



Xenakis first composition in *musique
concrète:*
Diamorphoses

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Abstract

Diamorphoses is the first electroacoustic work by Xenakis. Composed in the GRM, the historical studio of *musique concrète*, it uses the latter's techniques: recordings of sounds are transformed *via* tape operations and mixings. The recordings belong to various sources: earthquakes, jets take-offs, skips' shocks, musical instruments (bells, winds), etc. While using the techniques of *musique concrète*, *Diamorphoses* does not belong to its aesthetics as conceptualized by Pierre Schaeffer. Schaeffer introduced noise into music, but he retained from tradition the definition of music as a language, a definition which involves the idea of a double articulation: material and syntax. But the new material (noise) was rather difficult to be subjected to a hypothetical syntax. That is why Schaeffer developed the theory of the "sound object", which treats noise as a new minimal unity, like the traditional musical note. For this reason, Schaeffer says, the sound objects should not be too long, neither eccentric, etc. *Diamorphoses* is in opposition to this point of view. Its sounds are "too" long, they are "eccentric"! Their sources are quite often recognizable, while a "sound object" should be an abstract sonic unit, etc. As in his instrumental music, Xenakis' electroacoustic music breaks the opposition material/syntax. So, one of the main aim of *Diamorphoses* is to build complex sonorities emerging directly from the basic sound sources. That is why this piece is characterized by the melting of noises – and not by their combinations.

1. Introduction

- *Diamorphoses* (Διαμορφώσεις in Greek) belongs to Xenakis' first electroacoustic production: *musique concrète*.

It is his first composition in *musique concrète*, thus his first electroacoustic composition.

Whence its great importance.

- Despite being his first electroacoustic composition, it is not just a “study” (*étude*), neither an unachieved composition.

It is often mentioned as a masterpiece in the books on history of electroacoustic music.

Maybe the only aspect explained by the fact that it is the first Xenakis' electroacoustic composition is its brief duration: 6'50" (but his previous works, *Metastaseis*, *Pithoprakta*, *Achorripsis* were also brief, between 7 and 10mins).

- The paper that I present here is a work in progress.

It belongs to a broader research that I'm realizing on Xenakis' electroacoustic production. This research became possible thanks, between other factors, to the opening of Xenakis' audio Archives.

I'm realizing this research in collaboration with the German composer Reinhold Friedl.

- There are already some analyses of *Diamorphoses*. I mention them in chronological order:

- a short paper from Stefania de Stefano (1998);

- a more important analysis from Thomas Delio (2002), edited in a collective book on electroacoustic music;

- my own short analysis, presented already in England, in the Bristol conference of European Society of Musical Analysis in 2002 (Solomos, 2002), – some elements of this analysis are taken from my PhD thesis (Solomos, 1993);

- Rudolf Frisius' article for the proceedings of the Köln Symposium on Xenakis' electroacoustic music (Frisius, 2009);

- Martha Brech's short analysis for the same symposium (Brech, 2009).

These five analyses belong to the analytical *genre* well known in electroacoustic studies: the listening analysis, *analyse d'écoute*, *hören Analyse* (de Stefano's analysis belongs to a sub-genre of listening analysis: the so-called spectromorphological analysis).

- My presentation today tries to develop in four directions:
 - the listening analysis, which remains very important for electroacoustic studies;
 - the genetic approach, based on the study of the sketches;
 - the theoretical approach, based on the study of the compositional and theoretical goals of the piece;
 - the historical approach, i.e.: the inscription of *Diamorphoses* in the history of *musique concrète*.
- I will deal successively with:
 - the context;
 - some facts about the piece;
 - some of its compositional goals;
 - the development of the idea that the piece is already dealing with the concept of “emergence” (bringing forth), where the whole form is not a combination of sound objects, but their fusion in a continuum form. This will lead to the comparison with other *musique concrète* works of that time and with Schaeffer’s ideas.

2. The context

2.1. *Musique concrète*

- *Musique concrète*:

- born in the late 1940s thanks to Pierre Schaeffer;
- represents a technologico-musical revolution.

- Schaeffer founded the Studio d'essai, which became the GRMC (Groupe de recherches de musique concrète) and then GRM (Groupe de recherches musicales) (till today), in Parisian radio, thus benefiting of its technology. Equipment: tape recorders (beginning of the 1950s), microphones, mixing desk and some other apparatus like *phonogène* and *morphophone* (see *infra*).

The technology is thus of recording and transforming sounds and not synthesising sounds (the *Elektronische Musik* is the second technologico-musical revolution which happened, in Köln, almost at the same time).

- Principal ideas of Schaeffer, developed in his numerous books and especially in the “bible” of *musique concrète*, the *TOM (Traité des objets musicaux)*: Schaeffer, 1966):

- Schaeffer put the accent in the operation of *listening*. Indeed, *musique concrète* is the revolution where listening is the beginning and end of music, even of music composition;
- he worked the idea of a *morphological* approach of sound, with the help of two other ideas: a) “reduced listening” b) “sound objet” (see *infra*).

