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The Harpsichord Works of Iannis Xenakis

Ian Pace

A study of the five works of Iannis Xenakis that involve the harpsichord, exploring the processes, harmonic, textural or otherwise, by which their conceptions are realized.

KEY WORDS: pitch class sets, arborescences, random walks, non-repeating scales, pitch filters

Iannis Xenakis is one of the most successful post-war composers to demonstrate the modernist potential in the harpsichord. With the benefit of his immensely successful musical partnership with the brilliant harpsichordist Elisabeth Chojnacka, he has produced five masterly works. The intention of this article is to give an overall idea both of the nature of their construction, the means by which they make their impact and some of the ideas that either underlie or stem from the pieces. I stress here that my work here derives from listening to the music and examining the scores, as well as knowledge of other of the composer's works; I have not solicited the composer's opinions, in light of his reticence for dwelling upon past glories, so inevitably some amount of speculation is involved.

An obvious question might well be asked: what purpose *does* elucidation of the means by which a work arises serve? One answer is: as a form of demystification. If one is not to make a fetish of a musical score, then a form of compositional poetics can provide a way of 'understanding' that is in my view superior to metaphysical dwellings, treating a work as some sort of rarefied object. A crucial test for any work of music (or other art work) is: can one still appreciate and enjoy it to the same extent when the nature of its construction is made clear? I believe this to be the case with Xenakis's music.

Several common factors become apparent when examining a group of works like this. One of these is the similar nature of the large scale structures of the works, almost as if Xenakis were attempting to find an atonal equivalent of a Schenkerian model. Beyond that, the linear nature of material development seems relatively constant. In the hands of a lesser composer this could easily become banal, but the strength of Xenakis's material makes it possible for him to carry through such potentially predictable procedures. Through examining these works chronologically, one can also extract a type of 'sub-text' of Xenakis's compositional development through the period in question.

Xenakis's first work involving the harpsichord is *khoai-Xoai* (1976). This was written when the composer was making extensive use of 'arborescences', branch-like contours derived graphically and 'random walks' pitch contours which move from a starting point in a similar manner to Brownian motion. The composer wrote the following programme note:

Libitations of wine or water poured within the earth, vows to the chthonian (infernial) gods.

The sounds of the harpsichord, unlike those of the piano or organ, are short-lived, but they are more incisive. Registration provides a wide range, though going further into the bass than the piano, and a particular wealth of timbre. I have used various directions arising from former or more recent research of mine: clouds of sounds built upon scatterpatterns combined by the logic of ensembles; branch-diagrams and their transformation in the height-time plane (generalisation of linear polyphony); the

passage from order to disorder by rhythmic overlaps on two keyboards simultaneously, which is very well suited to the harpsichord...

The opening section of the work [A] (see Figure 1) would seem to make use of pitch sets. The first can be seen as consisting of two components: a large set (1) with a quasi-symmetrical construction, together with a series of Fs in five octaves (see Figure 2). The first of these is played at 4' while the second uses a combined registration of 4', 8' and 16" thus providing a layering process, as well as emphasising the Fs; indeed F acts as a tonal centre. The bottom part consists either of sustained or repeated notes with varying combinations of the five pitches. The top alternates single pitches, octaves and repeated pitches until bar 9, where Xenakis allows a pitch from the set to be played together with those pitches a semitone lower and a semitone higher, forming a three-note cluster. This is to be a key operation upon pitches in the set. Other than this form of modification, in the section from bars 1-37, there are at only two places pairs of notes played simultaneously which do not correspond at the octave: a tritone in bar 12 and a minor 6th in bar 24.

khoai - χοαί

clavecin solo

Commande de la WDR de Cologne
dédiée à Elisabeth Chojnacka

Durée: 15 min. env. $\text{♩} = 96 \text{ MM}$ i. xenakis

I - A'
II - 8' sup.
III - 8' inf.
IV - 16'

Figure 1. Iannis Xenakis, *khoai*, opening section.

In bar 15 is introduced the first of the random walks (which could also be thought of arborescences) - a continuous line of notes moving in various directions from an initial pitch, using repeated notes and small intervals, usually a semitone. A further such branch occurs in bars 31-33, and in bar 37 there is an abrupt change of texture, as six arboreal lines (some fragmented) are heard simultaneously (all at 4'). This lasts for a mere two bars, whereupon the music returns to an intensified continuation of the opening.



