

Layers of Illusions: John Rea's *Hommage à Vasarely* Degrés d'illusions : Hommage à *Vasarely* de John Rea

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Article abstract

Can lines be heard? Curves? Trajectories? Shapes? These are the questions Canadian composer John Rea asks us in his *Hommage à Vasarely* (1976), inspired by the work of the Op-Art painter Victor Vasarely. Rea's work attempts to transfer into sound the 'optical kinetic' illusions of movement, bending, and twisting that Vasarely projected onto two dimensions. The lines, shapes, and patterns embedded in the music are best illustrated through score excerpts, pitch-reduction examples and charts schematically displaying the use of the orchestra. Through an understanding of how Rea transfers these geometric patterns and motions into sound, a deeper appreciation of the work, and of the composer, is gained.

Layers of Illusions: John Rea's *Hommage à Vasarely*

James Galaty

Can you hear lines? Curves? Trajectories? Shapes?

Conversely, do sounds have visual equivalents, or, if that is too precise, can they suggest visual representations?

These are the questions Canadian composer John Rea asks us in one of his early works, the programmatically-entitled *Hommage à Vasarely*, composed in 1976, and inspired by the work of the Op-Art painter Victor Vasarely (1908-1997)¹.

Vasarely's paintings ask similar questions. Can a painting move? Can a painting be two different images depending on the position of the viewer? Can a painting seem to swell and warp as you look at it? Can a three-dimensional object have multiple points of perspective? A main figure of the 'Optical Art' movement that gained currency in the 1960s, Vasarely questions his audience by exploiting the illusions or optical effects of perceptual processes: the after-image and consecutive movement; line interference; the effect of dazzle; ambiguous figures and reversible perspective; successive color contrasts and chromatic vibration; and in three-dimensional works, different viewpoints and the superposition of elements in space (Popper, 2006).

Rea asks his questions by building his *Hommage* with Vasarely's own materials: "I tried to be inspired by the lines and networks, grids, superimpositions and transparencies, even the optical-kinetic illusions" (Rea, 2005). Rea does not *literally* use Vasarely's materials, as he could have by creating a graphic score with Vasarely-like shapes. Instead, Rea's *Hommage à Vasarely* transfers the

1. *Hommage à Vasarely* has only received a handful of performances. There is no commercially available recording. The score is not published, but is available at the Canadian Music Centre.

idea of Vasarely's illusions into the world of sound by creating musical analogues of Vasarely's visual language.

In this way, *Hommage à Vasarely* is programme music in a special sense of that term. Rather than containing an extra-musical narrative, what is novel in Rea's work is the exclusive focus on the idea, rather than that which the idea represents. *Hommage* doesn't represent Vasarely's paintings, but rather the ideas that underlie the painter's œuvre. This is a fitting way to pay tribute to the Hungarian-born painter, whose paintings are themselves non-representational.

Op-Art's visual playfulness negates the traditional role of art — as a vehicle for representation and expression — in order to focus entirely on its novel perceptual effects. Nonetheless, the subverted hierarchy in Op-Art follows from existing traditions:

Op-Art can be traced from both the art-historical tradition and from popular art, in particular from ornament, *trompe l'œil* and anamorphosis. The antecedents of Op-Art in terms of graphic effects and colored interaction may be found in the works of the Post-Impressionists, Futurists, Constructivists, Dadaists and above all in the artistic and didactic statements of the masters of the Bauhaus (Vasily Kandinsky, Paul Klee and László Moholy-Nagy). (Popper, 2006)

Collectively, these movements stem from a shift in 20th Century art away from representation towards geometric abstraction. The tools of a painter — strokes, lines, shapes, and geometries — become the subject matter of the painting, rather than a mere means of communication. The artist has neither the expressive aims of the Romantic, nor the merely decorative ones of the graphic designer — even if Vasarely worked as a graphic designer for an advertising agency. The aim is a marriage between form and function, and to stimulate its audience's perceptive assumptions through *trompe l'œil*.

