenge," writes Xenakis, "is to create a music starting as much as possible from a minimum number of premises," but which will be interesting to contemporary sensibilities without their "being trapped in known paths."

Gendy3, created at the composer's CEMAMu facility in Paris, was premiered on 17 November 1991 at the Rencontres Internationales de Musique Contemporaine in Metz.

Thalleïn was commissioned and premiered by the London Sinfonietta on 14 February 1984 in London, conducted by Elgar Howarth. It is dedicated to this ensemble and Michaël Vyner.

Iannis Xenakis was born in Rumania of Greek parentage; his mother was a pianist. The composer's formal education began at the Athens Polytechnic Institute; later, his knowledge of civil engineering brought him into the realm of architecture and to collaboration with Le Corbusier from 1947-60. His musical studies were done with Hermann Scherchen in Gravesano and, later, with Messiaen at the Paris Conservatoire.

At the time of his 70th birthday in 1992, Xenakis' distinction was unique—beyond the accumulated achievement of a productive compositional lifetime—in that he exercised leadership in the application of science to music as well as in composition itself. If not in the purity, even innocence, of his earlier works (especially from the 50's and 60's), then with the color and intensity of almost any of his subsequent compositions, the listener identifies immediately his distinctive voice.

Xenakis lives in Paris, having gained French citizenship in 1965. He is the founder (1965) and director of the Centre de Mathématique et Automatique Musicales (CEMAMu) in Paris, author of *Musiques formelles*, and inventor of the UPIC computing system.

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—A Conversation—

A lively exchange between Xenakis and two dozen students in UCSD's graduate music program took place on 9 April 1990. There follow some excerpts from their wide-ranging interplay.

Hiroyuki Itoh: It's very interesting that you accepted the performance by a Disklavier of the *Dikhthas* [1979] piano part, rather than having it played by a live pianist with the live violinist. Would you think there is an important difference between the performance by live persons and Disklavier?

Xenakis: That's an intelligent question because—[laughter]

Itoh: I'm glad—

Xenakis: You know, I think that the silly questions are maybe sometimes more interesting.—When you compose with a machine, when you try to control

the whole composition's sound synthesis, perhaps even the microscopic stuff, you delegate your power of making decisions. The result depends on what you put into the machine. And what you have to put in are sometimes very, very complex statements that you cannot do, because we don't have the tools, there are no tools to do that—yet.

Tim Labor: [Labor was responsible for preparing the digital Disklavier for the concert performance.] With regard to entering the information, I took the point of view that I wanted to get the rhythms as precise as possible. Partly because they were very fine rhythms, and also because there's an inherent information loss in the Midi processor. In the matter of velocity, how hard the keys are hit, what is done—is by feel. I had a program where I entered notes individually.

Xenakis: For each note, you did that?—Velocity, I think, is a matter of sound intensity; it also has to do with the spectrum, that is, the quality of the sound. This is in the feel of the fingers. And you controlled that how?

Labor: I followed the score and played the notes individually with my hand, if it was loud, if it was soft. The benefit of that is that there is a slight variation between successive attacks; so, the result has a more performance-like quality.

Itoh: So, [regarding my earlier question] I think you postpone the exact answer until you listen to the real performance today, but if the result is satisfactory for you, is it then acceptable to play *Evryali* [1973] or *Synaphaï* [1969], which have very, very difficult piano parts, to play those pieces with a Disklavier?

Xenakis: If the concert was going to be held, say, at Lincoln Center, maybe I would prefer a live performer of great skillfulness, because I don't know the [Disklavier] system. If this develops into something fantastic, why not? We have to try.

Itoh: I think my question is related to your aesthestic concept of technical difficulty. Peter Hill—who is an American pianist and who premiered your *Evryali* in this country—wrote an article in which he said there are a couple of measures which really are impossible to play.

Xenakis: I know. That's true.

Itoh: Could you explain your concept of technical difficulty which sometimes

involves impossibility?

Xenakis: Not always, but in *Evryali*, it is. In *Synaphaï*, the same thing, almost. Because playing is like sport—athletics. So, it's also for athletics, not only athletics for the hands and body but also for the brain: how to invent new ways. In these special pieces, *Evryali* and *Synaphaï*, the performer is free up to a point to make a selection of what he can play, with always a kind of sorrow because he cannot do everything. It's like a holy plan that he can conquer sometime maybe in the very remote future. So it's a kind of tangent. And that is important I think for our passage through life, a tangential aspect to it. So, you are trying to be eternal with a perishable thing, as a composer. But it's good to try. *C'est la vie*. What else can you do?

Charles Kronengold: I've been wondering about a quotation where you said that music was controlled entropy. It was in *Formalized Music* [Indiana University Press, English translation edition, 1971; more recently, Pendragon Press, revised and expanded English translation edition, 1992] somewhere.