Figure 2. Pitch sets of *khoai*.

Prior to this, however, at bar 20, Xenakis introduces a second pitch set (2) in the bottom part, which replaces the Fs and is signalled by a change of registration to 8". A return to the Fs brings about a corresponding return of registration. In the section bars 39-73 two further pitch sets (3) & (4) are interjected. Set (3) is used with differing registrations: in bar 50 at 4", but in bar 57 at 8' + 16". The first use of set (4) initiates the first use of a lute stop; this is soon afterwards used in combination with set (3). Bar 68 sees the first use of a union of sets, namely between (3) and (4).

All of this detail may seem very technical and of purely compositional interest. However, unlike in the earlier piano work *Herma*, these sets do have noticeably distinct characteristics, of symmetry, density and intervals. While alternation and progress between sets is accentuated by changes of registration, it is perhaps not too fanciful to suppose that a listener could discern these changes by the sets' properties alone.

From bar 74, which I shall call [B], two quite different types of material are introduced, then extended. The first is an exclusive use of pitches B, C and F, repeated at the octave. These are again either single or repeated notes or octave doublings, but with changing registrations. In a seven bar sequence, they progressively increase in density. At bar 81, a more urgent pattern is heard briefly: a series of D#s in three octaves (through the use of 4" and 16'), in an almost continuous series of semiquavers. This is then interrupted by a return to the arborescences,

though here characterised by a smaller density in terms of number of voices, but also by registral changes and a new development in the lowest line, which introduces chords and larger intervallic leaps.

The rest of section [B] (up to bar 134) continues to alternate and develop these three categories of material. From bars 87-104, the B-C-F set gradually increases in density and begins to introduce the threenote cluster modification mentioned earlier. This is overlaid at several points with single arboreal figures, which vary from single notes to five pitch close-packed chords as well as 'walking', and by the D# semiquavers, on their second occasion also subject to tri-cluster modifications. In bar 105, a substantial leap is made by expanding the D#s into permutations from a hexachordal set with D# as its uppermost member. Upon subsequent entries in this section a new two-note cluster modification is used, whereby a pitch is combined with that a semitone higher. At the close of the section filters are applied at two points, allowing only 4 or 2 pitches from the hexachord, with the modifications. Throughout this section there has been much more frequent changes of registration and use of the lute stop.

Section [C] begins with the upbeat to bar 135 and presents a continuous series of semiquavers drawn from what seems to be a new pitch set (the composer marks 'C' in the score), with two interspersed branch figures in demi-semiquavers. This is interrupted by a more angular branch involving chords as well as single notes, which then alternates with a more fragmented form of the semiquavers. Most of the rest of this section is occupied by the alternation and development of this two figure types, with repeated notes increasingly encroaching on both. The semiquavers return to regularity for the most part and are used for two distinctive passages: alternating scales in contrary motion in bars 154-155 and a derivative of this with pairs of such scales in each hand in bars 173--175. Changes in pitch sets are once again amplified by changes in registration.

The rhythmic patterns of the arborescences introduce triplets and quintuplets and, from bar 176 onwards, use multiple lines, as if an infection of further branches is produced by the initial ones. They range in different directions all around the instrument in a generally disjunct fashion, until in bar 205 a continuous series of close-packed semiquaver chords literally drag the hands together over the keyboard, rather in the manner of the earlier piano piece *Evryali*. After a silence which portends for what is to come, a final outburst of multiple lines leads us to the next section (D).

The high degree of motion present in the previous section receives its counterpart in this one. In a long section (bars 222-272) the chordal figures from earlier are polarised into repeated clusters around different pitches. Branch-figures attempt to break out at various points, but are soon closeted back in again by the clusters. At bar 261 the first high point of stasis is reached, with hammering on clusters in either hand. From here to the violent conclusion Xenakis presents a battle between arborescences both in single notes and using chords, and clusters both single and repeated. The sense of polarisation is heightened by the use of long silences and the the series of clusters moving in contrary motion (bars 281-295) towards a two bar continuous repetition. The final bars (320-331) first present two adjacent clusters (E-Ab, A-C#) in 'out of phase' rhythms, then together (with changes of registration), and extracts the two top notes, with increasing silences between, before ending on a final statement of the complete cluster with full registration.