- These ideas were collectively discussed, as we can see in Xenakis’ notes (**figure 1**).

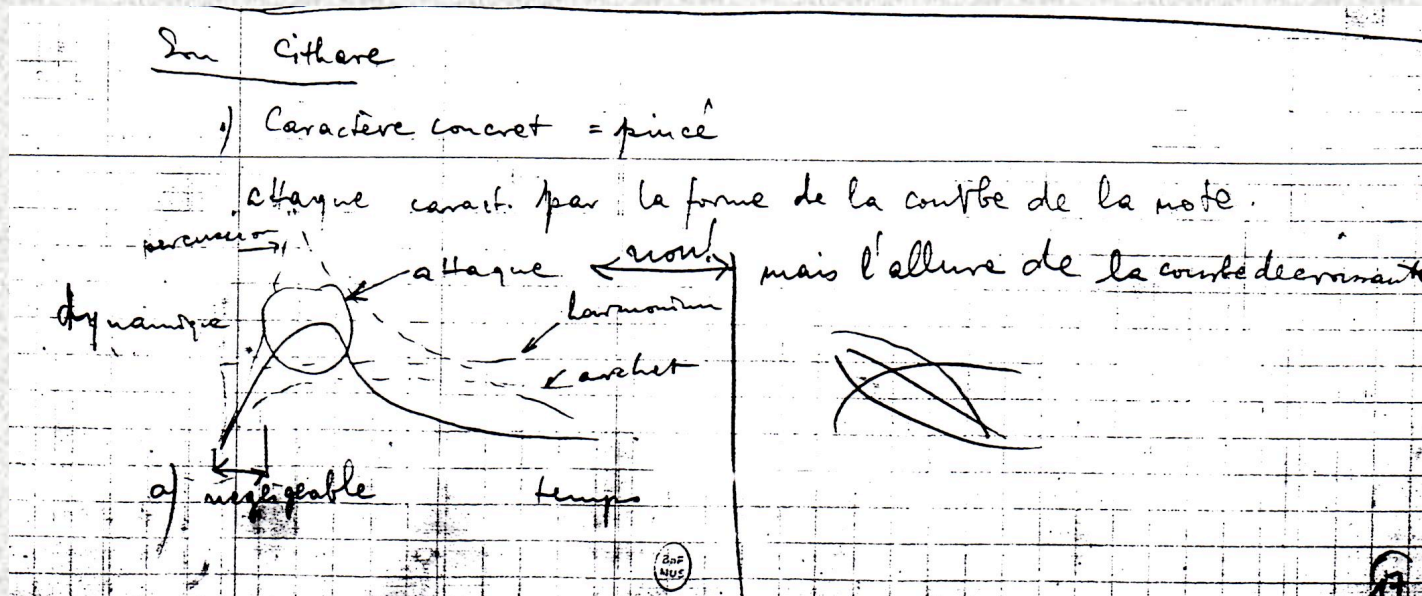


Figure 1. Xenakis' notes during discussions in the GRM, January 1957. Archives Xenakis, Bibliothèque Nationale de France. Carnet 19, p. 17.

- Thanks to the fact that technology is central and because of the studio which was collective, Schaeffer developed the idea of making something which is not “music”, but “musical research” (or “experimental music”). It is why many *musique concrète* compositions from that time were named *études*.

2.2. Before *Diamorphoses*

- Before *Diamorphoses*, Xenakis has composed numerous works. Besides his early compositions: *Metastaseis*, *Pithoprakta* and *Achorripsis*.

His main ideas:

- masses of sound, probabilities;
- development of sound morphologies (which I call “sonorities” so to distinguish them from Schaeffer’s idea of sound morphologies; see Solomos, 2001, 2004): glissandi, masses of points, progressive transformations, etc.
- So, he was ready to work with *musique concrète*.

(It has often been said that the composers of the 1950s were much influenced by their electroacoustic experience, transferring their results in this domain to their writing for instruments. For instance, David Ewen wrote that Xenakis “explored the possibilities of simulating electronically produced sounds and sonorities with conventional instruments” (Ewen, 1971, p. 125). Hugues Dufourt, probably thinking of his own music, repeats the same statement (Dufourt, 1988, p. 69). It is true that electroacoustic practice made composers like Ligeti or Berio to discover radical new ways of conceiving music in general — and, consequently, to apply these concepts into their instrumental music. But Xenakis’ case is more similar to Varèse’s, who wrote a radically new music *before* the introduction of the new technology, a music that was no more composition *with* sounds but composition *of* sound. Xenakis developed this concept already in his instrumental works *Metastaseis* (1953-54) and *Pithoprakta* (1955-56), i.e. before his electroacoustic experience.

