

A creative mind in eruption: Xenakis composing the *Anastenaria* cycle in 1953

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Several scholars pointed already out the very quick evolution of Xenakis' style in his early works, from the folklorist tendency of his first attempts to *Dipli* and *Tripli Zyia* (1952), the *Anastenaria's* cycle and finally *Metastasis* (53-54). However documents held in Xenakis' archives at the French National Library bring new lights on Xenakis' evolution during those years and make possible to evaluate even more precisely the early building of his creative personality. On *Anastenaria* cycle whose genesis has so far remained somewhat unclear, notebooks and sketches enlighten the processes brought into play and the links with *Metastasis*, seen wrongly at the present time as the third part of the cycle. The study of these processes will make possible to understand Xenakis' evolution particularly during the year 1953 that appears as a real turning point in his artistic path.¹

Although Xenakis' early works have been already studied in details (Mâche 2000; Solomos 2001, 2003; Barthel-Calvet 2003, 2010, 2011), the connection between the *Anastenaria* cycle (composed in 1953) and *Metastasis* (1954²) remains at present still rather mysterious. Relying on the logic of *Anastenaria's* outline, Makis Solomos (2003) casted doubt on the idea - nowadays generally admitted - that *Metastasis* would be the third part of the *Anastenaria* cycle, thematically conceived as a triptych. This idea was moreover endorsed by a CD issue of 2003 presented as the "world premiere of the full cycle"³ of *Anastenaria*, recorded in Munich in December 2000. Convinced that the triptych had remained unfinished, Makis Solomos expressed the wish that "later researches would perhaps lead to certitudes" (Solomos 2003, 4). In fact, it appears that the sketches of these works allow to bring elements which support this hypothesis and to give a more accurate description of the evolution of Xenakis' production at that time.

***Anastenaria's* project**

The genuine place of *Le Sacrifice* within the *Anastenaria* cycle

According to Xenakis' explanations in his sketches, and then in the foreword of *Procession aux eaux claires*,⁴ *Anastenaria's* ceremonial - still practised nowadays - is a very ancient worship, dating back from the 4th century AD, from the time of Emperor Constantin, and remained in its primitive form until present time.⁵ Although it is a christian worship, it contains some remains of paganism, mainly dionysian cult with the dance on burning charcoals. It runs in three main stages, on three following days around the 20th of May: first, a procession to holy fountains followed by dances and sacrifices of lambs; then, on the evening of the 20th, *Anastenarides* dance barefoot on the burning charcoals of a big fire that was lighted on the church place; and on the 21st, a bull is sacrificed, in accordance with very precise rules, some of which dating back to Antiquity. From this outline, Xenakis composed two pieces *Procession aux eaux claires* and *Le Sacrifice*, which obviously correspond to the initial and final stages of the worship (cf. Solomos 2003, 4 & 13). However, many years latter, in an interview of 1989 with Bálint András Varga, Xenakis asserted: "*Metastasis* was the third piece of the triptych after *Procession aux eaux claires* and *Sacrifice*, but I separated it from them because it is so different, because I progressed so far with it"⁶ (Varga, 1996, 73).

Salabert, the editor, relied probably on the first part of this statement when publishing also in 2000 the scores of *Procession aux eau claires* and *Le Sacrifice*, described on the front page as respectively the #1 and 2: "*Anastenaria* a cycle of three pieces: #1- *La Procession aux eaux claires* (Ed. Salabert); #2 - *Le Sacrifice* (Ed. Salabert); #3 - *Metastaseis* (Ed. Boosey & Hawkes)".

Procession aux eaux claires is, without ambiguity, on the initial place in the cycle. The manuscript allows to precise its temporal situations as it is dated of "Μάρτης - Μάρς 53"

(March-May 53),⁷ anterior to *Le Sacrifice*, whose first print bears the inscription "July 28th 1953".⁸ On the other hand, concerning this latter piece, the study of the sketches refutes clearly the fact that it could be the second piece of the cycle. In fact, he refers in his sketches always to *Le Sacrifice* (at the beginning without title, then most frequently in the greek form 'H Θυσία) as the third piece of the *Anastenaria*. In the sketches block of the *Anastenaria* enclosed in the file OM 2/25 of the Xenakis Archives, he wrote on the page heading: "AN. Γ" with the date of "6.53".⁹ In his first notebook,¹⁰ more especially, he designated clearly what will become *Le Sacrifice* by the words "Anastenaria III (sériel)". Thus, under the title "Interférences", at the date of 31.8.53, he related the following anecdote, about an event which occurred during the concert Le Corbusier asked him to organize for the International Conference of Modern Architecture:¹¹

Delaunay of the French Broadcasting, started to produce for fun interferences with his own voice at a time where the loudspeakers of the roof of Marseille (on the 25th of July 1953) gave 50 periods or a sound of a siren ; these interferences were magnificent. He had fun. I did not want to have fun also, because I was very busy, but I recorded the fact. *It's possible to use the phenomenon musically and consciously in the serial of the anastenaria*. It has a tremendous dynamical and tragical effect.¹²

Three pages further, he notates a sequence of eight sounds which corresponds exactly to the "series" on which the whole *Sacrifice* is based and then, a "chart of the interferences for Anastenaria III (serial)",¹³ organized around the 8 sounds of this series (Figure 1).