What interested Rea in Vasarely's works was not so much the optical illusion itself, but the strength of the idea behind that illusion. This 'meta' approach to composition is explicitly indebted to another of Rea's influences, Iannis Xenakis, who worked at materializing "movements of thought through sounds, [...] to test them in compositions" (Xenakis, 1922, ix). As Rea writes:

At that time, I was very much interested in the concert music of composer Iannis Xenakis, whose inspiration for his new compositions came from the field of architecture and from the designs of new buildings, his own, for he himself was a professional architect. Indeed, he seemed able to compose music as if he were designing it, with lines and trajectories. And, his musical 'buildings' could... well, they could fly through the air so to speak. (Rea, 2006)

Indeed, the driving force behind Xenakis' work was the investigation of 'alloys', i.e., alliances or means of communication between different artistic

and scientific fields, of which one result was a hyperbolic structure that led both to his musical work *Metastasis* and an architectural work, the Phillips Pavilion, constructed for the 1958 Brussels International Fair (Xenakis, 1979, p. 12). Vasarely was also interested in crossing artistic boundaries and cross-disciplinary alliances: he believed that his research could provide design prototypes for architectural and urban schemes, which led to one project at the Gare Montparnasse in Paris, where he painted a large set of murals in the main hall (Bann, 2006).

John Rea is a composer of ideas, an artist who locates himself somewhere *behind* his music. He describes the work of the Romantic artist as “holding up a mirror,” a sort of art that is based on narcissistic auto-biographicalism.² Rea has consciously chosen a different path in his work. Instead, he turns his attention outward, creating music that becomes a sort of laboratory in which ideas and influences are cross-fertilized to produce new musical hybrids. The two main threads in his music, although quite different, both reflect Rea’s desire to avoid the Romantic mirror: 1) ‘musical’ geometry, in which musical parameters like harmony, rhythm or timbre, are themselves the subject of the music, ‘processed’ in different manners (as in *Hommage à Vasarely* or *Treppenmusik* (1982), inspired by the drawings of M.C. Escher³); 2) ‘narratological’, where a human element is the guiding force, be it found in an actual program, or in a sort of theatricality of the music (*Las Meninas*, inspired by the work by the Spanish 19th century painter Velasquez) (Steenhuisen, 2004, p. 5). In either compositional role, Rea is dealing in ideas and the movements of thought:

A project to me is really a projection, and here I’m being a musical psychologist. I would say that whether artists know it or not, they’re always projecting something. I’m very conscious of the fact that I throw [something] against the screen, shall we say. I’m a projector and I throw against the screen, your ears, sound images. (Rea in Steenhuisen, 2004, p. 4)

Although Rea is conscious of what he “throws against the screen”, the listener may be less so. Undoubtedly, the magic in our experience lies in not ever quite being able to see behind the image on the ‘screen’, while possibly learning to see those images more clearly through a knowledge of what’s behind them. Certainly, with an illusionist like John Rea, there is more than meets the eyes, and ears...

After Rea’s first encounter with Xenakis’ music, a very specific seed grew in his head: the idea of a musical ‘grid’. In some of the works of Xenakis, a dense musical ‘grid’ is employed, consisting of tightly packed clusters. Instead of using Xenakis’ grid, Rea zoomed in on the grid, so that instead of seeing the entire picture we see the ‘pixels’ of the grid: instead of a cluster of tightly packed

2. Conversation with composer, 2006.

3. [Ed. note] Cf. an analysis of *Treppenmusik*: “Le charme étrange des espaces familiers. Périple analytique dans «Treppenmusik» de John Rea”, *Circuit*, vol. XI, no. 1, pp. 9-32.

minor seconds that blend together, we hear a widely-spaced chord of stacked fifths (*ibid.*). This grid is a literal link between the three players: Rea uses it to recreate — in sound — the illusions of Vasarely's own (visual) grids. But Rea uses more than the grid in his *Hommage*.

Hommage à Vasarely, on all its micro and macro levels, is constructed according to parameters and principles derived from Vasarely's work. The pitch-space, the melodic motives, the rhythmic and proportional relations, as well as the orchestration, are based on a principle common to geometry, architecture and music: *symmetry*. Even the form of the work, which is also symmetrical, follows a sort of narrative of the painter's process...