Xenakis: Did I say that? We can control not entropy but something which looks like it.—Of course, you can control entropy also. It depends on the technique that is used. You might, for instance, at a given moment produce sounds with probabilities. In that case, you have to deal with the problem of entropy, that is, how much coordination or how much determinism you have to include. You can start with something which has a high entropy value and then go to a much narrower [range] in rhythm, in pitch wealth and things like that—the evolution of the timbre itself in the tiny notes, or the tiny sounds [in the microstructure of the sound]. I am especially considering the East Asian way of producing sound, with small glissandi, for instance, with the *biwa* in Japan, or chant in India. That is in order to enhance the phenomenon of sound. You don't have just notes, pitch versus time with some envelope, you have more than that. Therefore, it's up to you what you want to do, it's not a general aspect of music.

The regular, deterministic (periodic) exposure of ideas was replaced (after the war, especially) by a more general thought in which things are not so much, or not at all, according to traditional rules, and in which everything is scattered, like what you have in the domain of physics or everyday life. If you

are in the country, you can see where there are cows. The cows are always scattered. It is interesting to see what patterns they produce, like the stars in the sky. So, you have to enter into those ways of thinking today, anyway. That means that you have tostudy, up to a point, branches of mathematics and of physics in the schools of music. Otherwise, you are a dumb musician, or composer. I am thinking of that because that was my life's struggle, to understand what is or should be the difference between music and other branches of research into fundamental things for mankind (we all have the same brain).

Kronengold: Is there any inherent difference between the way that you try to control your material (in and of itself) and the conditions that you impose upon that material from without, as it were? If you have sectional divisions in a piece, are the subtle inflections within them a different expression of this idea than the way that you articulate it as far as the overall piece itself is constructed?

Xenakis: You are free to do whatever you want. There are things that I can deal with on a microscopic scale and even calculate with a pocket calculator program. There are things that you cannot do because there are no tools, as I said, so you have to rely on an intuitive approach. But you have to think about the small scale, medium scale, and larger scales, of course, having in mind that what is interesting is the kind of time that a music could produce for the listener. Because this is the steam, especially of music. If there is not such a thing, then you are more or less asleep. Interest is broken. So, one initial approach would be, overall, like seeing a wall. And sometimes the wall has nice scratches or things like that that the composer enters. He says, "Well, that might be interesting." This is what happened to me when I heard for the first time Bartók, played by people like Yehudi Menuhin and Louis Ketner, the pianist. I didn't know Bartók at the time and I thought it was like a "wall" of sounds. And the public was very furious; they didn't like it at all and they were booing. I was not booing—respecting the people that played it—and also because I caught some glimpse of interest in that. Later on, I entered it more and more, and then I loved very much Bartók. So, this happens always. You cannot dominate the material that you are hearing, listening, or seeing—same thing for painting, or even architecture—you do that step by step. The

bad thing would be to say, "Well, I don't understand that; what an awful composer or artist he is," because maybe it's your fault. This is what usually happens.

There are paths that can be seen or heard with high entropy, without any coherence, which is a good thing, because there must remain always a small color of mystery, of not understanding, in every piece of art. So, the pure musicians, poor musicians—the pure ones also—try to do their best, that's all, mastering ideas and technology, the technique, let's say, of their own time. Also discovering new things, which is important. Something that remains in the past is dead, I think. A culture that doesn't invent is finished. It's a sign of vitality. So, this is why I think that it's important today to have these branches of the sciences in the music schools, because they are part of music itself, of the thought. What is music? Who can tell me what is music? Please. Raise your hand. [pause]

Mark Applebaum: I have a practical question about your composing. In an early stage, after you set up certain procedures or ideas to structure some of the material, do you find that the material itself then causes adaptations in the procedures?

Xenakis: In my early years, when I was young, I had ideas and also aural experiences, and I wanted to put them together. That is, I had schemes and some experience, and I was working hard to obtain a knot out of them, an interesting one aesthetically. But sometimes I was carried on by the theoretical aspect alone, with the idea that I must go in this direction as far as I can, to see what happens, if it is worthwhile or not. So, then there was a kind of discrepancy between let's say the aesthetic trend or tendency and the result which was not so interesting aesthetically (though it was maybe interesting in a theoretical way). There was much of this suggested in what I did, much of my work that was *a priori* thinking and testing. This is when I wrote *Pithoprakta* [1955-56, for orchestra], which was based mostly on probabilities. For months I tried to understand what it could mean; I was reading books on agronomy and the application of probabilities in biology. I was trying to understand how I could use this as a tool in order to shape the sound output. Months—trying to imagine the result. But now, since I have become maybe more lazy, then I have some overall view, which is also

dangerous, like being in a plane that might crash, you know. So, the way that I am working now is step by step, but always in the back of the mind having more general things, you see? And using for one section a stochastic approach or for another section something different, and so on and so forth. There are many bars where I cannot understand why I did that, suddenly I'm there and afterwards I say, "Do you think it's OK, that? Maybe not." What can you do? I don't know. And so I did. [laughter]