2.3. Xenakis and *Musique concrète*

- In fact, Xenakis was interested in *musique concrète* long before *Diamorphoses*:
 - he was probably present at the first concert of *musique concrète* in 1950, at a time when he was studying with Olivier Messiaen and composing music in the spirit of Bartók;
 - he had bought a tape recorder (very expensive for the time) in 1952 and made experiments on rhythms;
 - he evokes *musique concrète* in his first article, published in Greek: “Οι σημερινές τάσεις της γαλλικής μουσικής” [Trends in French Music Today] (Xenakis, 1955), published in 1955, but probably written one year earlier;
 - in the end of 1953, he tried to get access to Schaeffer's studio. Thanks to a recommendation by Messiaen, he met Schaeffer in 1954 (see Matossian, 1981, p. 90).
- Then he got more and more involved in Schaeffer's studio. The collaboration culminated with the famous “concert collectif” (beginning of the 1960s), which was directed by Xenakis (see Delalande and Gayou, 2001).
- And then, there were more and more quarrels with Schaeffer, which made him leave the GRM.
- In 1957, the year of composition of *Diamorphoses*, he seems in harmony with Schaeffer (even if he does not agree with all of his ideas). It is attested by his notes (see Archives Xenakis) during the various speeches in GRM, and especially during Schaeffer's speeches.

3. *Diamorphoses*

3.1. Available materials to study *Diamorphoses*

• We have:

1. Xenakis' writings: very few! Only:

- two small sentences in *Formalized Music* (Xenakis, 1992);
- two small texts not edited (Archives Xenakis);
- two paragraphs in his two big interviews: with Bálint A. Varga (1996) and François Delalande (1997);
- two paragraphs in Matossian's book (Matossian, 1981), which are directly coming from Xenakis.

2. Material in Archives Xenakis:

- in Richelieu, where the sketches are ("dossiers œuvres" and "carnets"). They contain very important materials, but less than for *Metastaseis* or *Pithoprakta*. Probably some material is lost;
- in Tolbiac, with the audio archives. There are very interesting tapes with Xenakis' sound material and transformations. Here also it is not clear whether everything was kept.

3.2. *Diamorphoses*' genetic

- Dates of composition:
 - beginning: it seems that the first sketch is from 5-1-57 (there is a page in Carnet 19 at that date labelled "Concrète");
 - in Carnet 19, we find a plan for the work in the studio (**figure 2**):

<u>Mars</u>	
<u>Semaines</u>	
11 - 16	1 écoute 2 enregistrements
18 - 25	3 séances fabrication systématique 3 séances montage
25 - 30	2 séances fabric systématique 2 " montage 1 " écoute 2 " écoute
<u>Avril</u>	
1 - 6	
8 - 13	2 " fabric définitive
15 - 20	2 " " "
	2 " montage
22 - 4 Mai	2 " montage 2 " mixage

Figure 2. Xenakis' plan for the work in the studio. Archives Xenakis, Bibliothèque Nationale de France. Carnet 19, p. 34.

- It is not totally clear, when Xenakis finished the composition:
 - a) many sources suggest 1957;
 - b) Matossian (1981) says that it was achieved six months after it's beginning;
 - c) in the Archives:
 - most of the sketches stop at beginning of July 1957;
 - but some are from June 1958. Two hypotheses: a) either they are for *Concret PH*; b) or Xenakis came back at that time to *Diamorphoses* to change it or to achieve it. This last hypothesis could be confirmed by the fact that in *Formalized Music* he gives the date 1957-58.
- Indeed the piece was only premiered on the 5th October 1958, in the *Journées internationales de musique expérimentale* in Brussels, during the world fair (along with the Philips Pavilion and *Concret PH*).
- The piece was produced on a commercial record very early, in 1959: LP *Musique concrète n°2*, Boîte à Musique, 1959, along with pieces from Luc Ferrari (*Étude aux sons tendus*) and Pierre Schaeffer (*Étude aux sons animés*).
- Versions of the piece:
 - most of Xenakis' electroacoustic compositions raise many problems;
 - here, it seems that there are only two versions, sometimes labelled *Diamorphoses I* and *Diamorphoses II*, corresponding probably to the initial 4-tracks version and to the stereo one.
- We have to mention that the short film *Fer chaud* from Jacques Brissot (with images from Nicolas Shöffer) uses material from *Diamorphoses*. It was premiered on the 23th of June 1958, so before the concert premiere.

4. A “Musique expérimentale”. The musico-research goals

- As I said, during the 1950s, Schaeffer’s tried to impose the idea of “experimental musical”: a music devoted to “research”. Xenakis seems to agree partially with this idea.

- *Diamorphoses* is a very good example of what “experimental music” was in the 1950s. It is a combination of:
a) research: for instance, Xenakis writes in *Formalized Music*:

“The choice of the logarithmic scale and of the base E and 3 is made in order to establish our ideas. In any case, it corresponds to the results of research in experimental music made by the author, e.g., *Diamorphoses*”.

(Xenakis, 1992, p. 373, footnote)

b) work of art. In a small text about the work, probably intended for a concert, after a technical development, he writes:

“Pour conclure aucune explication verbale ne peut remplacer l’audition directe et la réussite d’une recherche ne pourrait jamais être garantie par des arguments aussi scientifiques soient-ils.

Le climat d’une époque et le caractère de l’auteur peuvent seuls fonder un terrain commun d’entente avec les auditeurs si ce caractère est valable, ce qui reste à démontrer”.