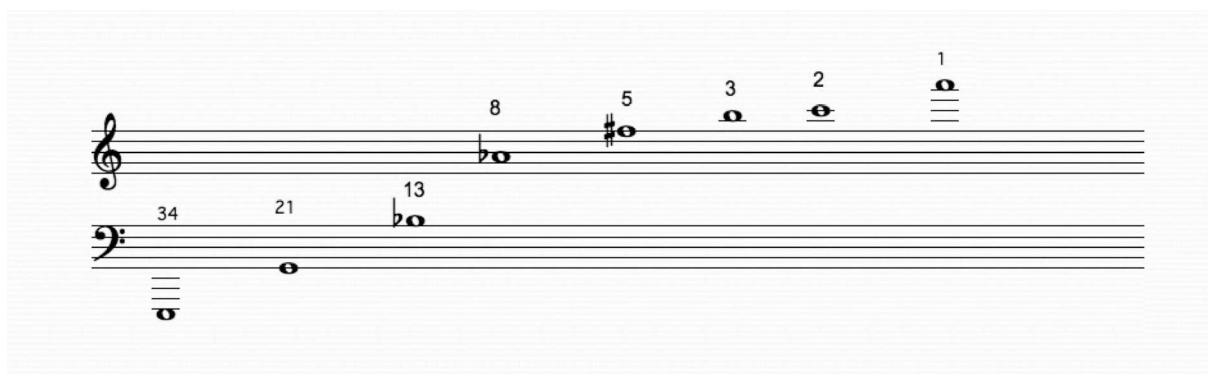


Figure 1. The eight sounds of *Le Sacrifice's* series, with their respective duration values (expressed as numbers of semiquavers).

It appears therefore clearly that, in 1953, when he composed *Le Sacrifice*, Xenakis considered this work as the *third* of the cycle, referring to the third and last part of the *Anastenaria* worship. For some reason – maybe of inspiration – he preferred to deal with this last episode, just after the first one.

The Metastasis project

At the very end of the year 1953, Xenakis started a new compositional project which will lead to *Metastasis*. The numerous notes and sketches allow us to follow step by step the long elaboration of this work which will be achieved almost one year later. They bring also very valuable information about the way this project began, and more particularly his articulation with the *Anastenaria* cycle.

The notes Xenakis took at that moment are scattered on different notebooks or sheets and have to be chronologically reordered. Notebook 13 starts at the date of 25th December 1953 with a long text in greek¹⁴ which continues on 30th December. This text is written in memory to Stamatis Katotakis, a friend of the Polytechnicum and of the Resistance;¹⁵ it is preceded, like an epigraph, by a "kleftikó" celebrating the great actions of the Independence War hero Ioannis Notaras. This text corresponds to the one of the "kathistó" (or table song) already described by François Bernard Mâche and dated in Decembre 1953 (Mâche 2000, 305 & 317).¹⁶ His datation may be precise as the text was written only at the very end of that month (between the 25th and the 30th) and as the musical composition certainly overlapped on the year 1954 and, in any case, just preceded the starting of the *Metastasis* project.

As a matter of fact, the first sheet of one of the sketches files of *Metastasis*¹⁷ brings significant details. This sheet is dated 26th December 1953 – which corresponds exactly to the moment he was writing the text in memory to Stamatis Katotakis – and brings up the scenario of a work, half graphical half verbal, topped by the following greek title: “Πυροβασία” [pyrovasia]. Litterally translated: “the walk on the fire” (βασία = the walk; πυρός = the fire), this word “pyrovasia” refers specifically, in the Anastenaria worship, to the second stage, the dance on burning charcoals. Therefore, at that moment, Xenakis considered to start composing a piece for the *second* episode of the worship, and being supposed to take place between *Procession aux eaux claire* and *Le Sacrifice*. The proposed scenario doesn’t correspond at all with *Metastasis’* one, even though this sheet belongs to *Metastasis’* sketches file (and not to *Anastenaria’s* sketches file). Under the title and the drawing, the sheet bears the following timbre indications: “extravagant timbres”, “extremists tones / very moderate / complex timbres”, “shrill, teared out”, “strident”, “heavy moderate oscillations”,¹⁸ etc. and also the following evolution plan:

Transmutations by timbres,
 “ intensity,
 “ planes (first plane
 2nd plane
 “ 3rd plane).