Christian Hertzog: I have a question about the synthesis method that you used in *La Légende d'Eer* [1977]. You talk about computing the pressure-time curves directly—

Xenakis: Yes, that's an interesting thing, I proposed that in *Formalized Music* about *twenty* years ago—alright. [laughter] Sound synthesis almost everywhere is based on additive synthesis—Fourier—with sine waves as the fundamental things, although you can do that also with square waves, at least in mathematics, which is easier for the computer. It's possible to obtain interesting sound synthesis patterns by using directly probability functions (interlocked or simple ones), and I discovered in the 70's, after I wrote that chapter in *Formalized Music*, that there are some specific values of probabilities, especially the logistic relation to barriers. When you have a probability function and you accumulate the values, then you might get out of the limits of hearing or of the computer. So, you have to put whatever you find in a closed situation; these are the barriers. When something tries to get out, it hits the barrier (this is a theoretical word), and it is brought inside. When you have a bullet in the cannon, this is what happens: it is forced to get out, it doesn't go out in a nice way, tranquil way, but it is a boat all the time on the cannon's inner sides. This is a mirror, you see, where the movements are regulated by elastic jumps from one side to the other, because you don't lose much energy. You can also have more absorbing barriers.

So, if you have such barriers in your probabilities, then an interesting phenomenon happens, which is to transform your probability function into something which is more regular for the eye, that is not like a noise but more like a sound. The difference between a noise and a sound is its periodicity. (This is a difference which is an aspect all over the universe. It's not only music-inspired. Music *is* in the universe and the universe is in the music.)

So, that means that the sound synthesis can be *created*—this is what I did in Paris in the 70's—and some of the sounds [in *La Légende d'Eer*] are produced that way; not all of them.

Labor: When you say that probabilities were accumulated, what does that mean? That successive probabilities within a space were added together—

Xenakis: That's right, yes. Suppose that you draw lengths or something, then each length is accumulated to the next length, is accumulated to the last, and this increases sometimes very fast—or very slow, it depends.

Labor: So, it's a Brownian procedure?

Xenakis: It's called *Brownian* when there are discrete jumps. Or *random walk* when it is more free, continuous. There is a book by William Feller [an introduction to probability theory and its applications] that might help you.

Rafael Liñán: Mr. Xenakis, I found very interesting your question of 'what is music?' And I think you've answered it now in this last phrase, saying that music is in the universe and the universe is in music. Would you say that music is like a manifestation of our research into the comprehension of the universe?

Xenakis: Yes, it is, also. You don't state it that way. That is narrowing, I think, the role of human activity. It's not only to discover what is behind the phenomena that you see. Because we are unable to do that, I think (this is a deceptive or pessimistic statement). But you are constructing something different, and that's important—not only by trying to discover what happens—you also produce theories. It is man's production. With these theories, you can do experimental tests and see that they work. Besides that, there is the effort that you put into these theories that change the logical environment, and that is very important because that's something *different*, and that might, at the end of thousands of millions of generations, allow man to construct a universe on his own.

I don't know if you understand what I am saying. Today we are destroying or constructing the environment on Earth, faster and faster. But tomorrow maybe we can change the planetary combination, and even in many thousands of years or generations or whatever lasts. (We don't know what will replace man.) That being could also create its own environment on a

very, very large scale. This happens through all these ideas that have been generated by the sciences, by economics, by politicians, by artists, who are freer than the others. Art has the property to be at the same time experimental and theoretical. The sciences have to be experimental, except for astrophysicists who are really poets because they cannot prove what they state. They have to wait thousands of years. [laughter]

Liñán: So one has to think. Your voice is something that is received by a lot of people, and you're conscious of that, you know that thousands of people every year listen to what you express. What I want to know is what do you try to *do* with that? If you're concerned with problems of the environment, do you try to make people conscious of that? Or do you just try to extract some beautiful scheme in order to make people reflect on it?

Xenakis: The last thing maybe is the most interesting, although I don't care if it is shared or not by other people. You see, I think that man is like a blind being that does whatever he can do and wants to do, and sometimes there is a response from society or not—negative or positive—or even from the environment. But this is the depth of the thing. You don't know why and what you are doing, in fact. This is what I think. For the sciences, same thing. The scientific world tries today to dig into things, to discover things, but it's much more than that. It is the destiny of mankind, of the animals, if you look at the past, through paleontology, the development of all these organs (fantastic!) that we have of feeling or listening, not only mankind but also even in plants. It is something that you cannot explain. You can explain with some ideas that are fashionable today, but the depth of it, the real meaning of it, escapes.

Hertzog: You were very politically active as a young man, and you've mentioned in a presentation this week how you moved on to art. Now, not in this country but in other parts of the world, there are artists becoming actively involved in politics. There's Havel in Czechoslovakia, in Peru a novelist is a presidential candidate,and, in Lithuania there's a music professor who is the president of the country. Do you feel the same kind of link between politics and art? Or, if not, then how do they differ?