(Xenakis, unpublished note for *Diamorphoses*, Archives Xenakis. Dossier œuvres 3/5).

- It is why its compositional goals are *simultaneous* musical *and* theoretical.

- From the few Xenakis’ texts on *Diamorphoses* and from his sketches, we can say that there are at least four such goals:

- noise and timbre study;
- research on logarithmic perception of density;
- the relationship continuity-discontinuity;
- stochastic processes.

- In this presentation, I will develop more the first.

4.1. Noise and timbre study

- In his sketches, Xenakis writes that he wants, in *Diamorphoses*: “to mix timbres in order to arrive at a body of sound like white noise; to study the evolution of timbres, dynamics and register; to make unisons with attacks only with or without transposition: to make chromosomes of attacks”.

Xenakis quoted by Matossian, 1981, p. 137.

- *Diamorphoses'* sounds are various. In the Archives, we have an important document labelling the tapes where Xenakis put these sounds and their transformations (**figure 3**).

- 1 Ionosphère
- 2 Ionosphère
- 3 Bennes
- 4 Cloches isolées glissées
- 5 Cloche 1 450 coups + montage
- 6 Mixage avions definitive
- 7 Transpositions aigües vent
- 8 Cloches 2
- 9 Fouet
- 10 Tremblement de terre
- 11 Cloche Suisse glissée original
- 12 Cloches 3 – 4 – 5 Triangle
- 13 Cloche 5 recherche de timbre (perception distincte)
- 14 Mixage oscillations cloche 2 (~140’')
- 15 Mix. Oscillations cloche 2 ~ 140’'

16 Cloche Suisse oscill. Mix. a + b + c [Puis : Coupures avant 1ere oscill. Et les cailloux broyés]

Coupures avant 1^{ère} oscill. et les cailloux broyés

17 Cloche Suisse originale 18 petites cloches Mixages début // Voies I – II – III (concasseurs)

19 Cloche Suisse glissés graves [puis flèche qui renvoie aux Voies I – II – III de 18]

20 Eléments originaux I – II – III

21 Oscillations cloche 2 avec langueurs ex 17 [entouré] 200 cm // transpositions

22 Oscillations cloche 2 et cl.3

23 Oscillations cl.2 transpositions (originaux)

24 Avions originaux

25 Mix. avions + vent + bennes et Fouets

26 Oscill. Clo 2 non transposées et à nouveau élevé + oscill cl. suisse A [entouré] + cloche glissé (copie)

27 Cl.2 glissée isolés numérotés.

28 Oscillations numérotées avec notes solfège (12 à 16)

29 Oscillations et mixages d'oscillations

30 Oscillations solfège

31 Oscillations solfège

32 Avions filtrés

33 Vent glissé. 1er mixage vent + av + Benne, + avions mixés

34 Mix. Avions + bennes. Cloche 1 glissée et cloche 1

35 Cloche Suisse oscill. b [entouré], b [entouré], d [entouré], e [entouré]

36 Vent multiple [petite flèche circulaire : (cresc-decresc?), puis: ~1'50'' ~60'' ~35'' ~15'' ~20''

Figure 3. “Liste de bandes inventaires” (copy). Archives Xenakis, Bibliothèque Nationale de France. Dossier œuvre 14/3.

- We can globally organize *Diamorphoses'* sounds in two categories.

- First category: noises.

- Xenakis mentions:

- that he “used clearly noises : railway, ??? [unintelligible writing], plane jets, earthquakes sounds, ionosphere sounds and various bells”.

Xenakis letter to Doati (?), 17-7-1988. Archives Xenakis. Dossier œuvres 14/3.

- “J’étais très content de pouvoir utiliser, de nouveau dans *Diamorphoses*, des bruits qui n’étaient pas considérés comme musicaux et que, je crois, personne n’avait utilisés de cette façon-là avant moi. Je prenais des chocs de bennes, des choses comme ça, des tremblements de terre enregistrés vite, et puis je les mettais ensemble pour essayer de comprendre aussi bien leur nature interne, par opposition ou par similitude, et de les faire évoluer, et faire passer de l’un à l’autre. Et ça, ça ne pouvait se faire qu’en travaillant sur le tas avec le matériau même. En mettant ses mains dedans, dans ses intestins, et pas d’une manière abstraite”.

Xenakis, *in* Delalande, 1997, p. 39.

- In the sketches we find about 18 names for these sounds, names sometimes unexpected:

avions airplanes

avion à réaction jet

tonnerre thunder

chocs de benne [sometimes: *bennes à ordure*] skip/dumpster/wagon/waster disposal/garbage truck’s shocks

concasseurs crushers

cailloux pebble

explosions de bombes bomb’s explosions

perceuses drill

ionosphère ionosphere

scie saw

vent wind

tremblement de terre earthquake

meteor ???

coups de feu shots

coït coitus
 terre seule earth alone
 bruit de fond background noise
 sifflement whistle

- These sounds raise two questions and a comment:
 1. Where did Xenakis find them? Did he record them? My hypothesis is that he took them from recordings. In the Archives, we found a document, which probably refers to a tape that Xenakis listened to in the studio, giving names and appreciations for the sounds (**figure 4**).