- 1) regular rhythm (repetition)
- 2) modulating accents (evolution) (biological growth)
- 3) birth of another rhythm a) by repetition, then b) by accents then c) by timbres
- 4) birth of a third rhythmical more complex logic.¹⁹

Some indications like (“repetition”, “birth of a rhythm”) of this scenario are akin to another one, declined in three following versions, more poetical or precise, which are notated at the end of the notebook held by Xenakis during Messiaen’s classes. They are written on the pages 161 to 163 on this notebook;²⁰ page 163 bears the date 25 December 53 – it means exactly the day where Xenakis started to write the text for Stamatis Katotakis – and we may assume that the two preceding pages on the same topic were drawn up really not long before.

On page 161, after a rather sibylline drawing, that appears difficult to bring closer to the one of the sketch sheet of Πυροβασία,²¹ Xenakis gives some indications in telegraphic style:

Chaos repeated bumps in low pitches and long sustained high notes, inverse or crossing or other combinations.

The order has to come in the big sudden silence although its origin is in the chaos (discontinuous steps).²²

This first rudimentary scenario appears on the next page (page 162) in a more detailed form, with different stages:

- I – All the cosmic richness but in a chaotic way.
 - II – Birth of the order which is very poor at the beginning,
 - III – The richness goes down, grows poorer, but the order increases at the expense of it. Decrease of rhythms and timbres and melodic complexes (?)
 - IV – Order complexity growing. Everything is arranged rhythmically, is classified, goes closer .
 - V – Explosion of order in ordered chaos.
- Increasing participation of linear sounds (curves).
 Polyrythmic structures with introduction of odd periods on even ones and combinations etc.
 Introduction of dynamic cycles.²³

At least, on page 163, at the date of 25-12-53, a third version synthesizes the poetry of the first one and structural aspect of the second:

Indefinite twinkles and αραία (harp, percussions, strings and winds) of punctual sounds representing gas molecules in interstellar space.

Chaotic and disordered illusion. (2000 meters under seas).

Static state.

- a) then a simple persistent repetition representing the birth of duration
- b) decomposition in units (submultiples)
- c) then Hindu shiftings
- d) During that time the twinkle continues ? yes but rejoins stepwise the order. All that in multiple superpositions. In the twinkle you perceive influences molecular attractions and repulsions which die out very quickly. That is moreover what creates the rhythmical repetition = symbol of the law the first law of the universe and of the music.²⁴

The general woof of this scenario doesn't make any explicit reference to the topic of the ritual of Πυροβασία but is rather organized around the idea of the "birth of order", "represented" by a regular rhythmical structure, emerging from an original chaos and going back to it (as it is explicitly indicated in the second version of this scenario). As such, this project fell through, but it has to be noticed that this scenario will reappear in some later works, like *Persephassa* for instance. Besides the recurrence of some words in these different versions (repetition of a rhythm setting up the order, then growing complexity of this rhythm which leads to chaotic explosion), notions that Xenakis will later widely develop are already occasionally mentioned. For instance, the "hindu shiftings" mentioned on page 163 recall the irregular rhythms (3+3+2) to which Xenakis referred as early as September 1951 in a text on "hindu music" (see Mâche 2009).²⁵ The "polyrhythmic structures with introduction of odd periods on even ones"²⁶ mentioned in the second version of the scenario will be brought into play in *Metastasis*, just like the "linear sounds (curves)"²⁷ with the famous glissandi.

Finally, it is only by the title "Πυροβασία" at the top of the page where this project is sketched²⁸ that this scenario may be connected to this episode of the *Anastenaria* worship, as there is neither "programmatic" element, nor thematic allusion. But that was also the case for *Le Sacrifice*, except for the contrabass glissando at the beginning where you may see the sacrificed bull's bellowing.²⁹

It is anyway of great significance that this sheet of sketches of Πυροβασία lies within *Metastasis*' file, because it brings out the linked process between both projects: Xenakis started to work on Πυροβασία, then, for some reason, gave it up (or considered it under an entirely different outline) and a new project rose – that he will later call *Metastasis*. For all that, it doesn't mean that *Metastasis* took the place of Πυροβασία in the *Anastenaria* project; such abstract piece would obviously have appeared as incongruous in this thematic context.