Khoai-Xoai is an exceptionally destructive (or some would say visionary?) work by the nature of its progress from differing pitch sets, via thwarted attempts to branch out, to thundering clusters. Its dialectical nature is pronounced, in comparison to *Erikthon* for piano and orchestra, from the same period, which develops arboreal figures throughout the entire duration of the work. The percussive nature of the harpsichord is used to exceptional effect in illuminating the clear rhythmic structural boundaries.

Xenakis's next work using harpsichord was *Komboï* (1981), for harpsichord and percussion. Here he makes extensive use of 'non-repeating scales', which differ from pitch sets mainly in the nature of their presentation. The composer's note here reads:

The name of this piece, *Komboï*, means "knots": knots of rhythms, timbres, structures and personalities (the performers).

Komboï continues the exploration of non-octave scales of scatter patterns, the theory of which is explained in my books 'Musique Architecture' and 'Formalised Music'. These scales are close to those of Europe and the Far East, especially Java, with the pelog, which is as it were the antipodes of the diatonic scale on the white notes of the piano. For the Rhythm, the exploration of multiple athyphereses (shifting of stress), continues after *Persephassa*, *Psappha*, and *Pleiades*, as does the exploration of temporal scatter-patterns. The antitheses or homeophanies of the timbres of the amplified harpsichord and the percussion are exploited and explored. Moreover, the introduction of ceramic vessels (flower pots) in the Percussion naturally aims to create an effect of antithetic homeophany.

The composer's score numbers by crochets rather than bars, so I will use this notation: e.g. cr. 260 refers to the 260th crotchet.

Much of this work makes use of a single scale, which is shown in Figure 3. At the opening (Figure 4), the harpsichord presents three series of ascending hexachords using notes from the scale, at full registration, then series of 1-6 chords, the last of each group being extended to the beginning of the next. The percussion, playing 2 bongos, 4 tom-toms and a bass drum, begins with continuous demisemiquavers on the highest bongo, which are developed in several ways. First they are accompanied by intermittent single blows on the other drums, which are extended to groups of two or more strikes. The top part introduces triplet demisemiquavers, then rolls. The continuity of the top part is interrupted by a different figuration in cr. 36-39, at which point the harpsichord stops playing, almost overwhelmed by the rate of change in the percussion. These procedures continue in the percussion, with the addition of triplet semiquavers from cr. 46. The harpsichord re-enters with an accelerating upwards scale of hexachords, and branches out into multiple simultaneous lines using demi-semis, triplet semis, then also 7:5 semis, 5:4 semis, which are then removed and triplet demi-semis put in their place as the patterns descend, answered by a single note on the vibraphone.

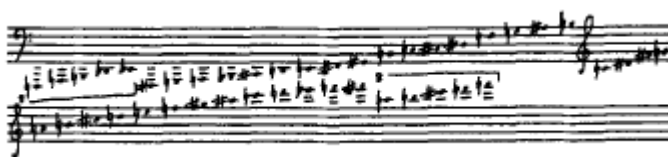


Figure 3. Fundamental scale of *Komboï*.

The image shows a complex musical score for the opening section of Iannis Xenakis's *Komboï*. It consists of ten staves. From top to bottom, the staves are labeled: 'C. FOUR' (Cello/Four), 'CLARIN.' (Clarinet), 'TRC.' (Trumpet), 'TRC.' (Trumpet), 'CLARIN.' (Clarinet), 'VIBRA' (Vibraphone), and 'CLARIN.' (Clarinet). The score is written in a dense, rhythmic style with many notes and rests. At the top, there are several lines of text in Greek and French, including the title 'ΚΟΜΒΟΪ' and the composer's name 'ΙΑΝΝΗΣ ΞΕΝΑΚΗΣ'. At the bottom left, there is a copyright notice: '© 1962 by Editions Salabert Paris'. At the bottom right, there is a small note: 'Four staves reduced'.

Figure 4. Iannis Xenakis, *Komboï*, opening section.

From cr 100, Xenakis adopts a "particle" notation (as he also does in the piano work from the same year, *Mists*). Notes do not have stems; he merely places lines where semiquaver stems would be, and places noteheads around them, which are presumably selected statistically. These are all taken from the initial scale, and begin in the middle register, working outwards in both directions. The percussion then begins its exceptionally difficult vibraphone part, which is similar to that of the harpsichord, though it comes in bursts, temporal sieves placed on a continuous series of notes. At cr. 184, the vibraphone becomes continuous and the harpsichord part is sieved. The flow of the vibraphone part then becomes interrupted by a tetrachord (A-B-D-Eb), first in quavers, then in semiquavers. The section ends with four crochets-worth of these semiquavers, joined part-way through by a similarly repeated set of ten high adjacent notes from the scale, on the harpsichord.

