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**Between morphological research and social criticism: notes on the aesthetics of noise in
avant-garde music**
Makis Solomos

ABSTRACT

The present article aims to retrace the history of the progressive increase in the share of noises in the avant-garde music of the 20th-21st centuries, from the proliferation of dissonance and noise at the start of the twentieth century to Agostino Di Scipio's "audible ecosystems". It is possible, schematically, to think of this progression of noise according to two main categories. On the one hand, noise can occur according to a *morphological* logic. Here, musicians are interested in noise for its sonic, musical potential, for the pleasure that the listener can take in being invaded by complex sounds, interesting from a sonic point of view. The second major way for avant-garde music to generalize noise is criticism, whether it be social, political or other. In this sense, noise replaces the dissonances for which Theodor Adorno, referring to Schönberg, wrote in his *Philosophy of New Music*: "The dissonances that frighten them [the listeners] speak of their own situation", implying the condition of the alienated.

The article is divided into five parts. The first evokes the generalization of dissonance in Stravinsky's work or the American "bad boys" of the years 1910-30, before focusing on the bruitists and on Edgar Varèse, who intertwine morphological research and criticism in their generalization of noise. The second part deals with the immediate post-World War II era when, fitting with the logic of technocratic progress that characterizes the avant-garde (serial music and *musique concrète* in particular), morphological research is predominant. With the years 1960-70, criticism seems to gain the upper hand: the histories of rock, free jazz and, for the avant-garde, of such composers as Luigi Nono or Helmut Lachenmann are evoked. In the fourth part, we acknowledge the generalization of noise and, ultimately, its trivialization in recent years, and analyze the proposals of Agostino Di Scipio and Hildegard Westerkamp, which form two distinct trends. By way of conclusion, the article goes on to study the case of Iannis Xenakis, a composer who successfully interweaves morphological research and critical positioning, in works where background noise or plain noise itself invades the musical fabric.

INTRODUCTION

In his beautiful article "Music and background noise", Michel Serres (1972: 191-193; our translation) writes:

"Perhaps we should distinguish two kinds of music [...]. The first is a signal, a shimmering fabric of signals; it also intends to signify, to communicate a message [...]. This music cannot cease to be cultural, marked by the relativities from here and there [...]. In the second kind of music, precisely that which refuses to trace signs, which tries to erase the signal [...] the transmitted message conveys the noise itself [... we are] on the side of the rendering of noise, a universal condition of any exchange. Not the noise which differs from the sound [...] but the physical or thermodynamic noise which is a condition of circulation of any message in general and which remains in the absence of any message

[...] This music is indeed universal: everyone can hear it, whatever its language, its suffering and its condition, its world and its birth, since it is conditional, prior to any broadcast, to any reception”.

This description elegantly sums up the great paradigmatic shift that corresponds to the emergence of avant-garde music from the twentieth to twenty-first centuries. Where music, as a rule, consists of “musical” sounds, of harmonic sounds, that is to say of “signals”, which “tell” us something (this music claims to be language), avant-garde music blends in with the generalized noise, it is background noise rather than language.

It's not that music, in the traditional sense, doesn't know of noise. Musical noises have existed in music from the past, but are treated separately in one way or another. Thus, in the Middle Ages, theorists see in noise the devil's music: “Countless pictures in manuscripts show us [the] division between celestial music –in general, music of the angels accompanied by the harp or stringed instruments – and infernal music – most often noisy, with pipes, drum, and trumpet” (N. Wilkins, 1999: 28; our translation); that's why they noise is passed down to popular music. In baroque music, listeners are fond of which composers integrate in the form of imitative music. Other noises, less stylized, call for a more secret listening; as Michel Chion (2016: 63-64) writes: “The role of noise does not start, as is often thought, with contemporary music. It is already important in the seventeenth century and pertains not only to imitative musical effects. The repeated notes and trills in Scarlatti's harpsichord sonatas are notated such that creakings and cracklings might be heard. [...] What hides this role of noise from the ear – and from the eye and mind – of classical musicologists [...] is the fact that in the score those effects intended to produce it are marked using the same symbols as the ‘notes.’” And noise could be put to many other uses whose logic can still be perceived in romantic music music.

However, it was not until the first avant-garde music of the 20th century that noise was thought of and integrated as such into music. And since then, it has not stopped, noise has invaded the musical fabric, from the earliest *musique concrète* to *Noise*, right through to countless musical moments that will be briefly mentioned in this article. We will limit ourselves here to the musical trends that want to be pioneers, new, original, aiming at unheard-of sound worlds, that is to say: “avant-garde”, whether the word is used or not – by the way, it is to be noted that musicians have rarely used this expression, unlike visual artists. And we will go to current developments, when the term “avant-garde” is no longer used by many people today. Truth be told, we could have adopted the term “experimental” music, which is more fashionable these days, and has been since the 1950s.