However, the question remains to determine when this project muted from *Pyrovasia* to *Metastasis*. Some sketches are undated and need to be cross-examined with other dated ones, according to compositional elements (like pitch organization, notes-durations organization, etc.). It appears that Xenakis gets into a really more abstract compositional project – that will become *Metastasis* – at the end of January 1954, which challenges the dates of 1953-54, so far given for the composition time of this work. At the date of 30th January 1954, in notebook 13 (notebook mostly dedicated to *Metastasis*' sketches), he notated indeed:

Unity of the system: melodic series

rhythmical corresponding series (...)

... I may have 12 different notes-durations. But 12 is too much for the unity of the work. (...) A tonal center is a center of converging intentions. I may not use it, I may also have it not all the time, I may also cloud it with the development of the serial whole but I may also use it as the head of musical ideas.³⁰

Retrospectively, we may see in the last two sentences the embryo of what will become the very original project of serial diastematic development in the last serial section of *Metastasis* (bars 202-309). The project of reducing the number of used notes-durations appears also in this text. More generally, Xenakis announced in these few notes a lot more abstract project than the preceding one, that undeniably can't anymore fit with it. It is therefore possible to give the end of January 1954 as the date where Xenakis gave up the *Pyrovasia* project as second part of the *Anastenaria* cycle, to the benefit of another work involving serial principles, a lot more abstract and, for this reason, unable, to take the place of *Pyrovasia* in the general organization of the *Anastenaria* triptych. We may assume that, at that moment, Xenakis may have not totally given up the idea he could one day complete the *Anastenaria*, but history will

take another path: *Metastasis* will be played, neither *Le Sacrifice* nor *Procession aux eaux claires*, and above all, Xenakis' compositional evolution will lead him in musical fields incompatible with an intrinsically folkloristic project.

It should be also noticed that this new work that, in January 1954, leads Xenakis in new paths which he may at that time not have suspected to be that fruitful, this new work will stay a long time without name: the title *Les Metastasis*³¹ doesn't appear in any sketches. In his 1954 diary, at the date of 19th November, he notated in Greek that he had met Theodorakis who was enthusiastic for the "Mutations orchestrales" (in French within the Greek note). But the day after, on the 20th, he notated also "Mutation", then crossed it out and wrote down the singular form Μετάσταση which is still not the definitive title.³²

In search of a xenakian serialism...

In former studies (Barthel-Calvet 2003; 2010; 2011) I already brought out the originality of Xenakis' serialism in *Metastasis* and I showed how the critique he expressed in "La Crise de la musique sérielle" (1955) is rooted in his personal experience of this musical language and its structural and esthetical consequences. It turns out that *Le Sacrifice* was already, to Xenakis' eyes, a first experiment in serialism,³³ as previously quoted sketches bring it out.³⁴ Closer to *Mode de valeurs et d'intensités* of Messiaen,³⁵ to whom *Le Sacrifice* is dedicated, the serial conception of this work reflects also concerns about sound that are only merging at that time, but will later appear as fundamentals in the xenakian aesthetics (Solomos 2003, 16-19).

Two letters to Louis Saguer,³⁶ respectively dated 9th and 12th December 1953, refer to a rather vehement discussion with Pierre Boulez to whom Xenakis had shown *Le Sacrifice*'s score. Blaming Saguer for "betrayal" by supporting Boulez's point of view, Xenakis develops an interesting argumentation:

Dear Louis, what was fundamental for me in the problem and the discussion, was musical. The discussion shifted to the question of rules because Boulez set the problem in this way and there also, I did and do not agree. "Η Θυσία" is not of the same nature than Boulez's closed system.³⁷

In this letter, Xenakis claims clearly a radically different compositional practice, that cannot be compared with Boulez's one. Sketches concerning *Le Sacrifice* which are scattered on notebooks and writings pads allow to have a better idea of this serial project and its consequences, on both theoretical and aesthetic levels.

In the big writing pad of graph paper entitled "Anast.",³⁸ Xenakis started just after the folio 7 bearing the title "AN. Γ" and the date "6.53" an analysis of the series of Schoenberg's *Variations pour orchestre* and, for this purpose, resorted to the representation of the series as "diastematic wheel" or "brush", that he will use for the last two serial sections of *Metastasis* (bars 174-202 and 202-309).³⁹ Starting from a regular distribution of the twelve chromatic semi-tones on a circle, he defines the succession of the intervals between the notes of a series by the circular functions sinus and cosinus.⁴⁰ He sums up his approach in the following terms:

1. I assume there is only twelve different sounds in the whole sound spectrum.
2. From one sound I may find the 11 others by adding together semi-tones (units) and find back at the octave [= + 12 (1/2 tons)] the initial sound.
3. I may go in the opposite direction and subtract semi-tones.
4. Image of the circular function. Period 12 sounds = 2π
5. As I am not interested in the positive or negative interval but in the sound itself, this constant is expressed by circular functions.⁴¹

At that point, he considered varying these intervals by a projection of this circle on an archimedian spiral,⁴² but he did not obtain a satisfying result.