The following section (C), uses clear pitch sieves. Two four note ceils (F#-G-A-C#, C~A#-B-Eb) from the scale are used initially for the harpsichord and vibraphone respectively. The harpsichord first plays continuous demi-semiquaver permutations of the top two notes, punctuated by the lower note every three demi-semis, while the vibraphone plays a permutation of the four notes, either 2 or 3 demi-semis between each one. From here to cr. 312, various extensions are used. The lower note in the harpsichord is joined by a D either a major tenth or third below (a note not in the

scale, an 'impurity'), or doubled at the octave. The vibraphone similarly adds accentuated Gs in two octaves. The periodicity of the lower note of the harpsichord cell becomes fractured, and the vibraphone part moves at times into continuous demi-semis, with regular semis in the harpsichord LH. At cr. 313 begins the first proper break with the scale, as the harpsichord plays a random walk, in up to seven parts, while the vibraphone continues its progress from before. At cr. 319 the harpsichord and vibraphone swap their pitch cells, and rhythmic 'impurities' are soon added: dotted semis, semis in 7:5, 5:4, 5:7 and further. With each instrument moving down-up-down-up the registers (though remaining within the scale), they finally come to a halt under the strain of a plethora of different rhythms and extreme density (at this point the vibraphone part verges on the unplayable!).

Section (D) (cr. 376) again uses pitch cells in both parts, derived from the scale. The cell in the harpsichord has a further impurity in the use of G'. The methods of pitch/temporal development used are similar to those of the previous section, with the use of a random walk exclusively drawn from the scale (cr. 446--452). The percussionist moves to woodblocks, soon afterwards joined by various drums, and their part moves towards regular beats, first in semis, then triplets, at which point the harpsichord moves to the 'particle' notation mentioned earlier, which contrasts with the regularity of the percussion. The harpsichord then begins another walk, using notes from the scale, generally moving in contrary motion away from and back to the middle register.

Section (E) (cr. 544--648) uses two pentachords for the harpsichord alone. There is less obvious sense of linear development, here except for the increasing punctuation by one of both of the pentachords, with different registrations, and the introduction of semiquaver triplets towards the end. The effect is of an extraordinary intensity, and prefigures procedures in *À l'Île de Gorée* (see below).

Section (F) moves through all the previous types of procedures towards re-introduction of the sort of chordal writing from the beginning. These chords are themselves 'sieved', so that different quantities are used in different regions, and have moved on from the beginning through the use of rhythmic disjunction between the two hands. The percussion for the first time uses the 'particle' notation. A set of repeated chords (cr. 817-827), *rallentando*, and with progressive couplings, leads to the final section (G).

From a sieved introduction, the percussion grows into a continuous pattern of mostly semiquavers and demi-semis to the end. The harpsichord continues with chords, some repeated, first in continuous rhythms, then 'particle' notation, towards contrasting rhythmic disjunction/synchronisation, before ending on the chords which opened this section.

For all the seemingly sectional nature of this work, it really does impress one as a unified and coherent conception. Each section seems either to grow out of the previous one, or come about as a moment of relief from a procedure stretched almost to breaking point. Beyond this, the use of the same scale, or filters thereof, provides a very marked harmonic consistency. The one exception to this rule (cr 313-319) is all the more sharply contrasted as a result.

If however, this work is at least particular in its unrelenting, possibly overall unidirectional nature, Xenakis's following solo work, *Naama* (1984) provides quite a contrast. The note reads:

Here the harpsichord is treated simultaneously under its percussive, harmonic and melodic aspects. Among other things, use is made of periodic constructions, thanks to a group of transformations (exahedric group) and to stochastic distributions. There is a flux of (foreseeable) regularities, sometimes on several planes simultaneously, which demands on the part of the soloist a mastery of architecture, of specifically harpsichord technique and exemplary determination.

In this work Xenakis uses registration to differentiate simultaneous lines of material, and for much of the piece the hands are firmly separated with respect to manuals. Repeated chords, which do also feature in some of the piano music but are much more practical to play on the harpsichord, feature prominently.