To put it simply, the generalization of noise in avant-garde music may be broken down into two main categories. On the one hand, it can occur according to a *morphological* logic. Here, musicians are interested in noise for its sonic, musical potential, for the pleasure that the listener can take in being invaded by complex sounds, interesting from a sonic point of view. It should be noted that “noise” does not necessarily mean a very loud sound – which could be dangerous for the listener –, it refers to a sound with non-harmonic spectrum. Avant-garde music likes complexity, with regards both to structures or compositional processes and sounds: in acoustic terms, noises are more complex sounds than the so-called “musical” sounds. Referring to this first way of generalizing noise, the qualifier I quite readily use is « morphological », which I borrow from *musique concrète*, which is precisely the model for this type of use of noise. I could also have spoken of a “purely musical” use of noise – to

distinguish it from the second –, but I no longer believe in the expression “purely musical”, or at least I don’t know what it means anymore, when it is not the sanitized world of the concert hall or the recording studio which, if it constitutes one of the conditions for the existence of music, cannot be identified with music, whose resonances are too complex_for it to be restricted to to itself.

The second major way in which avant-garde music generalizes noise is criticism – social, political, etc. Hugues Dufourt writes that “the growing share that noise takes in art music attests to the emergence of a repressed plebeian element and reveals the guilty conscience of the symbolic authorities” (1999: 9; our translation). This view has often been held even though it should not be taken for granted – the people’s voice is not always noisy, and revolutions like consonant chants like *Bella Ciao!* This hypothesis is nevertheless operative in many cases if we are talking about criticism or political-social protest in general. In this sense, it extends Theodor Adorno's philosophy of new music. Speaking of Schoenberg, Adorno (2006: 11) wrote: “The dissonances that frighten them [the listeners] speak of their own situation”, implying the condition of the alienated. In this sense, in avant-garde music, noise replaces dissonance, which has become too commonplace. Adornian analysis also has the merit of showing that the two ways of generalizing dissonance (and, by extension, noise) are intertwined:

‘Dissonances arose as the expression of tension, contradiction and pain. They deposited sediment and became “material”. They were no longer media of subjective expression. Still, they did not thus disavow their origin. They became characters of objective protest. It is precisely the enigmatic happiness of these sounds that, as a result of their transformation into material, dominates the suffering they once announced, and does so by holding it fast. Their negativity remains loyal to utopia: It contains in itself the concealed consonance – hence new music’s passionate intolerance of everything reminiscent of consonance’ (T.W. Adorno, 2006: 68).

In what follows, I will show how, during the history of musical avant-garde, morphological logic and critical positioning intermingle or exclude each other, in an increasingly pervasive history of musical noise. To do this, I will distinguish several periods: to begin with, the situation before 1945, then the years 1950-60, the years 1960-70 and the present age since the 1980s¹. A final part will focus on a composer who equally weaves these two great ways of integrating noise into music: Iannis Xenakis.

BEFORE 1945

Before 1945, noise had already entered avant-garde music in several ways, closely combining morphological research and criticism. We think, for a start, of the generalization of dissonance, which has just been mentioned, characteristic of the expressionism of the Second Vienna School. With Stravinsky’s *Rite of Spring* (1911-13), dissonance is not about suffering – be it protest against society or the expression of personal pain: Stravinsky plays with the temptation of challenging civilization with a primitivist aesthetic. Dissonance also spread, during the same period, thanks to the American “ultra-moderns” – described as “bad boys” – and their taste for sound experimentation (see D. Nicholls, 1990). Sometimes, it is the equivalent of Stravinskian primitivism, for instance with Leo Ornstein’s *Wild Men’s Dance* (1914). Elsewhere, it is related to a political involvement, as with Henry Cowell, Ruth

Crawford and Charles Seeger who were militants in the Composer's Collective, a progressive association. Cowell also earned a place in the history of music for his famous book *New Music Resources* (published in 1930, but begun as far back as 1914), which invents the notion of "cluster". Charles Ives is the most famous of these Americans who activated the proliferation of dissonance – along with polytonality and cross rhythms. We find many of the ways in which he introduces dissonances in his *Concord Sonata* for piano (1909-15). It is important to note that, during his life, Ives reworked his pieces, adding dissonances. Finally, in the same vein, we could mention some early Soviet composers, such as Alexander Mossolov and his *Iron Foundry* (*Zavod*, 1927).