12-3-57

Hackepill

1) Machine harmonique Telemecanique Meriville son joli
 plage 5 et 6

2) Vent dans le miroir. ← ^{incrép} son grave (tonnerre)

3) Plage 7 sucrée e tête repoussée

4) Plage 3 Dignies choes de bennes.

5) " 4 " " " (début)] ^{reverberés}

6) ~~Plage 4~~ Plage 4 Arbed ^{luxur} Concarrens (début)]

7) Plage 4 " " + cloche Concarrens fin] ^{regardé}
^{concarrens} tête repoussée ^{cartloux}

8) Air à réaction (reverberés?)

Figure 4. Xenakis' listening of a tape (?). Archives Xenakis, Bibliothèque Nationale de France. Carnet 19, p. 36.

2. Do they correspond to their name? To answer to this question:

- some do correspond. Example: the jet sounds that everybody recognizes when they enter in the beginning of the work (listen to *Diamorphoses* from the beginning to 0'25").

- some other names are probably poetical. For instance, in the same extract (beginning of the work), we have:

a) a background noise; b) three-times attacks, which could be what Xenakis calls "*tonnerre*" (thunder), or "*coups de feu*" (shots); in fact, the first is probably a "*choc de benne*" (I've compared with a tape in the audio Archives, baring that name).

3. Comment: Here we find a dissension with Schaeffer's theories. As I said before, Schaeffer developed the idea of "reduced listening": we have to try to forget the origins of the sounds, so as to listen to them as "sounds" and not as signs. This idea, applied to composition, means that the composer has to mask the origin of the sounds, by transforming them. But, very often, Xenakis doesn't care if we recognize the origin. In fact, he plays with the idea of the origin. The beginning of *Diamorphoses* is characteristic: a) the background noise could be the "earthquake" or the "wind"; b) then we have the "thunder"; c) and then the jet. This beginning is establishing a very strong poetics for the whole piece, which could be named "Dionysian" (fusion with nature) (see Solomos, 2003).

- Finally, when analysing *Diamorphoses*, it is not always possible to find these sounds because of two factors:
 - the ambiguity of their labelling;
 - the fact that there are very often mixed and transformed.

- Second category of sounds: bells (and few other percussions: triangle, splastick).

- As said Xenakis:

"Il y a des parties qui sont très construites, avec des petits glissandi de cloches. J'avais des cloches merveilleuses qui produisaient des sons très intéressants ; je les avais enregistrés et je les faisais glisser ; et puis ensuite je les mixais de manière conforme à des distributions de probabilité pour obtenir des formes de son nouvelles, et intéressantes, bien sûr. Ca, c'est surtout la deuxième partie de *Diamorphoses*".

Xenakis, *in* Delalande, 1997, p. 39.

- In the sketches, there are many calculations for the bells, for instance about their transpositions (**figure 5**).

cloche suisse ↗

densité 1) } top faible (pour sous-toléré ou)

(en 19 ou 38)

dens. 3¹ { 19 très puissant intéressant

{ 38 moins intéressant

3² } commune ↘

3³ }

3⁴ { 19 très bon comme } ↘

{ 38 " " } ↘

Figure 5. Transpositions of "cloches suisses". Archives Xenakis, Bibliothèque Nationale de France. Carnet 19, p. 78.

- Thus, from the point of view of the nature of its sounds, *Diamorphoses* is characterized by a double duality:
 - noise/sound with pitches (bells), a duality also existing in Varèse's *Déserts* and *Poème électronique*;
 - high pitched sounds (bells) / low or white noises.
- Regarding the transformations of the sounds, Xenakis used the classical transformations of *musique concrète*:
 - changing of the tape recorder speed (it changes pitch and duration);
 - reversing of the tape;
 - micro-montage and macro-montage;
 - mixage.

Two examples with the sketches: **figure 6** and **7**.