In this circular representation, he noticed that the intervals are equivalent on both sides of the median of the circle and that they could be reduced to intervals smaller or equal to six semi-tones, depending on whether the circle is covered in positive or negative direction.

Xenakis notated this way:

$$\Delta_6 = \pm \Delta_6$$

$$\Delta_7 = - \Delta_5$$

$$\Delta_8 = - \Delta_4$$

$$\Delta_9 = - \Delta_3$$

$$\Delta_{10} = - \Delta_2$$

$$\Delta_{11} = - \Delta_1^{43}$$

As "MÉTASTASSIS-*Analyse*" written on following year shows, this equivalence of the pitch intervals on both sides of the tritone (6 semi-tones) will be definitely admitted and will belong to the theoretical substratum of the composition of *Metastasis*. The study of these ground notes of *Le Sacrifice* brings therefore out that Xenakis had already elaborated, one year earlier, fundamental elements of the serial technique brought into play in *Metastasis*. They show evidence of Xenakis' will to rationalize the musical elements (in this case, a serial structure) with mathematical tools – and this will have the developments anyone know in his later production. More particularly, in the serial context, it reveals leanings toward a geometric conception of music thinking which, paradoxically, reminds in somewhat way ideas developed a little before by Boulez in "Éventuellement..." (Boulez 2005, more particularly 268-272).

These elements appear however as non-functional in the building of *Le Sacrifice's* series. Actually, in the sketches book where the different solutions for the series of this work are notated, it appears that Xenakis' main concern is about making a serial principle consistent with a proportion system following Fibonacci's canonic series. The chronology of his researches is difficult to set up, because the only notebook to bear a date (31.5.53) is the tenth, which shows evidence of a rather advanced stage of the composition process. The two others notebooks (6 and 8), which contain sketches of *Le Sacrifice*, are certainly anterior to it because they correspond to preliminary stages of musical working out. Moreover, these notebooks bear other numbering indications which contradict the ones of the French National Library; notebook 8 bears so the indication "1952 (3)", notebook 6 "1952 (7)" and the 10th "1953". This order is confirmed by the content relative to *Le Sacrifice's* sketches as the state of the series appears as more primitive in notebook 8 than in the 6.

There are two series in the notebook 8, where the organization of pitch intervals follows the numerical structure of the Fibonacci series. In the first ascending series, intervals grow according to the Fibonacci series (C, D flat, E flat, G flat, B, G, A flat, F, D sharp); the same idea is used for the second one, which is descending (G sharp, G natural, F, D, A, C sharp, E, B flat),⁴⁴ but Xenakis retains none of them finally. In this notebook, Xenakis takes up also the idea of building the series from one note, like on page 24 of notebook 6.

Notebook 6 (which contains also sketches of *Procession aux eaux claires*) presents on page 23, a first ascending series (B flat, A flat, G, F, E flat, B, E, A) with, above each note, a numerical value taken from the canonic Fibonacci series (34, 21, 13, 8, 5, 3, 2, 1). These values may be durations, but no specific links appear clearly between both structures. On following page, Xenakis gives a descending series; each note of the latter forms with the note C an interval which composition in tones corresponds to a value taken from the Fibonacci series: 0,5 (one semitone: B-C); 1 tone (B flat-C); 2 tones (A flat-C); 3 tones (G flat-C); 5 tones (D-C); 8 tones (A flat-C); 13 (B flat-C); 21 (G flat-C).⁴⁵ Following pages present other melodic structures, and on page 29 Xenakis wrote down the solution he retained (Figure 1).

Xenakis finally renounced to organize pitches in accordance with the Fibonacci series; on the other hand, he assigned to each of them a duration value corresponding to one of the Fibonacci series, taking back for that the principle used by Messiaen in *Mode de valeurs et d'intensités*, but with a different duration values organization. He set out the succession and superimposition schema of these durations in notebook 10.⁴⁶

This project, that Xenakis designated explicitly as "serial", has in fact nothing in common with the boulezian conception of serialism, as he emphasized it in his letter to Louis Sauer. Unlike what he will later do in *Metastasis*, he did not focus here on the combinatorial potential of serial structures. On the contrary, he paid particular attention to free this series from any linked-up logic and to consider it rather for its sound resources. As he explained in a text of

notebook 12 – unfortunately undated, but referring to *Le Sacrifice* and certainly anterior to *Metastasis*:

If I consider also a fixed position of the 12 sounds as too much uninteresting, in other words, if I permute the 12 sounds (serials have already done it partially by cutting [the series in sections]), *I free even more the 12 sounds and give them a total mobility*. The only link [between them] would be then their durations and their combinations in time. And even if I make a justified or arbitrary choice within the 12 sounds, I may combine $n < 12$ sounds by recouring to the durations.