Be that as it may, noise truly enters into music with the movement that took its name (in French) from it : bruitism. Among the bruitist musicians, Luigi Russolo, author of the Futurist manifesto of 1913, *L'arte dei rumori* (*The Art of Noises*), is the most singular. As an inventor of the *intonarumori* (the noise instruments) (see **figure 1**), he had some success, but being, unlike other Italian Futurists, not a fascist, he exiled himself to Paris in 1927, where he sank into oblivion until his relatively recent rediscovery. The futuristic manifesto expounds revolutionary ideas, which criticize tradition: "We futurists have all deeply loved and enjoyed the harmonies of the great masters. Beethoven and Wagner stirred our nerves and hearts for many years. Now we have had enough of them, *and we delight much more in combining in our thoughts the noises of trams, of automobile engines, of carriages and brawling crowds, than in hearing again the Eroica or the Pastorale*" (L. Russolo, 1986: 25). The text defends the idea of a history of music leading to what he calls "noise-sound": "From the beginning, musical art sought out and obtained purity and sweetness of sound. [...] As it grows ever more complicated today, musical art seeks out combinations more dissonant, stranger, and harsher for the ear. Thus, it comes ever closer to the noise-sound. *This evolution of music is comparable to the multiplication of machines, which everywhere collaborate with man*" (*ibid.*: 24). But, at the same time, he does not give up a certain idea of music. Thus, *intonarumori* are supposed to produce *itches*, they are not just noise makers. One of these instruments, the "howler", "is a mysterious, suggestive instrument that takes on an intense expressiveness in various enharmonic passages and offers many resources, being capable of the most perfect intonation" (*ibid.*: 78).

Fig. 1. Luigi Russolo, *crepitatore*.

Criticizing the noise makers ("Why, Italian futurists, do you slavishly reproduce the trepidation of our daily life only in what is superficial and annoying in it?"), Edgar Varèse (1983: 24; our translation) is the composer who conducted the furthest morphological research into noise during the interwar period. With his new definition of music as "organized sound" (*ibid.*: 56), he put an end to the debate waged by conservatives who contested the quality of "music" in works with widespread recourse to dissonance, let alone noise. As a matter of fact, he rejected the musical sound / noise cleavage: "I do not distinguish between sound and noise. When someone says noise (as opposed to musical sound the refusal is of a psychological kind: the refusal of everything that diverts from droning, 'pleasing', 'lulling'. It is a refusal that expresses a preference. The listener who states his refusal affirms that he

prefers what diminishes him to what stimulates him” (Varèse in G. Charbonnier, 1970: 43-44; our translation). In his music, noises proliferate thanks to the use of percussions (*Ionisation*, 1929-31, the first Western work for solo percussions) and complex harmonies, but also, after 1945, to the use of electroacoustic sounds. With *Déserts* (1950-54, instrumental ensemble and electromagnetic tape) – one of the very first “mixed” pieces in the history of music – or with the *Electronic Poem* (1958, electromagnetic tape: see **figure 2**), composed for the multimedia performance at the Philips Pavilion at the 1958 Brussels World’s Fair (a spatialized piece in which Xenakis collaborated), Varèse is also the composer who constantly calls for a new new world of sound, and in political terms too – let’s not forget his engagements with workers’ choirs during his youth.

Fig. 2. Edgar Varèse, *Electronic poem*, final part: spectrogram (R. Cogan, 1984 : 39).

1950-60s

The avant-garde music of the immediate post-1945 era unmistakably has a “technocratic” aspect. We may well take the birth of additive sound synthesis, which takes place in the Cologne studio, as a metaphor for the reconstruction of Germany (and Western Europe) with the help of the Marshall Plan. As a result, morphological type research tends to become predominant. Contemporary music, especially music working with new technologies, becomes synonymous with “progress”: progress in the dominance over the material, technological progress too. This is how the notion of “experimental” music was born, an expression notably launched by Pierre Schaeffer (ed., 1957). However, the critical positioning has not disappeared.

In instrumental music, dissonance, by spreading, becomes commonplace: we can't keep regarding it as a criticism. However, this trivialization of dissonance as well as the extraordinary rigor of the constructions lead to a kind of “neutrality” of the musical fabric, which could be analysed as the symptom of a critique, that of the subjectivist aesthetic linked to note-based music. In serial music, sometimes, to quote Henri Pousseur (1972: 78-79; our translation) talking about Book I of Boulez’s *Structures*, “we hear sorts of sound cohorts, statistical and of variable density [...]. Although the charm of this piece is however undeniable, it is less a matter of the charm of a perfectly clear and translucent ‘geometry’ than a more mysterious charm, exercised by many distributive forms encountered in Nature, like the slow moving of clouds in shreds, the scattering of gravel at the bottom of a mountain stream or the gush of a wave breaking on some rocky strand”. This “charm” is not without affinities with the undifferentiated, syncretic perception evoked by the psychoanalyst Anton Ehrenzweig (1967) in his book *The Hidden Order of Art*: also referring to Boulez and his *Marteau sans maître* (see **figure 3**), Ehrenzweig (*ibid.*: 111-112) notes that, in this music, “any continuity of melodic line or harmonic progression seems missing; the instrumental sounds tumble like the tinkles of an Aeolian harp responding to irregular gusts of the wind. [...] We must listen to this music without trying to connect the present sound to the past and future; [...] After a while the sounds will come with the feeling of inevitable necessity,

obeying an unconscious submerged coherence of a different order that defies conscious analysis”.