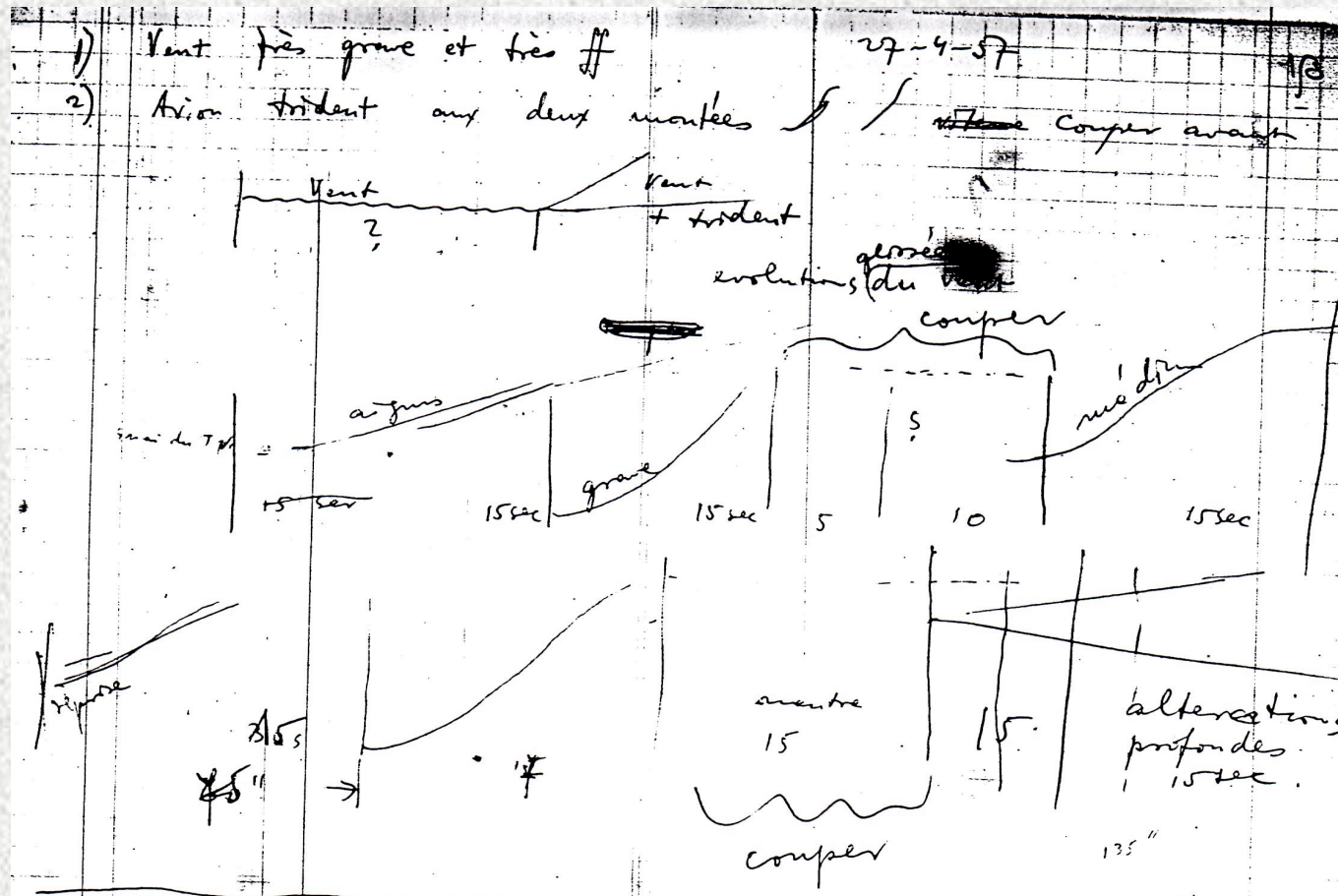


Figure 6. Operations on “vent” and “avion”. Archives Xenakis, Bibliothèque Nationale de France. Carnet 19, p. 67.