Xenakis: Oh, it's a big question. I don't know if I can answer to that question. When I

was young, I was reading Plato. Because I was not satisfied with the society in which I was living, and I thought that Plato was interesting in that aspect. He proposed a kind of government which was by *wise* people. And also, the equality between men and women, because at that time I liked to be in love with girls who had some personality. [laughter] And Plato tries to prove that women are also important for society, it's a "set theoretical" demonstration—closed ballot system. And then towards the Germans, when they invaded Greece, I was driven by a kind of nationalism, chauvinism (which was a good thing at that time), and I entered into a rightist kind of organization. Then I found that they didn't say much, because I kept being unsatisfied with society. So, I followed the Communists, who were much more accurate in that direction, especially with Marx (a kind of nineteenth century Plato). But then, before the war finished, I decided to do music, because even with Communism, I was not satisfied. And I promised myself as soon as the war was over to come to the States, because I had relatives here, and to study archeaology, philosophy, physics, mathematics, and music also. Only these five things. [laughter]

I wanted to go to the States, but then I stopped in Paris and I remained there, doing music, but it was very difficult. I was interviewed by Le Corbusier, and that was a very important thing. I didn't care for architecture, but Le Corbusier was interesting because he was searching for things that were very close to what I tried; not what I tried, but the *way* I tried to do music, composition. And so, after awhile, we worked on several projects in architecture, like the Couvent de la Tourette and some other things in Chandigarh, in India, and so forth. It's important if you can have two fundamental research domains because one reflects on the other one. It's rich in at least the early stages of your life; afterwards—I don't know.

Applebaum: Several times this week, I've gotten the sense that you've spoken of music and other disciplines such as the sciences as being different facets of the same whole.

Xenakis: Yes.

Applebaum: And I was going to ask, aside from the fact that composers will attest to some sort of need to compose, is there a purpose for music?

Xenakis: Music opens up your eyes and your mind to things, and you can put into music many aspects of knowledge and of intellectual matters; that is, for me, more interesting. Otherwise, it's not worth living at all. —Well, that's my problem.

Unidentified: Here's a question from a fellow Platonist. How would you answer accusations of nodding to the Aristotelian side of things, the scientific side of things, because of the complexity of your compositional processes?

Xenakis: Although he has taught me a lot, I am not Plato. [laughter] And so, I am free to marry or to balance things the way I feel. The role of an artist is to do things no matter what happens with his inheritance, or if the society responds to that or not. Look, for instance, at Van Gogh. Van Gogh sold just one painting during his lifetime, then he died. Today there is a huge—in Amsterdam—exhibition of his work, and prices of his paintings are fantastic. He would have been a fantastically rich man in his lifetime, but he didn't care for that. That is a kind of model of the artist.

Hertzog: Don't you think that that's a deceptive form? That's the public's notion of what artists do, and a lot of people expect *us* to follow that model: the person laboring in obscurity who doesn't really care what his contemporaries think; he's somehow removed, working for posterity, as it were.

Xenakis: No, you should cross out the 'posterity.' He works because he's there. He doesn't care for posterity. Maybe this is a kind of romantic statement, but I think this is a calling. It's like the asceticists, the people who went to the desert to live with God, by themselves; they didn't care about earthly posterity.

Chaya Czernowin: When you were young, you did a lot with invention—with new ways, kinds of music to do with newness—

Xenakis: No, no. At the beginning, I was so much admiring Bach and Beethoven that I said, "I must learn composition to understand, because I like that music (and Brahms also)," but then I said, "No. They did that, they are perfect, I cannot imitate them." Then I said, "Well, maybe I try something different." So, you see, there are phases.

Czernowin: But, on the whole, in your first famous pieces, you are applying automatic

formulas, are dealing—I would call it—with invention. Activity has a lot of ways to flow in, and *inventing* is only one of them. Another way which I think is more related to what you are doing now, is the way of *perfecting*. What I'm really interested in asking you is: what are the issues in your music now which you are perfecting, if this is true, what are you after musically? What are the issues at hand in your music now? If you could formalize it—

Xenakis: Yes, I don't know if I can answer to your question. I feel like somebody who is making pottery, for instance, and each pot is important (and he tries to make the best). But how—this is with all the experience of the past, if he can remember it, because you don't remember everything—much less. [laughter]

Czernowin: But when you came out of searching, what did you stay with, what interests you now?