Again Xenakis makes use of filtering procedures upon a large nonrepeating scale, but where *Komboï* seems to add layer upon layer of increasing intensity, *Naama* makes extensive use of contrasts between consonance/dissonance, rhythmic regularity/irregularity. It should be clear at this stage how Xenakis's transformational procedures operate, so I will not elaborate on these in such detail here.

The work opens with series of hexachords, similar to the harpsichord part at the opening of *Komboï*, contrasting in particular motion and repetition (see Figure 5). This is followed by the first instance of a type of passage with a distinctive set of pitches, only using regular subdivisions of the beat, which is so insistent as to have the nature of a refrain. The overall 'tonality' might seem of an 'E minor' variety, supplemented by augmented harmonies. Between such 'refrains' are placed three 'verses': a quasi-melodic line accompanied by chords, leading to more repeated chords, a rather more manic section in which both hands gradually envelop the whole range with chords in increasingly irrational rhythms, eventually using the 'particle' notation, and a pair of lines in 'out-of-phase' rhythms, accompanied by chords.

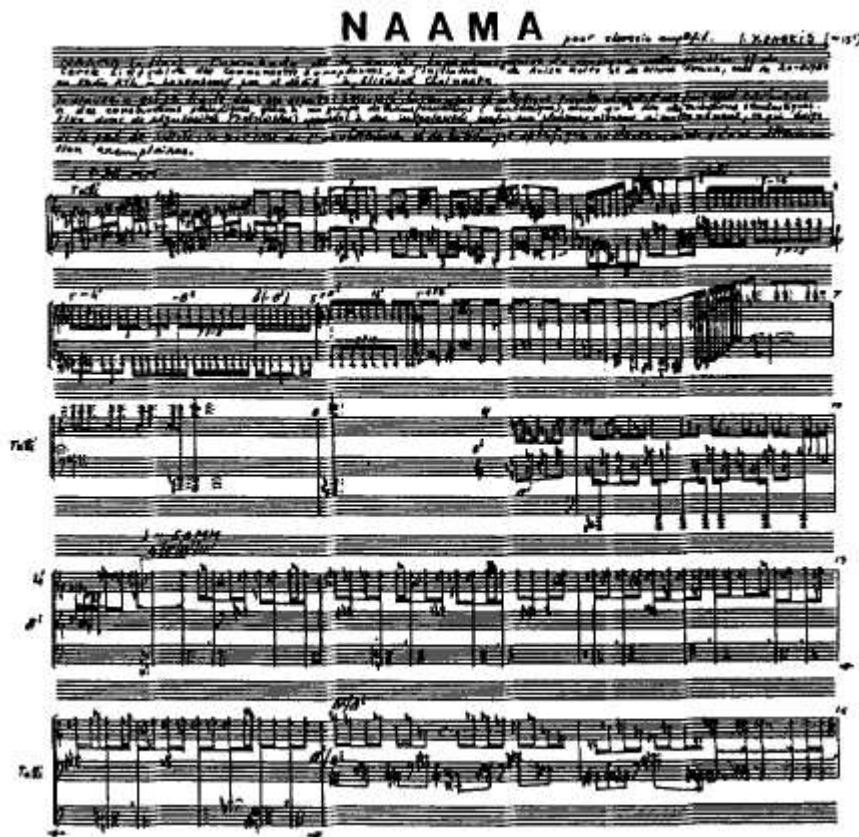


Figure 5. Iannis Xenakis, *Naama*, opening section.

After the refrain is brought to a halt at bar 65, a continuation of the second 'verse' is followed by a dispersion into seemingly independent notes and chords. From this grows a rather sad line, using a different filter in which both perfect fourths and tritones stand out. After irregular chords accompanying, and threatening to usurp, this line, it reduces to a five note (B-C-D-E-F) cluster (Figure 6), as Xenakis used on a smaller scale in the ensemble work *Palimpsest* (1978). This is repeated at high velocity in the top line, and provides a wall for the irregularities, both harmonically and rhythmically, of the subsequent series of chords, to 'bounce off'. The registration at this point is extremely unusual and sophisticated: the 4' and 8' superieur are played with one hand, keeping the 4' on all the time, and adding the 8' pedal when required, and the 16' and 8' inferieur are played with the other hand, the 16' strings being engaged using the pedal when the small square sign is used, the resulting effect sounding like a 'meta-harpsichord'! As this 'wall' threatens to fracture under the strain it is put, Xenakis suddenly cuts off the clusters, and alternates a few of the chords in an almost elephantine manner, then coming to rest on a decelerating repetition (bars 109-114).

