

# CAUSALITY AND FREEDOM IN XENAKIS: A CRITICAL EXAMINATION.

Markos Tsetsos: Athens University, School of Philosophy, Department of Musical Studies, [mtsetsos@music.uoa.gr](mailto:mtsetsos@music.uoa.gr)

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## ABSTRACT

Attempting to legalize philosophically his artistic choices, Xenakis refers frequently to the notions of "causality" & "freedom" around which he constructs two opposing conceptual fields: "causality, symmetry, repetition (etc.)" and "freedom, asymmetry, chance, non repetition (etc.)". Xenakis interprets European music before himself in its totality under the prism of the conceptual field of causality, claiming that the radical modernity, which he represents, must have as its precondition an absolute freedom of a non causal character. The critical examination in which we will proceed refers mainly to the Kantian and meta-kantian distinction between "causality" and "freedom" and aims to demonstrate the insufficient elaboration on behalf of Xenakis of essential conceptual differentiations inside the two contrasting conceptual fields (e.g. between "causality" and "symmetry"). Overlooking the established by Kant distinction between natural (or "classical") causality and normative causality ("causality of freedom", "causality of reason"), Xenakis essentially deals with the music before himself in terms of *natural* causality, erroneously opposing to it the notion of freedom –cornerstone of the political and aesthetical modernity- as the opposite of causality in general and, the most problematic, as a synonymous of chance.

In his writings and written lectures Xenakis touches upon a series of philosophical issues of great importance for the art and especially for music. The notions of "causality" and "freedom" hold there a prominent place. The fact is very important not only due to the rarity of the treatment of such issues by artists, but also because with these notions Xenakis reaches to the core of the theory of artistic praxis. In the past, only one philosopher had dealt with causality in music and this en passant: Arthur Schopenhauer. In the much discussed §52 of his major work *The World as Will and Representation*, the philosopher claims that in musical perception there is not any sense of causality, due to the fact that "musical sounds impress aesthetically already as effect and without tracing back to their cause" (2: 371). Schopenhauer's claim has gnoseological origins which are not to be discussed here. It suffices to point out that it contributes a lot to the foundation of his metaphysics of music (see also 10: 43 ff.).

Contrary to Schopenhauer, the element of causality in Xenakis' thought becomes constitutive of European musical tradition, tonal as much as atonal. In his text "Elements of probabilistic methods of musical composition" (1962) (9: 70 ff.) Xenakis argues that strictly on the level of construction a tonal or atonal musical work consists of "linear deployments (melodies) and chords" that are constructed in "particularly causal" manner. This "particularly causal" formation of music material was replaced in dodecaphony and serialism, according to Xenakis, by "a different, more severe in abstract level" causal formation (see also 8: 1-2, 4, 8-9). Xenakis nevertheless, at least in this text, does not define the notion of causality he uses and therefore the previous statements obtain a rather enigmatic character.

Thirteen years later, in his lecture entitled "Scientific Thought and Music" the problem of causality in music becomes more concrete. Quoting as an example the loud noise that follows the falling of a hand on the table, Xenakis defines causality as "a couple of letters, names, events, which always, whenever it is repeated, will be repeated in the same order and the same way – never an 'alpha' will be followed by a 'gamma'" (9: 121). However, the simple existence of such a connection of events does not guarantee, according to Xenakis, the eternal validity of this connection, which means that causality is limitable by chance or that the causal relation is not a *necessary* relation. The elimination precisely of this element of necessity from the xenakian notion of causality brings it close to that of the English philosopher David Hume. Appealing to experience, which he considers as the final judge of any truth, the skeptical Hume challenges radically the metaphysical legitimization of the principle of causality, reducing it to imagination and habit (see 5).