That's what I have done in *Le Sacrifice*. But there is a weakness, the arbitrary of the tones and loudnesses (?) There is no other rules than the linear ones ? (straight, reverse, etc. ?).⁴⁷

It appears that the use of interferences in *Le Sacrifice* has to be considered under this perspective of freeing of sound to take its full meaning. Going back to the anecdote Xenakis told in the summer of 1953, his following comments show what he got from this experience:

Conclusion of the experiences.

- 1) Very difficult to play exactly intervals smaller than a semitone, i.e. by starting from a note.
- 2) Very easy to play relatively intervals smaller than a semitone, i.e., starting from a played note, by tuning and counting provoked beatings.
- 3) The ear follows only the beatings !!

Colossal and very important result !

To be able to command to the calm and lifeless unison and to give it an internal life qualitatively new but so intense !!

I do not fear anymore very long duration values. By varying the beatings outline a new musical thought may appear.

4) With the interferences, I obtain the fissuring of sound, of its genuine essence, of its vibrations, its pitch (generalized use of quarter tones)

5) By varying interferences according to harmonics, the results could be unexpected ! e.g. a wind instrument in a very low register with a high-pitched string instrument or the contrary.⁴⁸

Xenakis draws then up a chart giving, for each note of *Le Sacrifice's* series, every possible interference: for the lowest ones (E and G), these interferences arise with notes a semitone apart; for the six others, with tones apart from one comma. With these interferences, Xenakis builds interesting sounds displayed on long durations. In this way, they appear as a means to get out of the pointillistic serial aesthetic of this period.

Studying the sketches of these early works allows not only to confirm the hypotheses of scholars and to invalidate definitely the nowadays' accepted description of the *Anastenaria* cycle, but also to understand and to get into the compositional process in operation. The spreading of the materials (notebooks, graphical sketches, sketches on music sheets, etc.), the development on a same paper block of researches of which some are kept and other withdrawn, the simultaneity of different projects make almost visible the feverishness and the relentlessness, the passion of the young composer. What was Xenakis doing on Christmas day 1953? He was writing a text in memory to a murdered friend and imagining the form the second part of his *Anastenaria* could have after that two of his colleagues had strongly denigrated the third one, a few weeks earlier!

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Notes

¹ A french version of this text was published under the title "L'apport historiographique d'une étude d'esquisses: une note à propos du cycle des *Anastenaria* et de *Metastasis* de Iannis Xenakis", in *Propositions pour une historiographie critique de la création musicale après 1945*, ed. Anne-Sylvie Barthel-Calvet, 147-161. Metz: CRULH, 2011.

² As we will see a little further, although the score bears the time indication of "1953-1954", the earliest sketches of this work date only from late January 1954.

³ "World Premier of the full cycle", Col Legno WWE 1CD 20086, *Anastenaria, Troorkh, Aïs*, Symphonic Orchestra of the Bavarian Radio, Charles Zacharie Bornstein (dir.), Mike Svoboda (trombone), Spyros Sakkas (baryton), Sylvio Gualda (percussion).

⁴ See also Mâche 2000.

⁵ You may find on youtube videos of *Anastenaria*'s worship: for instance <http://www.youtube.com/watch?v=LUQuiYDUHFs&feature=related> (2005) or <http://www.youtube.com/watch?v=JKT8EAP3m1Q&feature=related> (2008).

⁶ Actually, some statements made by Xenakis in these interviews with Bálint András Varga appear as either erroneous or vague. It is certainly related to the fact that these talks took place a long time after the related events.

⁷ *File O.M. 2/27*, Xenakis Archives, Bibliothèque Nationale de France, Music Department.

⁸ *File O.M. 2/28*.

⁹ *File O.M. 2/25*, f. 7.

¹⁰ In the Xenakis Archives held at the Bibliothèque Nationale de France, there are the microfilms of 40 notebooks, containing various notes, sketches, drawings, etc. The 13 first ones cover the time period 1951-1954, i.e. until *Metastasis* of which some sketches are in the thirteenth notebook.

¹¹ Xenakis refers here to a concert (among others of electronic music) that Le Corbusier has asked him to organize on the terrace-roof of the Marseille Unité d'habitation as closure event of the 9th International Congress of Modern Architecture (CIAM) (see Kanach 2006, 45).