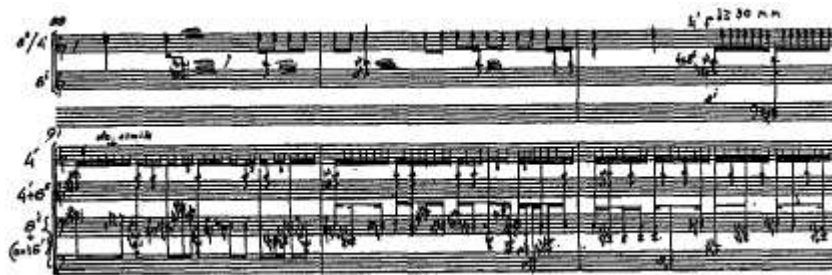


Figure 6. Iannis Xenakis, *Naama*, bars 88-93.

The melodic line that emerges from these ruins is drawn from a filtering process that very definitely suggests D major, if tempered by lower notes. The filtering process is then refined further to the high register, using almost only pitches D-F#-G-A-C#. Interpretable either as a symbol of humanity in a world of barbarism, or an allegory of the relationship between the individual and the masses, this makes the descent through multiple scales of chords, into the long closing section, which combines the characteristics of the refrain and the 'cluster-wall' sections from earlier, all the more marked.

Through its dialectical nature, particularly in the harmonic sphere (one might argue that pitch is still the most potent parameter that a composer can use) one might claim that this work could be said to inhabit a wider emotional range than *Komboi*. Yet perhaps in an age where (for example) many find it possible to appreciate the music of such different composers as Brian Ferneyhough and Morton Feldman in equal measure, one need not make preferences between that which contrasts musical objects and their natures, and that which focusses in on a singular phenomenon. It would be rash, of course, to suggest that *Komboi* falls into this latter category; this opposition merely provides a concrete paradigm to examine the nature of the two works' differences.

Nonetheless, Xenakis's subsequent work, *A l'Île de Gorde* (1986), for harpsichord and ensemble, possibly the most powerful work of all using the instrument, very definitely builds on the achievements of *Naama*. The charged nature of this work is implied by the composer's note:

The Isle of Gorée, off the coast of Dakar, in Senegal, was once a world slave market ...

This piece is a tribute to the black Africans who, torn by force from their homes on the way to appalling slavery, yet managed to win, in certain civilised countries to which they were transported, positions of the first rank. It is also a tribute to the heroes and black victims of apartheid in South Africa, last bastion of hysterical racism.

The large-scale structure of the piece is both determined and made evident through statistical harmonic predominance (see Figure 7, which centres on the harpsichord pitches, those being the most obvious). Sections differ in the manner in which this is actualised: in some the harmonies are dissolved and overtaken by the whole scale, in others the predominant harmonies are re-iterated with increasing intensity.

Figure 7. Overall harmonic progress of *A l'île de Gorée*.

The opening harmony is almost a combination of D major and G minor, demonstrating the conflict of opposing forces which is fundamental to the piece, and which has an obvious societal parallel. After the exposition of this, the harpsichord begins a solo as if in D, but immediately loses this sense of tonality within a rapid series of chords, then scales. In a similar manner, the opening of the following section (C) would seem to suggest the key of E in the trumpet, yet it is immediately tempered by the harpsichord and bassoon, then other instruments. An anguished cry from the woodwind leads to the key dichotomy of the work (Figure 8). For a long stretch, the harpsichord alternates a pair of strident chords in the bass (the first two in (C) (b) shown in Figure 7), always in regular semiquavers. Alternating with this are more varied rhythms, using the other two chords listed, and very occasionally other pitches. After a second cry from the woodwind, the ensemble, splitting into groups, develops other types of material. The brass simultaneously develop their own line using regular semi- and demi-semiquavers, though without regular recurrence of a fixed number of either, while the woodwind and strings provide an eerie backdrop through highly dissonant double stops and multiphonics. From bar 42 the conflict is amplified as the ensemble double first the pair of chords, then the alternating rhythms. After a descending tremolo scale, that fails to wipe out what has come before, Xenakis introduces passages in the ensemble which reflect the disjunction that has been achieved between the the two voices of second set of (C)(b) chords, but using different pitches, then abruptly changes to (C)(c); the removal of octave doubling at this point serves to increase the tension. Mass pitch and/or rhythmic unity and disjunction, complete separation between harpsichord and ensemble, the abandonment

of stems in favour of the 'particle' notation finally usurp the two chord cell, leading to a sudden shift into section (D).