This Humean, anti-ontological and formal notion of causality by Xenakis, is compatible with his indeterministic picture of the universe. To the predictability of the causally structured deterministic world of the traditional science, Xenakis opposes the negative cosmological model of "unpredictability, indeterminacy, chance and non-causality" (9: 117). Inside such a world causality is but a "part of indeterminacy" (7: 23), a possibility with theoretically great, but not infinite probability. And the conclusion is close: "Because humans and the rest of the creatures are constructions of the universe, we also have the capacity of the unforeseen and therefore the freedom of the will" (9: 117). On the condition, of course, that the monism that such a conception presupposes is valid.

As a result of the preceding reasoning, the notion of freedom, as the basic precondition of artistic praxis, is situated into the same conceptual “constellation” with the notions of unpredictability, non-reiteration, asymmetry, indeterminacy, chance, non-causality etc. Xenakis’ statements such as: “the maximum of my freedom is the non-existence of any symmetry” or “my freedom is identical with the demand for chance” (9: 129), are indicative of this kind of thinking. In the opposite pole, that of non-freedom, are assembled the notions of predictability, reiteration, symmetry, determinacy, necessity and causality. If we now consider Xenakis’ claim that all music before him is causally structured as valid, then we must reach the conclusion that all that music was permanently in a state of non-freedom or, at least, in a state of limited freedom. Indeed, Xenakis seems to affirm the last conclusion. Quoting as example the rhythmical pattern of the Geek dance “Calamatianos”, he argues that the sole use of such a stable rhythmic pattern, when it becomes binding, “annuls freedom”. Freedom, on the contrary, is regained as an exodus from the self so that the choice of musical event is independent from the will. Freedom for Xenakis means here ecstatic disengagement of the will from the creative process, abandonment to the dictates of a chance, of a non-causality, which, negating the will, turns itself to a *law* of chance and, consequently, to a *mechanism* of freedom (9: 128-129).

These philosophical premises of Xenakis’ musical creation, so interesting and fertile they appear, they nevertheless break off the established epistemological conceptions. Grounding freedom in nature and abolishing the will from human action, Xenakis challenges as a matter of fact the fundamental distinction between nature and culture; and this because precondition of culture is precisely freedom and the will that is connected with it and which in its turn presupposes consciousness. For Xenakis, the monist, everything is nature and function of nature, though of a nature, paradoxically, free. The philosophically established distinction between mechanism and freedom, that characterises a fundamental ontological antinomy, ceases to be valid and the paradox of a “mechanism of freedom” comes to the foreground. Notice that the freedom of the will, as a causality of different order, is maintained as a problem in contemporary philosophy of science, even when a probabilistic constitution of the universe is supported. In his article entitled “The Problem of Causality and Modern Physics” Hans Titze notices: “In the notion of probability as reason of a phenomenally causal realization something free is contained. [...] [On the other hand] determinants which are intentionally and freely (finally) set can always be added. [...] The number and the choice of the determinants is in this sense at least partially free. Here lies the possibility of a freedom of the will and not, as it is often argued, in the indeterministic relations of modern physics. Finality is the intentional setting of determinants that are freely decided by the will. Certainly behind may lie motives, however motives themselves only suggest, they do not determine” (6: 50).

The aforementioned essential refutations by Xenakis must direct us towards a re-examination of the validity of his philosophical claims, and primarily of the claim that causality and symmetry are notions identical, synonymous and interchangeable. As a matter of fact, causality is *relative*, but not *identical* to symmetry. Even if we admit that every causal association is symmetric, we are not obliged to admit the contrary, that all symmetry is causal. For example, in the alternation of day and night there is not causality, meaning that the fact (a), the day, does not causally produce the fact (b), the night and vice versa. In architecture the existence of a pair of similar elements does not imply that the one element is the cause and the other the effect. The same applies to music in the case of two notes with equal duration or two phrases with the same number of measures: neither the duration of the second note is causally produced by that of the first, nor the measure number of the second phrase by that of the first. In causal relation the cause contains the effect or, to put it differently, the reason of the existence of the effect is contained in its cause. This is not the case with the symmetry relations that we have just examined. Besides, in non-causal symmetric relations the transition from the one element to the other is reciprocal, a fact not applicable to causal relations: here the loud noise always follows the falling of the hand on the table; the reverse is impossible.