Xenakis: You see, I don't know. You have to be very relaxed and free in that, because as soon as you say, "Ah, this is what I want to do," you are trapped, you see? You don't see a ladder anywhere. It's a kind of game, a strategy, that one has to play with himself, during all his lifetime. One is not aware of that, but after awhile, when you start looking at the past (or other people doing things), then you have an understanding that you could not have when you were young, because you had not that experience. Things become much more simple, or maybe they look simpler. In fact, they are much more complicated, but you are not aware of that because you are getting older. [laughter] Things are loosening. I can't answer what I try to do because I want to be free, with all the criticism on the spot. When you produce something, ask, "Is it interesting or not?" With very sharp eyes, you say, "Yes," or "No—maybe." [laughter]

But that is not your role every day. It's like the post office man who works there every day from 9:00 o'clock, and after the day is finished, he doesn't know if he has done interesting work or not. So, he watches TV at the end of the day. [laughter]

Czernowin: He *knows* that he delivers post because that is what he is doing.

Xenakis: Yes, he knows those things, and if that's interesting enough, to go ahead the next day—the same thing. It's important to have *relativeness* in what you are

doing. It's important because, in that way, you are not dominated by one idea or by one faith. You have to be very free, that's the difficulty with man. Man wants to be conducted, to obey; he likes that because that relaxes him. Yes, when you look around, it is like that. We are, in fact, slaves in many, many domains. At least in music, we should not be slaves of any theoretical approach or technology, which is a difficult and interesting fight at the same time.

Paul Smith: Some of the processes you've used have mathematical sources that are easier for people to discuss; but you speak a great deal of feeling and creating something and having to look at it, not being sure where it came from. People who discuss your music overemphasize the mathematical aspect because it can be quantified, and the intuitive, feeling, emotional side of the thing can't be articulated as well.

Xenakis: Yes, you are right. This is the way it is. Why? It's my fault. Years ago, I was explaining the theoretical aspect of what I was doing, and people thought, "Well, he is very bright; he is all technical and no feelings." Music is not only rules or mathematics. Forget it. I thought you cannot prove anything by saying, "That's high," "That's beautiful," or whatever, the aesthetic things. But when you speak about theories, that's much easier. During all the years that I taught at the University, at Indiana, it was about principles, not about music itself. Because I thought that it was more important for the young people, and for myself also, to understand the mechanisms of composition. So, I think that was the problem; it was my fault. I never write anymore program notes about techniques, *finished*. So, the critics sometimes don't know what to write, you see, because they have to *hear* and write. [laughter] Really. And that's a challenge, that's good.

Mark Osborn: Speaking of hearing, I was wondering to what extent you find it important that your formal structures be translated or interpreted by the audience?

Xenakis: It's impossible. That is another thing. I remember discussions that I had with serial people. They thought that when you write music, you have to be able to write down what you hear. And that's nonsense, sometimes you can't do that. There are, after all, physical phenomena that are blending the sounds together, and then it's impossible to write them down. So, why impoverish

Michael Pelz-Sherman: these aspects of music? Very basic. I wonder if you could speak about the idea of melody.

Xenakis: Melodies are all pitches, right? Now, these pitches are taken from some scale, this is one thing; and then there are the problems of their duration and how they're ordered in time. It's a very complicated procedure. If you follow a style, for instance, serial music, then you know that you cannot do such and such things, you are free to do other things. But then you are stuck with this theory. So, you have to find something different which is very difficult, of course. It depends so much on scales, maybe you should start with the problems of scales. This is what I did years ago, and I came up with a theory that is close to the Fourier transform, but in another way. That is, any selection of points on a line can be called a scale. The line or the points can refer to pitches or time or whatever: discrete. Then the structure of that is basic for what you are going to do, as it used to be everywhere in music, and in other domains too. How to construct the scale is fundamental; it is also rewarding because if you discover that it is some form of periodicity, you are linked suddenly with all the scientific world that is there, waiting for you.

For rhythm, there are certain African cultures. Not the ones that try to blend together pop music with traditional, no. The pure tradition of Africa. There are places where the rhythms are complicated ones, but always based on an isochronic beat, which is not sung, but it is there in their minds. And that was discovered [at least it is discussed in his book, *African Polyphony and Polyrhythm*, Cambridge University Press, 1991] by a musicologist, Simha Arom.

So, you see how wide this problem is of the scales. At the same time you are in a quite strict domain because of the aural possibilities of your ears, the physiological ones. Composers don't think about scales anymore; very rare, that. I am perhaps the only one, with Messiaen. When you write a melodic pattern—let's say that you work in a well-tempered semi-tone scale—you think that all the notes are available. Then you don't think about the scale anymore. You think it's locally different, but, in general, pitches are available.

[What this results in is] not only a matter of style, of melodic patterns, of chords, but also of sound itself, of *alloy*. If you have different instruments,

and if you have a specific scale that is well thought-out, you can produce, as in sound synthesis, different timbres with the instruments themselves. The scale, if it's not octaviating, (that is, [does not have] that periodicity with octaves which is traditional), but in each region, has another suite of intervals, then you can produce that kind of wealth in chords, but also in timbre. With the same instruments, you don't hear them analytically, but synthetically. Each stage of your scale is different from others. Now, this is one way. The other way is to think of the scale's complement, the notes that you have not taken to produce the scale. Suppose that your scale is a mixture of black keys and white keys. The complementary scale would be the black and white keys that you have not taken. Then you can do logical combinations of these things.