Fig. 3. Pierre Boulez, *Le marteau sans maître*, IV (Commentaire II de « Bourreaux de solitude »): beginning. © Universal Edition.

Also related to instrumental music, the same analysis could be proposed concerning the proliferation of noise in John Cage’s music either with the use of percussions or with the invention of the prepared piano: it is indeed a morphological quest, but also a critique of the subjectivist aesthetic in favor of a neutral expression. To quote one last example: what about the search for noise via clusters, extreme registers or particular modes of playing in Krzysztof Penderecki in the 1960s, and in particular in his *Threnody for the Victims of Hiroshima* (1960, string orchestra)? We know that the title was given after the piece was composed, accordingly it’s a matter of morphological research, of which however the composer soon grasped the expressive (critical) potentialities.

In the 1950s and 60s, it was of course *musique concrète* – the first musical creation of which was given by Schaeffer’s *Five Studies of Noise* (1948) – which further developed morphological research on noise. For the *musique concrète*’s musician, there is no difference between musical sounds and noises: any sound sound material can serve music. The words “noise” and “musical sound” are discarded in favor of the sole word “sound”. And the whole effort of the theorist Schaeffer (2017), in his *Treatise on Musical Objects*, consists in analyzing the morphology of sounds through the use of a much refined typology². After several successive approaches, the *Treatise* resulted in a “summary diagram” (P. Schaeffer, 2017: 467). This chart consists, horizontally, of seven “criteria of musical perception” (mass, dynamic, harmonic timbre, melodic profile, mass profile, grain and allure) which several columns fill with “descriptions” and “evaluations”. To quote but one example, regarding the criterion of “mass” – a term that corresponds, roughly speaking, to an approach to sound according to its spectral dimension, or a generalization of the notion of pitch – we have several “types”: “tonic (type N), complex (X), variable (Y) and some or other (W, K, T)”. This typology is based on the sole principle that sounds are not classified according to their origin, but only according to their internal morphology. The same principle enables Schaeffer to postulate the existence of “sound objects” attainable through “reduced listening”: “There is sound object when I have achieved, both materially and mentally, an even more rigorous reduction than the acousmatic reduction: not only do I keep to the information given by my ear (physically, Pythagoras’s veil would be enough to force me to do this); but this information now only concerns the sound event itself: I no longer try, through it, to get information about something else (the speaker or his thought). It is the sound itself that I target and identify.” (P. Schaeffer, 2017: 210).

By cutting off sounds from their origin and making “sound objects” – which are almost the equivalent of musical notes –, Schaeffer is merely exploiting the morphological dimension of the world of noises. However, while Schaeffer tried to impose this methodology on young composers who took up *musique concrète* in the 1950s and 60s, not all of them bowed to this

discipline. Among the best-known “dissidents”, Luc Ferrari, with *Hétérozygote* (1963), developed a sort of “sound cinematography” in which various anecdotal sounds blend, in particular in soundscapes and words. *Hétérozygote* has remained in the history of concrete music by its “opening” to the world of external sounds, which are neither made nor cut off from their source. This opening occurs at 4’43” when we hear sounds of waves in a stereophonic movement, then at 5’12” when a voice says, “Ah! no, don’t think of that... you only think of eating...” (see the analysis of A. Reyna, 2016; **figure 4** gives the Ferrari assembly diagram, where the “waves” can be seen).

Fig. 4. Luc Ferrari, *Hétérozygote*’s montage diagram: sequence 2. In A. Reyna, 2016: 65.