First, the 'canvas' is established, i.e., he defines the 'grid' upon which the figures will dance, and the 'palette' is filled with colors. The 'canvas', or aural equivalent of what in a painting dictates the boundaries of the work, is established by the two pitches set at the extremes of the piece's registration. The lines of the 'grid' are the poles, pitches that are fixed in the acoustic space between the extremes of the 'canvas' creating the '*Hommage* chord'. The colors of the 'palette' are the different timbral shades applied to the aforementioned poles through the use of different instrumental timbres.

At this point, as we said, the figures are allowed to dance. Lines, trajectories, shapes, and even words (!) are painted across the orchestral canvas. The five sections of the piece "explores the sonic possibilities and spatial properties" of the orchestra, inspired by Vasarely's "lines and networks, grids, superimpositions and transparencies, [and] optical-kinetic illusions (illusions of movement, stretching, bending and twisting on a two-dimensional surface)" (Rea, 2006). It is not without similarities to the 'Connect-the-Dots' books which children draw in: the figures are imagined by the listeners, drawn as it were psychoacoustically between the moving pitches, and choreographed across the stage as the musicians pass the acoustical ball back and forth.

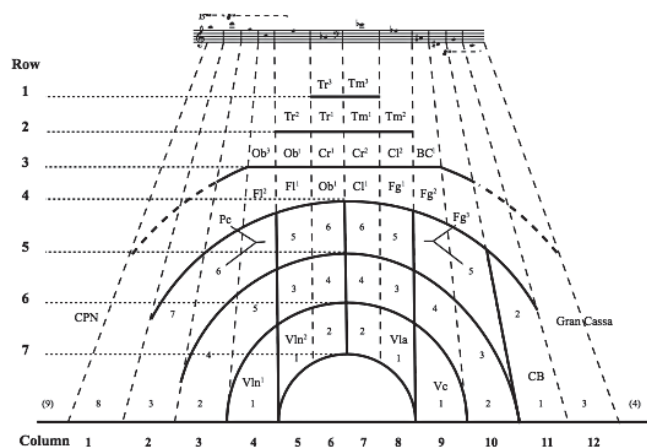
But in the conductor's score, you can actually 'connect-the-dots', which is the task which the following analysis sets out to accomplish.

Analysis

Acoustic Space

- Instruments are grouped unconventionally in twelve columns across the stage. Each column is fixed to a specific pitch and register in the chord, all spaced at the interval of a perfect fifth from its neighbor. The total pitch pool therefore includes all twelve tempered-pitches of an octave, while the total range of six and a half octaves precludes the possibility of dodecaphonism.

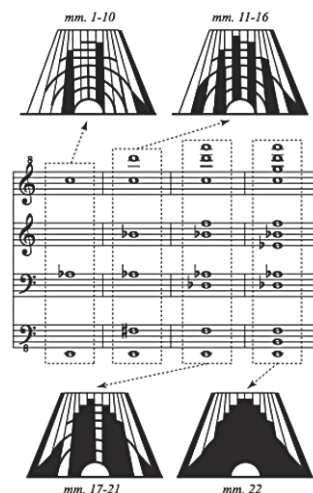
FIGURE 1. Arrangement of pitch and orchestral space in *Hommage à Vasarely* (sketch by John Rea)



- The instruments are distributed in rows (the front four rows curve inwards) in such a way that, moving from the front to the back of the stage, timbre changes but pitch remains the same along the row.
- An interesting perceptual phenomenon occurs with the *Hommage* chord: although every pitch in the chord is separated by the same interval (perfect fifth), a psychoacoustic phenomenon known as the ‘equal loudness contour’ distorts the perception of this interval. The equal loudness contour, a measure of sound pressure over the frequency spectrum, reveals that the ear is most sensitive to sounds between 1 and 5 KHz (approximately the top 1/3 of the keys of a piano), while less sensitive to pitches outside of this range. Consequently, the intervals at the bottom and the top of the *Hommage* chord are not perceived as distinctly as those in the middle. This creates a distortion effect not unlike the warped perspectives which Vasarely creates at the edges of some of his paintings, in which the middle of canvas seems to be stretched and the periphery compressed.