Pelz-Sherman: So, you're thinking very carefully about pitch choices, and yet, what I'm asking about melody is that I don't often hear a single voice carrying on a single line. It's almost always in conjunction with several voices, I don't often hear typical melody with accompanimental texture in your music.

Xenakis: You don't.

Pelz-Sherman: Not very often, maybe once in awhile.

Xenakis: Yes, you're right.

Pelz-Sherman: Is this something you don't find that appealing, or—

Xenakis: Well, this is dangerous. [laughter]

Randall Giles: On the other hand, a piece like *A Colone* [1977, for male—or female—chorus with 18 instrumentalists] that we played and sang has much to do, it seems to me, with melody.

Xenakis: Yes.

Giles: You've been talking about black and white notes, and in the score, at least (although, unfortunately, not in our voices!), you asked for many three-quarter tones, quarter-tones, and so forth, which come from some sense of scale. Or is it that they come from some sense of language inflection that you were describing in the preface to the score, or are those the same things?

Xenakis: I tried to revive the ancient (fifth century B.C.) style of phrasing, because these choral parts of Sophocles were sung, more or less, but close to the speech, not much different, I think. It was not like an opera chant. It was very close to the tongue, to the way that phonemes were pronounced. I studied to understand what the inflections of the voice could be, although we don't have any testimony from that time. We have only the accents of [a] much later period, that is, the second century B.C. with Aristophanes from Byzantium. And scholars, they pretend that there was only the prosodic way of saying things, that is, the short and long sounds, without any accent.

This is false, I think. Accents. It's impossible to escape from them; especially when your voice rises, you are accentuating the syllable or the phoneme more than when you go down. This is a correspondence to dance, where you have the arsis and the thesis. With the tongue it's impossible to escape from that. So, this brings you close to the original melodic pattern, because you have at the same time intensity, duration, and pitch.

Now, what is the pitch? According to what theoreticians of that time said—like Aristoxenos of Taras (Tarentum)—the difference between speech and chant or song is that speech is continuously going up and down pitch-wise, whereas song has steps. Now, what scales? He described about six tetrachords, including two diatonic scale tetrachords. He had also chromatic ones; this might account, perhaps, for the quarter-tones that I usually use, and also for some more up-to-date effects that I wanted. It's a mixture of the study of ancient things with contemporary expression of mine. The melodic pattern is something which is personal, it's not there in the text itself.

Frank Cox: You talk about science very much, and different theorems in mathematics, but your music also seems to have a profound respect for traditional cultures and ancient musics. *A Colone* really sums up, for me, what a Greek chorus would sound like, and, it's apparent that you're not just imitating, for instance, African drums. You're not simply imitating Hebrew chant, but you're reinterpreting it somehow.

Xenakis: Yes, I hope so.

Cox: I was wondering how this world of science—which takes us into the twentieth century and a late capitalist world, far away from nature and the natural

world—connects to archaic cultures and ancient musics, in your mind. Are they both a kind of nature for you? Is it an exploration of nature, in a sense?

Xenakis: Yes. I think we do not change so much, and there are things that are very powerful in older cultures. We don't know them, really. This is why it's very important to save all these cultures from Africa, from Asia, from here also, perhaps the Indian reservations have things that are very important. When I went to Mexico years ago, I tried to find out traditional aspects of Mayan music. This was impossible because it was completely destroyed by the Spaniards. And that's a pity, because I have much esteem for the traditional Mayan, or Toltec, or Incan (far away), or Aztec architecture, and also their way of living—for instance, the human sacrifice, something very interesting. We had that in the Mediterranean basin until perhaps the tenth century B.C., still there. The Hebrews, the Phoenicians, I don't know about the Egyptians, but at least all these barbarian people, like the Greeks, had to sacrifice. You can find that in *The Oresteia* when Agamemnon sacrifices his daughter, Iphigenia.

There are things that it's very important to learn instead of thinking that we discover them when we write music. If you are simulating or imitating what happens or what happened in the past or elsewhere, it's not the proper life of a composer. You should know about them in order to do something different, but with the same strength and coherence and depth of these past things, because these are past experiences of life and of the evolution of the brain and the thought.

Roger Reynolds: I think we'll stop.

Xenakis: Yes, as you wish.

Reynolds: Mr. Xenakis has been attending virtually every rehearsal all week, there's another program, as you know, tonight, and there are yet more rehearsals. We have one more encounter this evening, and there's a reception after that too, so it's still not too late to get one more question in, if it is possible that you still don't have a picture of this remarkable man. Thanks for coming.