1960s-70s

Much as the 1950s and 1960s were a period of faith in technocratic progress, the 1960s and 1970s were a period marked by protest. The progression of noise in domains like rock music or (free) jazz parallels the multiplication of diverse forms of revolt, protest or political, social and cultural criticism in western societies during those two decades. When, in 1966, Archie Shepp declared: “We see jazz as one of the most meaningful social, aesthetic contributions to America. It is that certain people accept it for what it is, that it is a meaningful profound contribution to America – it is anti-war, it is opposed to the U.S. involvement in Vietnam, it is for Cuba; it is for the liberation of all people. That is the nature of jazz. [...] Why is that so? Because jazz is a music itself born out of oppression, born out of the enslavement of my people” (in P. Carles, JL Comolli, 2015), free jazz has already developed all kinds of noise, whether through modes of playing such as multiphonics or by structures calling on free improvisation, polyrhythm or atonality. As for rock, noise enters through the front door with the Beatles’ montages (“Tomorrow Never Knows” from the *Revolver* album, 1966), the distortions of the electric guitar (live recording of “Star-Spangled Banner” in Woodstock by Jimi Hendrix, 1969), the sound experiments of progressive rock (*The Lamb Lies Down on Broadway* by Genesis, 1974)...

In avant-garde music, such composers as Iannis Xenakis, Luigi Nono or Helmut Lachenmann also use noises for purposes of protest. This was the time when Nono had his work *La fabbrica illuminata* performed several times in factories resulting in debates with the workers. This piece for soprano and magnetic tape, composed in 1966, is based on recordings made in a factory – the Italsider factory (one of the most important steel companies in Europe throughout the XXth century) located in Cornigliano (West district of Genoa) –, and includes noise-based sounds. At the end of one of these “concerts”, Nono (1966: 238-239; our translation) writes: “The workers: often without the slightest academic, cultural and musical ‘preparation’ [...]. But forced, in life and at work, technically to be in the vanguard: new technical means of production and work. The technical and aesthetic analysis is the vehicle of their understanding: the work and composition processes in the electronic studio and the phonetic and semantic analysis of the text in relation to its musical becoming, they easily perceive. The relation between sound and noise and the sound structure of the

acoustic phenomenon do not represent a problem for them, as it is for the bourgeois audience who most often attend concert halls”. In a way, reviving Walter Benjamin’s thought, Nono explains that the workers are much more sensitive than the bourgeoisie to contemporary music, because of the technique. Both contemporary music and the proletariat are indeed at the “avant-garde” in the technical field, because they use the most advanced techniques in their respective fields (assembly-line work for the workers, electroacoustic music studios for the composers).

To name another figure in the 1960-70s, the German composer Lachenmann starts from the Adornian observation that the musical material is not neutral but is already in conflict with reality: “Musical material is something other than simple, docile raw matter waiting uniquely for the composer to fill it with expression and thereby give it life within such and such a set of relations: it is itself already inscribed in relations and marked expressively, even before the composer approaches it” (H. Lachenmann, 1991: 262-263; our translation). Against an authoritarian domination of the material, which empties it of its concrete qualities – of its share of reality – by transforming it into something neutral, and that regardless of its nature (tonal material, dissonances, noises), Lachenmann develops, to use Adornian language, a veritable mastery, enabling it to preserve these qualities. To do so, he advances the idea that composing means “building an instrument”: composition is not an abstract task (a blind domination), but a confrontation with matter, like the musician's confrontation with his or her instrument. So in sum, it’s all a matter of “touching a sound” (see H. Lachenmann, 1993: 233; our translation). With his “*musique concrète instrumentale*”, Lachenmann composes pieces that constantly rub with the matter. Moreover, the literal action of rubbing is quite important in his works, as we can observe in the opening of *Pression* (“Pressure”, 1969), a piece for cello (see **figure 5**). The score, which constitutes a tablature – Lachenmann indicates the action to carry out and not the sound result –, indicates the bow’s motion (up) and the fingers’ on the strings (down). In *Pression*, Lachenmann rejects operations concerning the notion of note, for it can be obtained only by abstraction: the musical material is made up uniquely of the cello’s concrete sounds and the actions for obtaining them. By laying the stress on matter, the concrete, the living, and the sensitive, Lachenmann’s music makes us aware that the domination of Nature leads to its disappearance. It is in this sense that, with him, noise constitutes the musical sign of social criticism. In a musical way, Lachenmann prolongs the critique of “Instrumental” Reason that Adorno and Horkheimer (2002) had carried out in their *Dialectic of Enlightenment*, which tends towards the blind domination of Nature.

Fig. 5. Helmut Lachenmann, *Pression*: beginning (first edition). © By kind permission of Musikverlage Hans Gerig, Köln, 1980 assigned to Breitkopf & Härtel, Wiesbaden.