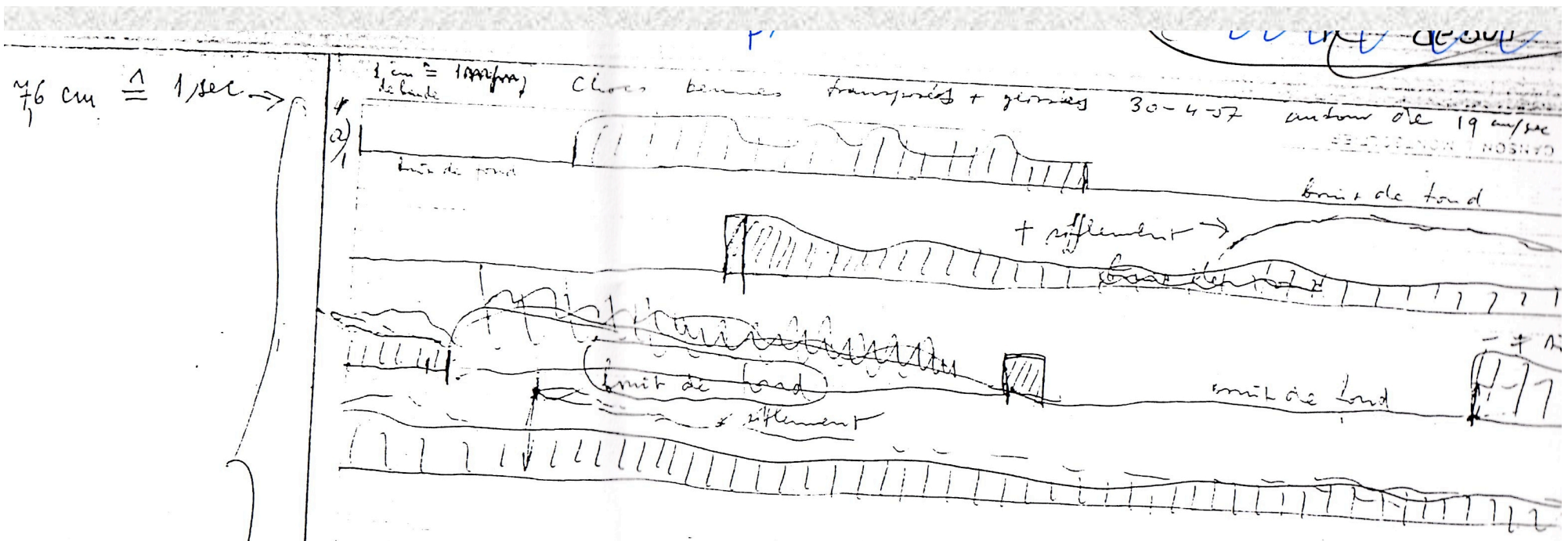


Figure 7. Montage with “chocs de benne” and “bruit de fond”. Archives Xenakis, Bibliothèque Nationale de France. Dossier œuvre 37/3, p. 3.

There are also transformations with the help of two apparatuses:

1. “Phonogene” (figure 8):

- a kind of tape player, with which we can change in real time the speed of the tape into one of the 12 preset speeds;

- Xenakis produces the bells glissandi with the phonogene (listen to *Diamorphoses* at 1’43’’).

2. “Morphophone”: a rotating disk on which was stuck a tape with its magnetic side facing outward. It produced accumulation of events through delays, filtering and feedback.



Figure 8. The phonogène. *In* Jacques Poullin, ?.

4.2. Logarithmic perception of density

- In this goal, we find the core of the idea of “experimental music” (see previous quotation).

In fact, Xenakis starts from a question, which belongs to psychoacoustic experiments, and then he turned it to become a compositional question.

- In the above-mentioned letter of 1988, he writes:

“With the bells I did a double study: a) how many short sounds can we perceive in a short delta t (up to 5, then we loose the counting ability) b) The sensation of density (numbers of sounds / sec) and the law that binds sensation and density. For b) I found the law is logarithmic with a base between 2 and 3, this is why I choose the number $e = 2,718$. A consequence of this finding was the formula (p. 136 in Formalized Music) for the ST instrumental music series [...]”

Xenakis letter to Doati (?), 17-7-1988. Archives Xenakis. Dossier œuvres 14/3.

- He was introduced to the psychoacoustic researches, very new for that time, thanks to conferences in the GRM by Abraham Moles. In his notes about these conferences, he copied the formula: see **figure 9**.

$$\begin{array}{c} \text{Intensité du son} \\ S = K \log E \\ \text{son} \quad \text{excitation} \\ (\text{phén. psychol.}) \quad (\text{phén. physique}) \end{array}$$

Figure 9. Archives Xenakis. Carnet 19, p. 29 (25-2-1957).

- In the sketches, we have a lot of calculations for the density.
- To work this kind of densification, Xenakis mixed several times the same tape, of course using temporal gaps.

4.3. Continuity-discontinuity

- In the above-mentioned note about the piece, Xenakis writes:

“Une autre recherche importante fut de créer des timbres directionnels, c’est-à-dire comportant des trames orientées à partir de sons élémentaires d’un physique tout autre. En particulier des mouvements continus de la matière sonore.

Continuité et discontinuité dans l’évolution, voilà deux aspects de l’être, en opposition ou en communion. Dans les *Diamorphoses* cette antithèse a été travaillée dans les passages de certaines sonorités à d’autres très opposées mais tout spécialement dans des organisations de variations continues des hauteurs moyennes. Statistiques dirait-on”.

Xenakis, unpublished (?) note for *Diamorphoses*. Archives Xenakis. Dossier œuvres 3/5.

- This research about this duality is very evident in the construction of the whole form of the piece. In fact, it is related to the question of “emergence” I will deal with later.
- This research explains also the “pre-granular” aspects we find already in *Diamorphoses*. Let’s quoted again his letter of 1988:

“The other fact about short sounds produced by the tiny bells, is that they gave me the idea to construct sounds and timbre from clouds of point-sounds and to formulate a kind of quantic approach of sound synthesis with the Analogiques [*sic*] A, B and Syrmos [...]. That intuitive idea was corroborated later by the Gabor quantic formulation of sound energy which in fact goes back to Einstein’s phonous (1917) = quantic jumps of energy like Plank’s formula, for the thermal of mechanical sound diffusion of energy in solids”.

Xenakis letter to Doati (?), 17-7-1988. Archives Xenakis. Dossier œuvres 14/3.

4.4. Stochastic process

- This last research and musical question is less important than the others: in fact, Xenakis used probabilities for calculating the densities and the distributions of the bells (and probably, as we saw in last quotation, also for bells’ pitches).

5. Emergence

- Now, leaving the level of the material, we have to deal with the whole form of *Diamorphoses*.
- We found here again the duality continuity/discontinuity: Xenakis used discrete elements (the sounds), but the whole form is very continuous.
- In fact, in comparison with *musique concrète* works of that time, *Diamorphoses* is totally new, thanks to its continuity: most of the repertory is made by pieces characterised by a — sometimes very tiring — montage of discrete sounds.
- To characterize the form, almost all analysts agree that there are three parts, but made with continuity.
- The three parts are clearly “visible” in the whole sonogram of the work (**figure 10**): from the beginning to 2'48, then to 4'13 and then to the end.