¹² "Delaunay de la Rad. Dif. Française pour s'amuser s'est mis à un moment où les haut-parleurs du toit de Marseille (25 juillet 53) faisaient entendre les 50 périodes ou un son de sirène, à interférer avec sa propre voix et à proposer des battements d'interférence de toute beauté. Il s'amusait. J'avais pas envie de jouer ce jour-là car le travail était

encore énorme mais j'ai enregistré le fait. *On peut utiliser le phénomène musicalement et consciemment dans le sériel des anastenaria*. C'est d'un effet dynamique et tragique énorme". (*Notebook 1*, 43; emphasis mine).

¹³ "tableau des interférences pour Anastenaria III (sériel)", *ibid.*, 43.

¹⁴ *Notebook 13*, 1-3.

¹⁵ I owe my colleague Theodora Psychoyou the identification and translation of this text.

¹⁶ As Theodora Psychoyou explained to me, the "kathistó" is one of the two big categories of the demotic greek song. Xenakis refers with it to the traditional greek music, and this reference is reinforced by the "kleftikó" in memory of Notaras.

¹⁷ *File O.M. 1/4*.

¹⁸ *Id.* f. 1: "timbre extravagant", "sonorités extrémistes / très sobres / contre très brutales / criardes / timbres complexes", "criard arraché", "strident", "grave moyen oscillations".

¹⁹ *Id.*: "Transmutations par les timbres

" " l'intensité
" " les plans (premier plan
2^e "
3^e ")

1) rythme régulier (répétition)

2) accents modulants (évolution) (croissance biologique)

3) naissance d'un autre rythme a) par répétition puis b) par accents c) puis par timbres
naissance d'une troisième logique rythmique plus complexe".

²⁰ *Notebook 9*, microfilm BOB 30249, p. 161-163.

²¹ *File O.M. 1/4*, f.1.

²² *Notebook 9*, 161: "Chaos coups répétés dans graves et longs tenus dans aigus, inversement ou passage ou autres combinaisons.

L'ordre doit faire son entrée dans le grand silence subit quoique sa racine est dans le chaos (paliers discontinus)".

²³ *Id.*, 162: "I- Toute la richesse cosmique mais chaotiquement.

II- Naissance de l'ordre qui est très pauvre au début.

III- La richesse baisse, s'appauvrit, mais l'ordre augmente à ses dépens (sic.) Diminution des rythmes et timbres et des complexes mélodiques (?)

IV- Complexité de l'ordre en croissance. Tout s'ordonne rythmiquement se classe se rapproche se resserre.

V- Explosion de l'ordre en chaos ordonné.

Participation de plus en plus grande des sons linéaires (courbes).

Polyrythmies avec introduction de périodes impaires sur pairs et combinaisons etc.

Introduction des cycles dynamiques".

²⁴ "Scintillements vagues et *αραια* (harpes percussions cordes et aussi vents) de sons ponctuels représentant les molécules des gaz dans l'espace intrastellaire.

Illusion chaotique et irrégliée (sic). (2000 m sous mers)

État statique.

a) Puis une simple répétition persistante représentant la naissance de la durée

b) Décomposition en unités (sous multiples)

c) Puis les déplacements hindous

Pendant ce temps le scintillement continue ? oui mais rejoint peu à peu l'ordre. Tout ceci en superpositions multiples. Dans le scintillement on aperçoit des influences attractions ou répulsions moléculaires (sic) qui s'éteignent très vite. C'est ceci d'ailleurs qui crée la répétition rythmique = symbole d'une loi la première loi de l'univers et de la musique" (*Notebook 9*, p.163).

²⁵ *Notebook 1*, microfilm BOB 30249, 3-7; on 3: "Hindu music. the most civilized and the most perfect organization of rhythm (..) The basic time, the continuum, forms the perceptible frame. The rest is a play of antithesis, for instance, 3+2, 3+2+2, the syncopations (...) This is a matter of spirit, of mathematical order of simple numbers » and on 7 : « Organizing time mathematically means hindu rhythm".

²⁶ *Notebook 9*, 162.

²⁷ *Ibid.*

²⁸ *File O.M. 1/4*, f.1.

²⁹ See Solomos 2003, 13.

³⁰ "Unité du système: série mélodique

série rythmique correspondante (...)

... je peux avoir douze durées différentes. Mais douze c'est trop pour l'unité de l'œuvre. (...) *Un centre tonal est un centre d'intentions convergentes. Je peux ne pas l'utiliser, je peux aussi ne pas l'avoir en permanence, je peux aussi le brouiller avec le déroulement du total sériel mais je peux aussi l'employer en tant que pointe d'idées musicales*" (*Notebook 13*, microfilm 30250, 10; emphasis mine).

³¹ Title used by Xenakis at that time.

³² *Diary 1954*.