SINCE THE 1980S

From the 1980s, noises also spread in such post-rock music as “industrial music”, in post-punk music, and are found in rap too... In some cases, they still bear their protest charge. This is the case with such new trends as “radical improvisation”. The book *Noise and*

Capitalism (Mattin and al., 2009) federates some research in this field. The British drummer and percussionist Edwin Prévost writes: “If we – as musicians and listeners – have any choice when confronting the morality of capitalism, then it must be to do rather than to be done to. We must decide who we are rather than be given an identity. In our freely improvised music there is the opportunity to apply a continual stream of examination. We search for sounds. We look for the meanings that become attached to sounds. [...] The search is surely for self-invention and social-invention. This is an opportunity to make our world” (*ibid.*: 58). In avant-garde instrumental music (contemporary music), however, the work on noise-based playing modes no longer has this critical load, as noise has become widely commonplace: this is true for example, of the French “saturation” music (Franck Bedrossian, Raphaël Cendo, Yann Robin...) (see P. Rigaudière, 2014) or of the Russian composer Dmitri Kurljanski (Kourliandsky) (see M. Solomos, 2010). Situated between avant-garde music and popular music, *Noise* music, for its part, is a cross of criticism and morphological research. This is the case with “Japanoise” and Merzbow (Masami Akita), who explores the complex morphologies of the universe of noises and, at the same time, playfully transgresses limits (see P. Hegarty, 2007: 155).

Unable to analyze everything that is done in terms of noise in avant-garde music during the late 20th and early 21st centuries, let us mention only two musicians representative of different trends, Agostino Di Scipio and Hildegard Westerkamp. Di Scipio is one of the pioneers of “ecosystemic” compositions. In the set of pieces called *Audible Ecosystemics* (2002-2005, live electronics solos), which offers implementations of composed interactions (see **figure 6**), the ecosystem is a triangular interaction between the musician, the DSP computer and the sonic ambience (see Di Scipio, 2003: 272-275). This idea has noise play an important role. In the simplest terms, I would say that in Di Scipio’s music, noise is not disturbance (as in traditional music) nor sonic material (as in modern music). It is one of the agents of the interaction, since it is produced by the concrete place where the interaction occurs: it is part of the system. In *Audible Ecosystemics*, “the role of noise is crucial [...]. Noise is the medium itself where a sound-generating system is situated, strictly speaking, its ambience. In addition, noise is the energy supply by which a self-organizing system can maintain itself and develop” (Di Scipio, 2003: 271).

Fig. 6. Agostino Di Scipio: composed interactions for the *Audible Ecosystemics* interface (after A. Di Scipio, 2003: 272). © By kind permission of Agostino Di Scipio.

With Hildegard Westerkamp, we are in the field of the so-called acoustic ecology. For this musical and ecological movement, noise must be banned: acoustic ecology fights against noise pollution; as Murray Schafer (1977) explains, it is synonymous with “lo-fi” soundscapes. However, Westerkamp takes a more dialectical approach. Insisting on the need to give priority back to our ears, which have been neglected, she explains that listening can sometimes be a painful, exhausting or even depressing experience when the surrounding sounds are too loud or seem meaningless to us, that is, when it is noise. “Trying to ignore them, however, makes even less sense [...] We desensitize our aural faculties by shutting out sounds and thereby not allowing our ears to exercise their natural function” (H. Westerkamp,

1974: 49). What is needed is to produce the (inner) force to resist these sounds. Westerkamp explains that she has experienced with this type of sound attitude in India, for example by observing “people worshipping in deep inner focus at a temple while crowds and noises, hustle and bustle happen around them” (H. Westerkamp, 2015). Her piece *Gently Penetrating Beneath the Sounding Surfaces of Another Place*, made from recordings in India, brilliantly illustrates this dialectic of listening thanks to its subtle mix of lively street atmospheres and moments of sound peace.

XENAKIS, A CASE STUDY

Michel Serres’s text that I quoted at the beginning of this article is largely dedicated to Xenakis’ *Pithoprakta* (1955-56, orchestra). The piece begins with noises: each of the players (46 in number), totally individualized, turns their instrument over and strike the body of the instrument. Only the rhythms are noted on the score (**fig. 7**). This is one of the earliest examples of “granular” music in Xenakis. Indeed, the rhythms vary and the density also, the strokes are sufficiently short and numerous so that, overall, a kind of synthesis of sound takes place³, from which Serres (1972: 189-190; our translation) concludes: Xenakis “erases the signal and composes the noise. He gives to hear the *rerum* universals, the naked voice of the things of the universe. He strictly emits what is emitted *per se*, without intervening, without letting the articulate intervene, without letting anybody intervene. What is emitted, in the absence of screening, filtering or separating? The effect of gravel, the effect of scintillation, the noise of thermal agitation – the ensemble of background noises”; and we know how important the reference to thermodynamics is for Xenakis at that time, who introduced stochastic music.

Fig. 7. Iannis Xenakis, *Pithoprakta*: bars 0-4. © By kind permission of Boosey and Hawkes.