Another claim by Xenakis, related to the previous, that should be examined is the identification of causality with reiteration. Here also the range of the notion of “reiteration” is wider than that of “causality”. Reiteration characterizes causal as well as non-causal relations. The reiteration, for example, of a rhythmic or melodic pattern does not transform this rhythmic or melodic pattern into “cause” and its reiteration into “effect”. The morphological phenomenon of recapitulation is not explained causally, as if it were the “effect” of the exposition. Xenakis’ assertion about the causal formation of melodies and chords is proved to be problematic if we consider that in a melody a note is not explained as the cause of the next, not in a C major chord the note C as the cause of the notes E and G. Here probably Xenakis has something else in mind, a different notion of causality that will soon come into view.

Before this, another conceptual identification in Xenakis’ thought should be examined: the identification of “freedom” and “chance”. Chance characterizes the existence of events without causality. In nature, for example, we observe radioactive procedures as the effect of an accidental, non-causal collapse of the nucleus of some heavy elements, namely the alteration of the condition of matter without any observable external cause (6: 42-43). On the other hand, in human action we observe the generation of physical causes without apparent causality. As the common element of the obvious analogy we could consider, with Xenakis, the element of freedom. To which extent are we legitimized to do so? Initially we must differentiate the relation cause-effect from the relation reason (ground)-consequence. The first relation has to do with phenomena, the second with concepts. The collapse of the nucleus of some heavy elements as an *effect* may have no cause, may be accidental, as a *consequence* however has always its reason, and the reason here is the minor probability of maintaining a highly complex nuclear structure which therefore tends to decompose itself into nuclear structures of major probability of maintenance (entropy) (6: 43-45). The logical

relation reason-consequence is preserved as a basic constitutional condition of science, even when a probabilistic cosmology is the case. It must be preserved, of course, in order to understand human action. Even if from a phenomenal point of view human action is an accidental commencement of a new causal chain, from a logical point of view it is the consequence of a reason. And the reason of all human action, in contrast to the reason of natural events, is freedom, a phenomenon that presupposes the existence of consciousness and will. The collapse of the nucleus of a natural element proceeds by itself and not by freedom. If we claim the opposite, then we are probably misled by a defective application of the method of analogy.

Consciousness and will are nevertheless necessary though not sufficient reasons of freedom. The animal has also will and consciousness. However, whereas the animal acts because of exterior stimuli and as long as they are present, human has the ability of disconnecting his act from the stimuli of his environment (this is a central thesis of philosophical anthropology). Whereas the behavior of the animal is always hetero-determined, that of the man is open to the possibility of self-determination. Despite the fact that it has no natural causes, the self-determined behavior has nevertheless reasons; and these reasons are ends and values the realization of which is projected into the future; and the consciousness of the future presupposes consciousness of time, precondition of which is not only the consciousness of exterior things but also the self-consciousness as consciousness of the consciousness of exterior things.

All this leads us to the conclusion that human behavior and artistic behavior as a part of it, inasmuch as it is determined by ends and values, it is only in appearance accidental but in substance causal. Nevertheless, the causality of human behavior, opposed to that of the natural objects, presupposes consciousness, self-consciousness, will, freedom of self-determination, which in philosophy is called *Λόγος* (ratio, reason, Vernunft). Human action has not only physical form, it has also moral or aesthetic content, it is not only *explicable* by reference to natural laws but also *understandable* by reference to moral and aesthetic values and to the practical norms that realize them. Norms not only do not revoke freedom, but their existence is precondition of it. Xenakis is right when he insists that chance can not be improvised (9: 77-79). Improvisation presupposes will and will is always normatively determined. Chance is incompatible with will and consequently with freedom. These two notions are simply associated with two things of quite different order: chance is associated with nature, freedom with human action and consequently with civilization. Accidental human action is not free because it is unconscious and involuntary. The xenakian construction of a “mechanism of freedom” presupposes already freedom as the possibility of binding oneself to non-normativity. This is the meaning of the question that was posed to Xenakis after his lecture in Athens in 1975: “You have mentioned a line which you divided to disproportional fractions. Doesn’t this seeking for disproportion bind your freedom?” (9: 143). The questioner of course doesn’t actually realize that this self-binding is the *conditio sine qua non* of freedom, not its revocation.