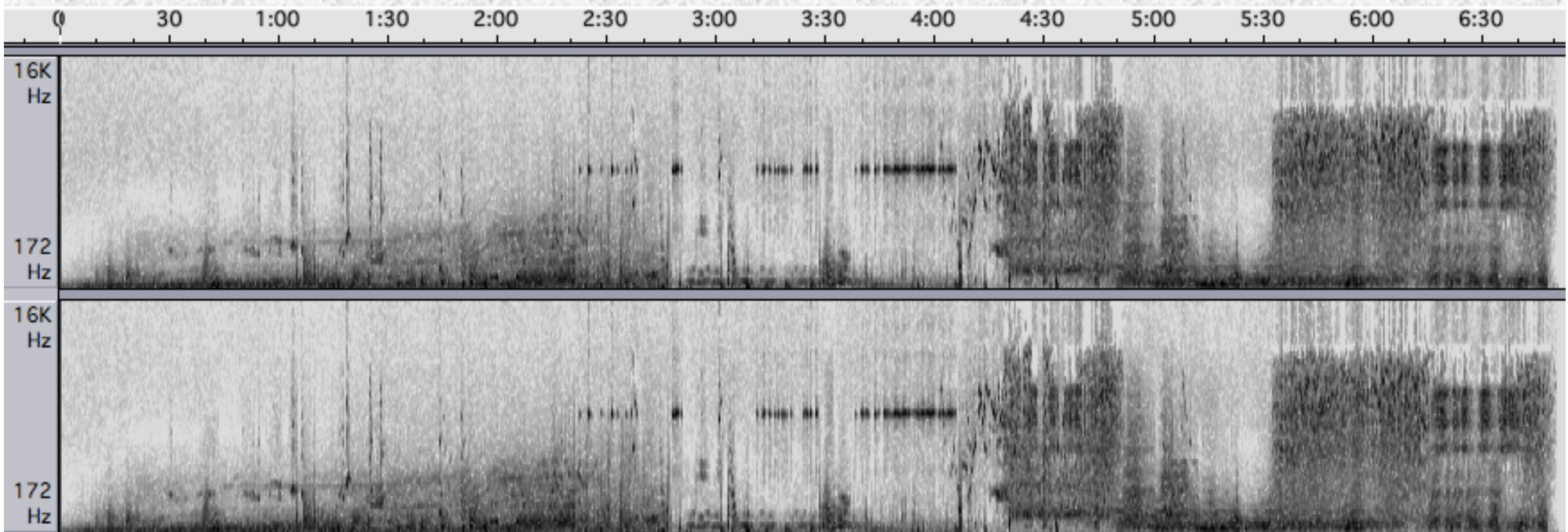


Figure 10. *Diamorphoses*: sonogram (with the software Audacity).

- What the sonogram does not show is that the transitions are very smooth and that the three parts are not “sections” (I mean with different content).
- The graphical “transcription” shows it better: see **figure 11**.



Figure 11. Graphical transcription. Solomos, 1993, p. 268.

- In the Archives, we have a very important document showing that there is a general plan for the work, a general plan characterized by progressive transformation, by a continuous processus:

“Partir d’un son fermé grave ex. vent ou avion puis des événements sourds ex. trembl. terre puis plus riches chocs de bennes etc. puis désagrégation de plus en plus rapide vers l’ionosphère extrême aigu avec ??? [unintelligible writing] des rappels des événements – états précédents”.

(Archives Xenakis. Carnet 19, p. 43).

- I spoke about continuity and process for the form, but we could even speak, if we have in mind the works which will follow (the granular works: *Concret PH* and *Analogique*) about *emergence*.

- Here is the second important dissension between IX and Schaeffer.

- In Schaeffer’s theory, the practice of *musique concrète* changed totally the musical material (the composer works now with noises), but the conception of music remains that of classical music, which is conceived as a “language”, characterized by the clearly division in two levels:

- the level of the “vocabulary” (material), which starts in classical music with the notion of note. In Schaeffer’s theory, it should be the role played by the notion of “sound object” in *musique concrète*;

- the level of combination of vocabulary with the help of a “syntax”, which is in classical music what we call “tonality”. For Schaeffer, that was of course the very difficult point, which he could never clearly develop.

For example, listen to the beginning (up to 1’00”) of the first *Étude aux objets* (1959), “Objets exposés”, by Schaeffer:

“In the first movement, *Objets exposés*, eight different sound objects form a phrase given in the first loudspeaker, to which the second loudspeaker replies with a “counter-theme”, formed also with eight sound objects. The developments are obtained by varying the theme which imposes its form on the successions and superimpositions in the different sequences of objects”.

(Pierre Schaeffer, 1960, p. 75; emphasis mine).

We notice the traditional vocabulary used by Schaeffer: phrase, theme, counter-themes...

- In *Diamorphoses*, we do not have two levels. The whole form is not conceived as the result of a combination, but as an emergence, as a qualitative transmutation.

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