Xenakis is one of the composers who most closely mixes morphological and critical approaches, in his search for music that exploits the dimension of noise. The hypothesis of a granular synthesis is of a morphological order, but Serres’s analysis makes it clear that the whole issue is also a critique of art as riveted to a “molar” subjectivity in order to favour a “molecular” subjectivity, to use Deleuze and Guattari’s (1987: *passim*) terminology⁴.

Morphologically, Xenakis’s music is intimately linked to the world of noise, moreover, it is in both senses of the term: sound of very high intensity and sound with a very rich spectrum. Great intensity: in his instrumental music, Xenakis makes extensive use of *fortississimi*, sometimes exhausting for instrumentalists in terms of duration – especially in his latest works. With electroacoustic music, we know that he liked playing the sound very loud. This was also one of the reasons for his argument with Pierre Schaeffer, who wrote for the premiere of *Bohor* (eight-track tape, 1962): “Bohor, it was, in worse (I mean better), the early wood fire. It was no longer the little embers [*Concret PH*], it was a huge backfire, an offensive accumulation of lancet hits in the ear at the maximum of the potentiometers” (P. Schaeffer, 1981: 85). Maybe Xenakis liked playing the sound very loud due to his partial

deafness (due to his injury during the Greek Civil War, an episode when he almost lost his life). It should be noted, however, that the speakers he was working with are not today's⁵. Playing very loud with today's high-performance speakers, without filtering out some high-pitched sounds, as some do, is criminal.

As for the second meaning of the word noise, now, Xenakis is one of the main composers of his generation to have worked on noise as a musical material, developing its morphological dimension. To mention *Pithoprakta* again, the piece follows the model of physical sound: its entire form goes from noise (the “grains” of the beginning) to pure sound (harmonics at the very end). This transformation is realized through interpolations, with frequent returns to prior states in terms of the degree of noise. To summarize, the process is as follows: 1. Noises with continuous transformation of density and spatialization with progressive emergence of *pizzicati* and *arco* (bars 0-51); 2. Overall transformation through “filtering” of a “cloud of sounds” (bars 52-59); 3. *Tenuti* with progressive emergence of *pizzicati* then *glissandi* (bars 60-104); 4. Discontinuous transformations of a field of *glissandi* (bars 105-121); 5. Noisy superposition of six timbre groups with sporadic “views under the microscope” (bars 122-171); 6. Continuous transformation of the register of sounds in *battuto col legno* (bars 172-179); 7. Discontinuous transformations through “filtering” of a cluster (bars 180-207); 8. Fields of *glissandi* with irregular then linear transformation of register (bars 208-231); 9. A large cluster that “evaporates” progressively into the high register (bars 231-250); 10. Harmonics in discontinuous spatial transformations (bars 250-268).

To illustrate the fact that, in Xenakis, noise is also valid as criticism – according to social, political, historical dimensions – let us take two periods: his beginnings when, in a way, he heals, with music, his wounds as well as the defeat of civil war; then, the mid-1960s, foreshadowing the unrest May 1968, when the revolutionary Xenakis reappeared. The first period relates to the political and military action that the composer carried out in Greece, before being forced to flee the country illegally (where he would be sentenced to death *in absentia*) to settle in France. Everyone knows the important role he played during the Resistance against the Nazis, organizing with his comrades demonstrations, food distributions, etc., as well as the tragic events of December 1944 – the outbreak of the Greek Civil War – when, along with his comrades of the Lord Byron battalion, he was among the last to defend Athens against the colonialist troops of Churchill and their Greek allies (former Nazi collaborators), until the day of his above-mentioned injury. In some interviews, he evoked the relationship between the chaotic, noisy sound and visual environment of war and civil war and his polytopes (cf. N. Matossian, 1981: 261-266), a subject that some commentators have developed (cf. E. Kiourtsoglou, 2016: fifth part). But already, in *Metastaseis* (1953-54, orchestra), the relation is obvious. A famous passage from *Formalized Music* explains the need to introduce the calculus of probabilities in music:

“Everyone has observed the sonic phenomena of a political crowd of dozens or hundreds of thousands of people. The human river shouts a slogan in a uniform rhythm. Then another slogan springs from the head of the demonstration; it spreads towards the tail, replacing the first. A wave of transition thus passes from the head to the tail. The clamor fills the city, and the inhibiting force of voice and rhythm reaches a climax. It is an event of great power and beauty in its ferocity. Then the impact between the demonstrators and the enemy occurs. The perfect rhythm of the last slogan breaks up in a huge cluster of chaotic shouts, which also spreads to the tail. Imagine, in addition, the reports of dozens of machine guns and the whistle of bullets adding their punctuations to this total disorder. The crowd is then rapidly dispersed, and after sonic and visual hell follows a detonating calm, full of despair, dust, and

death. The statistical laws of these events, separated from their political or moral context, are the same as those of the cicadas or the rain. [...] They are stochastic laws” (I. Xenakis, 1992: 19).