The novel acoustic space of *Hommage* is slowly activated through the beginning of the first section (mm. 1-32). Figure 2 shows a pitch reduction of the orchestra, with accompanying charts in which darkened physical spaces in the orchestra correspond imply that the musicians seated in that area play at that given moment. These charts help to illustrate one of the methods in which Vasarely-like geometries are embedded in the fabric of the piece. In fact, this orchestral chart resembles some of Vasarely’s early works, from his so-called ‘black and white’ phase. The columns that ‘light up’ at the extreme left and right of the chart are the frames of the acoustic space, the low E of the double

FIGURE 2. Configuration of acoustic space of the first 22 measures



bass at the far right and the high A of the violin at the far left. The frame of this canvas is then held for the rest of the work.

The *Hommage* chord, that pervades the entire piece, is first heard in its entirety in measure twenty-two. The *Hommage* chord provides the structural ‘poles’ or pitches. The term ‘poles’ invites a comparison between the visual and musical: in painting one frequently draws out a grid which provides a reference for using perspective, each individual line being one of the ‘poles’.

The rest of Section I (mm. 1-72) establishes how sound can be ‘painted’ through the acoustic space (figure 3 to 5).

The deployment of the *Hommage* chord in the space delineated by the Cartesian axes of pitch and timbre as illustrated in the above examples, has profound implications on the piece’s orchestration. The same reasoning is extended to the more complex sections of the piece, with remarkably original results, as is described in what follows.

FIGURE 3. Movement along the Y-axis (i.e., color/timbre, but not pitch) at m. 37

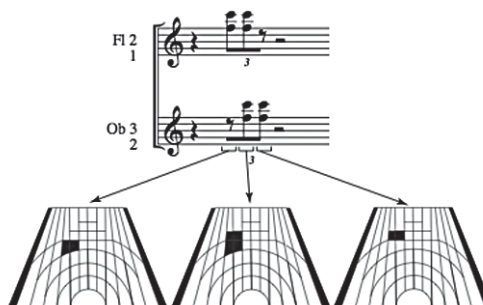
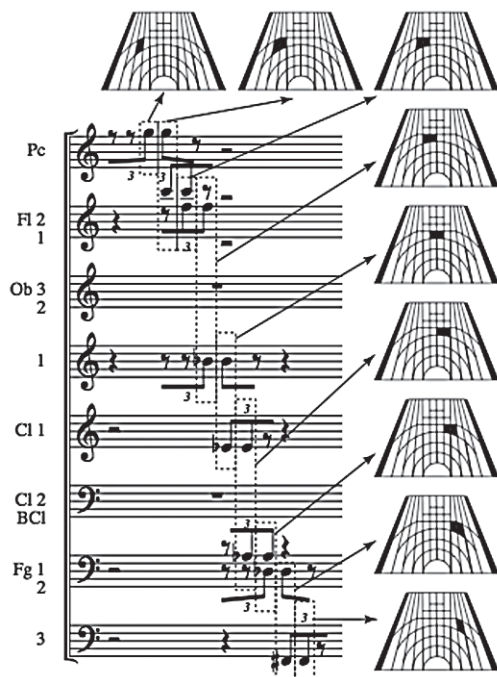


FIGURE 4. Movement along the X-axis — change in space (i.e., pitch) at m. 63



Musical Lines — Set in Motion

A given geometrical structure delineates negative and positive space, as defined by the intersection of its constituent lines. A line segment has a beginning and an end, and a finite length. It also has a certain thickness, and possibly even a certain texture. If the segment intersects with another one, the two lines define an angle. Each of these phenomena can be related to a musical equivalent:

- Starting and ending pitches correspond to the segment's extremities
- Scales can create a sort of 'thickness' or 'texture'
- Gestures and motives give shape to the line

In Section II (mm. 72-121), lines begin to be drawn across the orchestra, filling in the pitch space between the notes that constitute the structural poles of the *Hommage* chord (figure 6 and 7).