Xenakis: Thank you. [applause]

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—Performers—

Bass baritone **Philip Larson** has distinguished himself as a leader in the performance of demanding contemporary repertoire: *Aïs* by Xenakis, *The Palace* by Reynolds, as well as his work in the music theater duo [THE] with Edwin Harkins suggest his range, as do [THE] 's collaborations with Braxton, Cage and Takemitsu. International appearances include Music Today in Tokyo, the Festival International de Musique Expérimentale in Bourges, the Paris Autumn Festival, the Warsaw Autumn Festival, the Holland Festival, and Darmstadt's Ferienkurse. In 1994, Larson will premiere an extended work for voice, computer processed sound and piano, written for him by Reynolds in collaboration with poet John Ashbery. He has recorded on CRI, Nonesuch, Neuma Records and Lovely Music, and is presently Associate Professor of Music at UCSD.

Thomas Nee, music director of the La Jolla Symphony Orchestra since 1967, has also served as director of the Minnesota Opera Company, the Minneapolis Symphony Orchestra, the enterprising summer New Hampshire Music Festival (1960-1992) and of SONOR at UCSD. Always a vigorous proponent of new music (earlier a student of Krenek, Wolpe and Scherchen), Nee has premiered numerous American works with his own ensembles and as a visiting conductor. He led the American Composers Orchestra at Lincoln Center's Alice Tully Hall in 1984 and, during the Summer of 1988, a series of highly acclaimed programs with the SONOR Ensemble at Darmstadt's Ferienkurse. Nee is Professor Emeritus at UCSD.

Percussionist **Steven Schick** has performed as soloist throughout the United States, Latin America, Australia and New Zealand as well as in Europe at major festivals including Darmstadt and Ars Musica in Brussels. He is a longtime associate of pianist James Avery with whom he has also toured extensively. Honored by Fulbright and Annette Kade fellowships, Schick has also won Kranichstein, Gaudeamus and American Wind Symphony prizes. He has guest lectured at the Royal College of Music in London, the Rotterdam Conservatory, the Bydgoszcz International Percussion Workshop in Poland, the Darmstadt Ferienkurse, and has been on the regular faculty at UCSD since 1991.

Rand Steiger has conducted the Los Angeles Philharmonic New Music Group, the CalArts Twentieth-Century Players, SONOR, and the California EAR Unit, including many premiere performances. Honored as a composer by a Prix de Rome and a National Endowment for the Arts Composers Fellowship, he has also been commissioned by the Los Angeles Philharmonic, the Fromm Foundation and the Aequalis Trio. An Associate Professor at the University of California, San Diego, Steiger was also the Composer Fellow with the Los Angeles Philharmonic during the 1987 and 1988 seasons. His music is recorded on New Albion, CRI, Crystal and New World labels.

The **La Jolla Symphony Orchestra** was founded in 1954 and, since the mid-60's, has been based at the University of California, San Diego. An organization of non-professional musicians, this 100-member ensemble is noted for its practice of introducing newly composed and other unusual musical works to its audiences. In addition to commissioning younger composers, it has premiered works by Henry Brant and Robert Erickson, and has worked under such notable guest conductors as Mr. Brant and Ernst Krenek.

SONOR, the resident contemporary music ensemble at UCSD, was formed in 1975 to give voice to the continuing new music activities of its performing and composing faculty. Its repertoire includes important Americans such as Cage, Carter, Crumb, Davidovsky, Druckman, Erickson, Feldman, Ives, Oliveros, Tower, Varèse, Wuorinen, and Zwilich as well as other international figures: Berio, Dallapiccola, Globokar, Maderna, Murail, Nono, Penderecki, Saariaho, Schnittke, Stockhausen, Takemitsu and Xenakis. SONOR has recorded for Neuma, New World Records and Lovely Music, as well as the Pulitzer Prize-winning *Canti del Sole* by Bernard Rands for CRI. In presenting larger-scale works, SONOR calls upon gifted graduate students and guest artists. The ensemble's resident composers now include Ferneyhough, Ogdon, Reynolds, Steiger, Sollberger and Yuasa.

SONOR performers for *Thalleïn*: John Fonville, flute; Robert Zelickman, clarinet; Susan Barrett, oboe; David Savage, bassoon; Edwin Harkins, trumpet; Warren Gref, French horn; Heather Buchman, trombone; János Négyesy, violin; Agnes Gottschewski, violin; Mary Oliver, viola; Peter Farrell, cello; Bertram Turetzky, contrabass; Daniel Koppelman, piano; John Flood, percussion.

1. *Aïs* (1980)

Recorded 7 April 1990, Department of Music,
University of California, San Diego, Mandeville Auditorium.
Recording Engineer: Josef Kucera
Editing: Josef Kucera
Second Engineer: Michael Pelz-Sherman
Producers: Philip Larson, Steven Schick

2. *Gendy3* (1991)

Magnetic tape, 2 channels, DAT at 48 kHz,
4 loudspeakers minimum in performance.
Music stochastically synthesized by computer,
utilizing a special program at CEMAMu,* Paris.