Figure 8. Iannis Xenakis, *A l'Île de Gorée*, bars 30-35.

It is probably unduly naive to suggest programmatic connotations in this work, but the various polarities, in particular that between the incessant pair of chords and more varied types of writing, might be said to represent the dichotomy between authority and individual freedom. On the other hand, one might equally well think of it in terms of the strength of the mass against the embattled few. Different listeners (and those who positivise either fragmentation or mass solidarity) will draw their own responses; what is undeniable is the dialectic.

In section (D), the third and fourth chords from (C)(b) continue to play an important part in the following section, which proceeds in a more linear fashion, using the whole ensemble most of the time. Section (E) transfers the intervallic balance between the hands and leads to a type of climax through wild overlapping scales spreading out amongst the whole ensemble. The harpsichord is out on a limb in section (b0), dementedly returning to the same chord as it is increasingly surrounded by woodwind multiphonics and string glissandos.

The return of the opening harmonies in section (G) is here more focused and direct than previously, both through a greater degree of rhythmic unison and the removal of the 'partial' extreme upper and lower pitches. A sudden shift to a repeated cluster-like chord leads to section (H) in which each group within the ensemble uses its own harmonic filter so as to remove any sense of consonance. The rhythms doggedly emphasise the semiquaver beat, and a long *rallentando* brings the ensemble grinding to a halt.

The final harpsichord solo is purposely ambiguous in nature, alternating the harmonies of (G) with fragments of more diffuse material from earlier, and ending on a very indecisive chord. Such a non-closure of this musical narrative, however, reflects humility on the part of the composer, in not wishing to make an absolutely unequivocal statement, and also the corresponding non-closure of the historical continuum. *A l'Île de Gorée* is an intensely emotional work, but which appeals both to the heart and the mind, the authenticity of either form of reaction being strengthened by its interdependence with the other.

The more recent work *Oophaa* (1989) for harpsichord and percussion is of a noticeably more sedate nature than the earlier pieces, through the use of pots as well as drums (often played with the hands) by the percussion, the generally slow tempos, and the wider intervallic content of the harpsichord part. The structural processes are similar to those in *Komboi* and *Naama*, so I need not elaborate in detail here. What seems of most importance is the manner in which the wide trichords are replaced by denser tetrachords from bar 51 onwards, from which are extracted quasi-triadic bars of trichords similar to those in *Komboi*. It is almost as if Xenakis is standing back and casting a critical eye over some of his previous music, attempting to put it into perspective after time has elapsed.

From the composer of *Metastasis and Eonta*, it is remarkable how in all of these works, Xenakis returns with a vengeance to the use of a 'beat'. The crispness of attack of the harpsichord (as well as many percussion instruments) is particularly well suited to this style of musical rhetoric. Xenakis shows immense sympathy and understanding of the harpsichord as an instrument, avoiding the unfortunate syndrome of quasi-pianistic writing that infects some modern compositions for the medium.

That said, harpsichords of the type that Chojnacka played and Xenakis composed for (albeit amplified), are deeply unfashionable in an age where historically authentic instruments are a serious concern. The instrument for which Falla, Poulenc, Carter, Xenakis and many others up until about the 1980's is in every sense a 20th century instrument, and its repertoire is a relatively small sub-genre, requiring types of technique and approach quite distinct from earlier harpsichord music.

But such an instrument and such approaches are undoubtedly 'authentic', for all that term entails. If the instrument and its manufacture fall into neglect, as seems to be the current tendenc~ it is likely that future generations will have a skewered view of the repertoire (and harpsichordists who perform contemporary music are still very few in number, decreasing the likelihood of continuity of performing 'traditions'), just as was the case for a long time with the fortepiano music of the Classical period (and still remains the case with most 19th Century piano music). Xenakis's harpsichord works are one of the most persuasive cases that can be made for the continued manufacture and appreciation of the 20th Century instrument.