³³ Concerning this succession of eight sounds on which is the whole score of *Le Sacrifice*, François-Bernard Mâche calls it "series" (2000, 317), but Makis Solomos prefers the term "scale" (2003, 14-15).

³⁴ *Notebook 1*, microfilm BOB 30249, 43-50.

³⁵ As François-Bernard Mâche and Makis Solomos emphasized it.

³⁶ Besides Messiaen's class, Xenakis took lessons (mainly in harmony) with Louis Saguer from 1952. A first letter of January 9th 1952 makes possible to give a precise date for the beginning of this teaching: "Dear Sir, I am a greek musician. On Serge Nigg's recommendation, I beg you to accept to give me music lessons (fugue, composition, etc.). I would be very grateful if you accept...". According to Xenakis' notebooks, he worked a lot chorals harmonization. (*Notebook 3*, microfilm BOB 30249).

³⁷ Letter of 12-12-53, *Lettres de Yannis Xenakis à Louis Saguer, 9 janvier 52-59*, BnF, Music Department, NLA-253, microfilm VM BOB-31753: "Cher Louis, le fond du problème et de la discussion pour moi était musical. La discussion a

glissé sur les principes parce que Boulez a posé le problème de cette façon-là et que là aussi je n'étais et ne suis pas du même avis. « 'H Θυσία » n'est pas dans le même ordre d'idées que le système fermé de Boulez".

³⁸ *File O.M. 2/25*.

³⁹ See Xenakis' text in Barthel-Calvet 2003, 167 and *Notebook 13*, 165-169. For the use of the word "brush" ("brosse"), *File O.M. 1/4*, f. 27 v°. For the organization of this system, see Barthel-Calvet 2011.

⁴⁰ *File O.M. 2/25*, f.11 v° et 12 r°.

⁴¹ *Ibid.*, f. 12 r°: "1) J'admets qu'il n'y a que douze sons différents dans tout le spectre sonore

2) À partir d'un son je peux retrouver les 11 autres en additionnant des demi-tons (= unités) et retrouver à l'octave [= + 12 (1/2 tons)] le son initial

3) Je peux partir en sens inverse et soustraire des demi-tons.

4) Image de la fonction circulaire. Période 12 sons = 2π

5) Comme ce n'est pas l'intervalle positif ou négatif qui m'intéresse mais le son même, l'expression de cette constante se fait par les fonctions circulaires".

⁴² *Ibid.*, f. 18-22.

⁴³ *Ibid.*, f. 25 r°.

⁴⁴ *Notebook 8*, microfilm BOB 30 249, 28.

⁴⁵ *Notebook 6*, microfilm BOB 30 249, 24.

⁴⁶ *Notebook 10*, microfilms BOB 30249, 4.

⁴⁷ "Si je considère également comme trop inintéressant une fixité de position des 12 sons c'est-à-dire si je permute les 12 sons (les sérielles (sic) l'ont déjà fait en partie en tronçonnant) *je libère encore plus les 12 sons et leur permets une mobilité totale*. Le seul lien serait alors leur durée et leurs combinaisons dans le temps. Et même si je fais un choix justifié ou arbitraire dans les 12 sons je peux combiner n<12 sons en jouant avec les durées.

Dans le *Sacrifice* c'est ce que j'ai fait. Mais là il y a une faiblesse l'arbitraire des timbres et des intensités (?) Il n'y a pas d'autres lois autres que les lois linéaires ? (droit inverse, etc. ?)". (*Notebook 12*, microfilm, 30249, 40; emphasis mine). It is the continuation of a text started on page 85 of notebook 1 and entitled "Principes de synthèse".

⁴⁸ "Conclusions des expériences.

1) Très difficile à réaliser des intervalles < 1/2 ton absolument c'est-à-dire en partant d'une note.

2) Très facile à réaliser des intervalles <1/2 relativement c'est-à-dire en s'appuyant sur une note qui joue et en comptant en « s'accordant » sur elle les battements provoqués.

3) L'oreille ne suit plus que les battements !!

Résultat colossal très important!

Pouvoir commander l'unisson calme et inerte et lui donner une vie interne nouvelle qualitativement mais tellement intense !!

Je n'ai plus peur des durées très longues. En faisant varier le dessin des battements on obtient une nouvelle pensée musicale.

4) Avec les interférences j'obtiens la fissuration du son de son essence-même, ses vibrations sa hauteur (généralisation de l'emploi des 1/4 de tons)

En variant les interférences suivant les harmoniques les effets peuvent être inattendus ! p.ex. un instr. à vent dans le très grave avec un archet dans les aigus ou le contraire !!!" (*Notebook 1*, 47-48; emphasis mine).