This text is, in a way, a perfect description of the first part of *Metastaseis*. **Figure 8** shows “the reports of dozens of machine guns” (brass and percussion), “chaotic shouts” (strings) and “total disorder”. In his text, Xenakis considers to “separate” these events “from their political or moral context” in order to be able to compare them with natural events that are also stochastic, but it should be remembered that he himself experienced these demonstrations from the inside: we can consider that, the creative proposal that he emits was a way for him to survive after his injury and the death of several of his comrades. There is therefore a relationship between the concept of “mass” that Xenakis introduced in music and the masses of demonstrators during the Resistance and the Greek Civil War: his music represents these historical events and “uses” them to invent noise-based avant-garde musical techniques.

Fig. 8. Iannis Xenakis, *Metastaseis*: bars 0-4. © By kind permission of Boosey and Hawkes.

To go further, we could also consider a movement in the opposite direction. Indeed, in some cases, music does not only represent social, political, historical struggles, but itself becomes an instrument in a struggle to transform society: it is “revolutionary” in the sense that avant-garde research at the musical level has also a combative character at the socio-political level. Indeed, the noise, the chaotic masses could also be interpreted as weapons: the weapons of a revolution which one tries to win by music itself. In other words, not only does Xenakis represent the historical events of the Civil War which culminated in the defeat of the Greek left and its exile in France, but he continues the fight, giving promises for future victory.

As an example, let us take another period when both musical and social-political events mingle: the mid-1960s, when the major protests began which led to the revolts of May 1968. During that period, Xenakis was no longer, officially, a “committed” composer, but he continued to be linked to political protest. That was also the time when he composed *Nuits* (1967, twelve *a cappella* voices) that he dedicated to the political prisoners of the Junta which had just stage a coup d’État in Greece, as well as to the political prisoners of Spain and Portugal, still under dictatorship. At the same time, students taking to the streets see him as revolutionary because of his music itself. And they are right: when you listen to a work like *Terretektorh* (1965-66, orchestra), you want to make a revolution! Not only are we stimulated by the incredible sounds and the noisy complexity of the sounds of the piece, but the unprecedented arrangement of the orchestra (the 88 musicians are dispersed among the audience: see **figure 9**), which breaks with the conformism of the Italian stage, foreshadows an egalitarian society, resulting from the revolution.

Fig. 9. Iannis Xenakis, *Terretektorh*: arrangement of the orchestra. © By kind permission of Editions Salabert.

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¹ In chapter 2 of my book *From Music to Sound* (M. Solomos, 2020), I also deliver a history of noises in the music of the 20th-21st centuries. While some steps are found, of course, in this article, the perspective is different.

² Here, the words “typology” and “morphology” are not used in their Schaefferian sense. For Schaeffer, typology is linked to *listening* to a sound and morphology to its *making*.

³ It is only with electroacoustic music, *Concret PH* (1958), but also certain passages from *Diamorphoses* (1957-58) that Xenakis formalizes his search for a granular synthesis. The theoretical text in which he sets out the beginnings dates from 1960: “All sounds represent an integration of grains, of elementary acoustic particles, of sound quanta. Each of these elementary particles possesses a double nature: the frequency and the intensity (the life-time of each corpuscle being minimum and invariable) Each of these elementary grains has a threefold

nature: duration, frequency, and intensity. Every sound, every even continuous variation of sound is to be understood as an assembly of a large number of elementary grains being disposed adequately within the time level” (Xenakis, 1960: 86-87. In Xenakis, 1992: 43-44).

⁴ Serres’ analysis also finds an echo in a Milan Kundera, who explains that, two or three years after the crushing of the Prague’s spring, he found “relief” in the “objective” noises, the “no sentimental” music of Xenakis: “European music is based on the artificial sound of a note and a scale; it is the opposite of the raw, ‘objective’ sound of the world. From the beginning, it is linked, by an insurmountable convention, to the need to express a subjectivity. [...] But the time may come [...] when sentimentality [...] is exposed straight away as the ‘superstructure of brutality’. It was at this point that music struck me as the deafening noise of emotions, while the world of noise in Xenakis’s compositions became beauty for me; beauty washed away from emotional filth, devoid of sentimental barbarism” (M. Kundera, 1981: 21-24).

⁵ Daniel Teruggi (oral communication) told me that when digitizing *Bohor*’s tapes, Xenakis was very surprised to “discover” low sounds in the piece.