The notion of normative causality or “causality of freedom” which we have just developed has undoubtedly kantian origins (see 1: 296 ff). The oldness of the theory does not in any case affect its validity. On the contrary, it helps us to understand the peculiar causality of the musical phenomenon. A melodic sequence of sounds is certainly perceived as non-causal, though not as random; and that because the choice of each of the next note is not generated “causally” by the previous one but it is dictated by the artistic will which has previously bound itself to an aesthetic or stylistic value as the reason of that choice. In order to make what is perceived meaningful, musical consciousness always turns itself to the values as the reasons of what is perceived. On the other hand, the rules to which the artistic will is bound do not determine categorically, by natural causality the sequence of musical events, but they only delineate the horizon of possibilities for the artistic will so that it is not random and always linked to the aesthetic value that is to be realized. Thus, in the transition from the aesthetic value to its realization indeterminacy emerges, an indeterminacy that guaranties the freedom of the artistic will. Artistic rules determine only the impossible, not the possible. The horizon of artistic possibility thus remains infinite.

The fact that a musical sequence of sounds is not accidental leads directly to the prospect of being necessary; and it is definitely necessary, though not in terms of nature but in terms of art, i.e. of freedom. Normative necessity in music means that, for example, you can not change a single note from the melody of the 40<sup>th</sup> symphony of Mozart without changing its meaning. The existence of each note in this melody is necessary, i.e. irreplaceable. Musical works of art are autonomous worlds that contain their necessity in themselves. The German philosopher Georg Simmel, referring to works of art, speaks of “necessity without causality” (see 4). Quite recently these issues were examined by Roger Scruton in his book *The Aesthetics of music*: “The causality that we hear in the musical foreground is [...] the ‘causality of reason’ which, for Kant, was the ground of human freedom. It is the more easy to hear this ‘causality of reason’ in music, in that the world of physical causes – the ‘causality of nature’ – has been set aside, discounted, hidden behind the acousmatic veil. In music we are given an unparalleled glimpse of the reality of freedom; and because, as Kant reminds us, reason deals only in necessities, we hear the free order of music as a necessary order: it is when each note *requires* its successor, that we hear freedom in music. Freedom is the consciousness of necessity; but it is a necessity imposed upon life” (3: 76-77).

In conclusion: trying to legitimize theoretically his artistic choices, Xenakis proceeds to some problematic conceptual equalization of notions, on the distinction of which the established division into natural and human or social or, in German, “geistige” sciences and also the differentiation of art and science is based. The conceptual equalization of freedom with chance and of causality with non-freedom presupposes an ontological monism which defies the basic

dichotomy of modern philosophy which, beginning with Descartes, was described as the dichotomy of “res extensa” and “res cogitans” or, later, as the dichotomy of being and consciousness, nature and mind, nature and value, nature and freedom. Xenakis regresses to a pre-modern manner of thought, loyal to his commitment to the mutual approach of art (freedom) and science (nature). His invocation of ancient Greek philosophy is not but symptomatic. In itself this regression is absolutely legitimized to the extent that artistically it is remarkably productive; it is nevertheless erroneous, and we dare to say provocative, to the degree that it attempts to interpret the whole of the European musical tradition in terms of a non-freedom, the contents of which are based on very problematic philosophical premises.

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