3. *Taurhiphanie* (1987-88)

Magnetic tape, 2 channels, 38 cm/sec.,
4 loudspeakers minimum in performance.
Music realized on the UPIC** system at CEMAMu,* Paris.

4. *Thalleïn* (1984)

Recorded on 1-2 February 1991, Department of Music,
University of California, San Diego, Warren Studios.
Recording Engineer: Josef Kucera
Editing: Josef Kucera
Producer: John Fonville
Production Assistant: Tim Labor
Production Manager: Kathryn Martin

*CEMAMu: Centre d'Etudes de Mathématique et Automatique Musicales

**UPIC: Unité Polyagogique Informatique du CEMAMu *pour composer à l'aide du dessin*

Producer: Shirish Korde
Text editing: Karen Reynolds, Roger Reynolds
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Works performed at the **Xenakis @ UCSD Festival**: *Achorripsis, A Colone,*** *Aïs,*** *A r., Charisma, Dikhthas, Embellie, Keren, La Légende d'Eer, Mikka, Mikka "S", Mycènes Alpha, Nomos Alpha, N'Shima, Pour Maurice, Psappha, Rebonds, Thalleïn,* and *Voyage absolu des Unari vers Andromède.****

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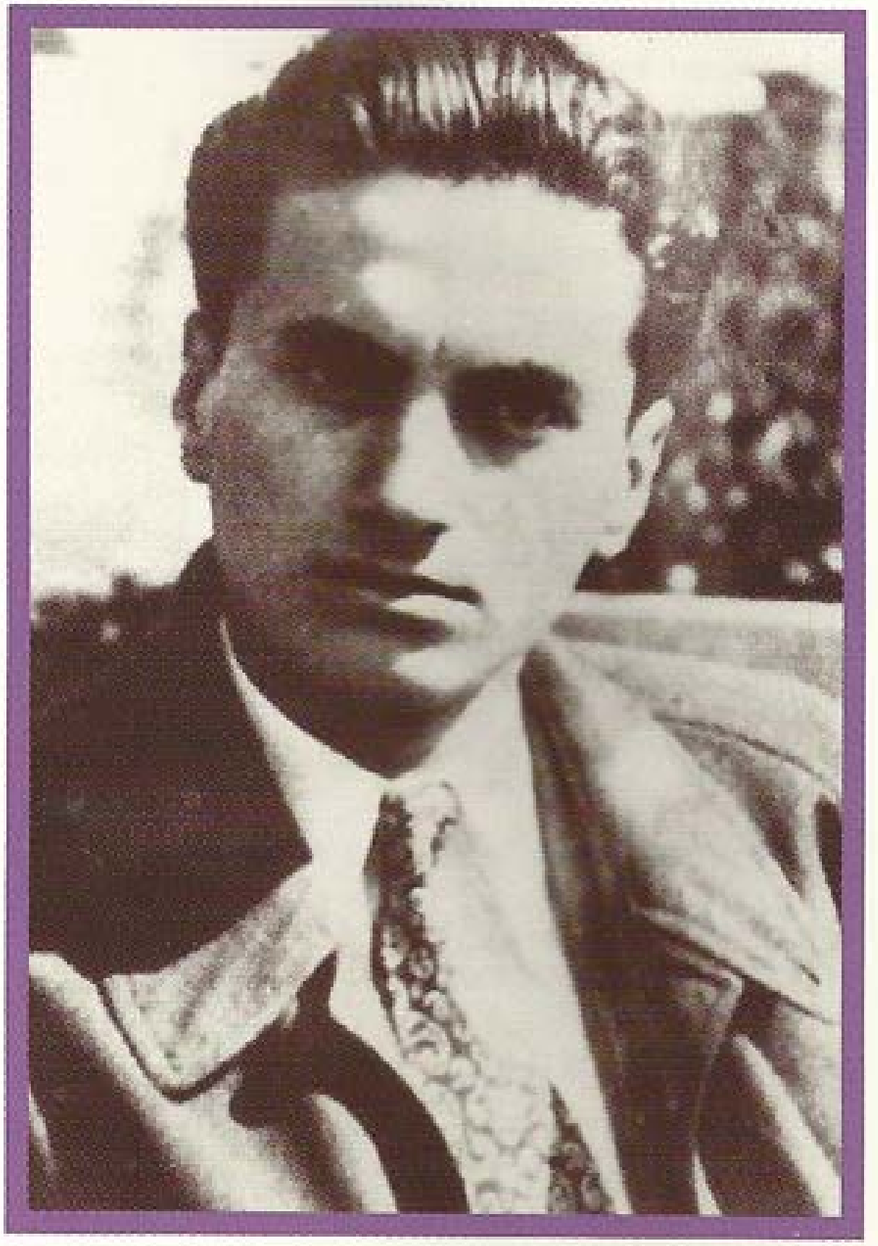

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