In the above example, each of the four-note chords is comprised of a different stacked interval (M6, m6, P5...). It is as if the *Hommage* chord, which reappears periodically at a distance of a dotted quarter note, is being alternately stretched and compressed. This is analogous to that familiar effect in Vasarely's

FIGURE 5. Movement simultaneously occurring along both the X and Y axis, and in multiple directions (measure 48)

The image displays a musical score for measure 48, featuring a variety of instruments: Pc, Fl 2 1, Ob 3 2, 1, Cl 1, Cl 2 BCl, Fg 1 2 3, Cr 1 2, Tr 2 1 3, and Tm 1 2 3. Each instrument part is represented by a staff with musical notation. Overlaid on the score are three trapezoidal diagrams, one for each of the three parts of the Flute 2, Oboe 3, and Trombone 1. These diagrams consist of multiple curved lines that converge towards a central point, creating a sense of depth and movement. Arrows point from these diagrams to the corresponding musical staves, indicating the specific notes and movements being referenced. The overall layout is organized into a grid, with the instrument names on the left and the musical staves on the right. The trapezoidal diagrams are positioned between the staves, and arrows indicate the relationship between the visual representation and the musical notation.

paintings in which lines alternately converge and diverge, producing the illusion of a three-dimension stretching of space.

In the last three examples, John Rea blurs the musical 'lines', as Vasarely would in his paintings, in order to give the illusion of movement. Vasarely accomplished this not by literally blurring lines, but by exploiting some quirks in visual perception, creating distortions through calculated juxtapositions of

FIGURE 6. Movement from one structural pitch to another (i.e., movement by the interval of Perfect Fifth)⁴



4. The notes in parenthesis are not actually in the score, but extrapolations of the projected end points of their respective lines.

FIGURE 7. Movement around structural pitches

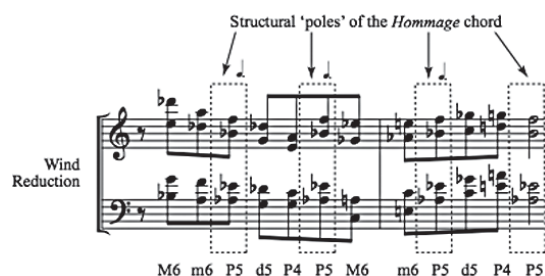


FIGURE 8. Movement from structural pitches to the same pitches an octave away



specific colours and contrasts of intensity. Similarly, Rea juxtaposes and superimposes lines that use contrasting scales (augmented, diminished, whole-tone, chromatic), in order to achieve an analogous aural effect.

Lines Cross, Space Twists

When the musical 'lines' begin to cross over each other, the 'poles' of the *Hommage* chord also flip, i.e., the chord is modified through inversions and new voicings. This occurs in the fourth section (mm. 169-216). It is as if the

musical space is being torn apart and twisted into new shapes. The traces of the musical lines resemble some of the intricately enmeshed lines of some of Vasarely's works (figure 9).

In the upper example of Figure 9, the pitches that are included are those of the *Hommage* chord appearing in different inversions, which constitute the beginnings, endings, i.e., the maxima and minima of the lines. The lower example of the same figure, which presents a detail from the same passage (in which two empty notes on the viola logically finish the line that is out of range on that instrument), demonstrates the character of the individual lines by

FIGURE 9. Reduction of mm. 177-180 (top), and at m. 178 (bottom)

Reduction
Structural markers - The *Hommage* chord and inversions

Mm. 177 178 179 180

Explosion
Connecting lines
Hommage chord

Vln I 1, 5 Augmented

1, 3, 5 Diminished

Vln II Whole-tone

2, 4, 6 Chromatic

Vla Chromatic

2, 4, 6 Whole-tone

1, 3, 5 Diminished

VC 1, 4 Augmented

Scale Type

including all the pitches used and by labeling their scalar type. This gesture is used throughout this fourth section.

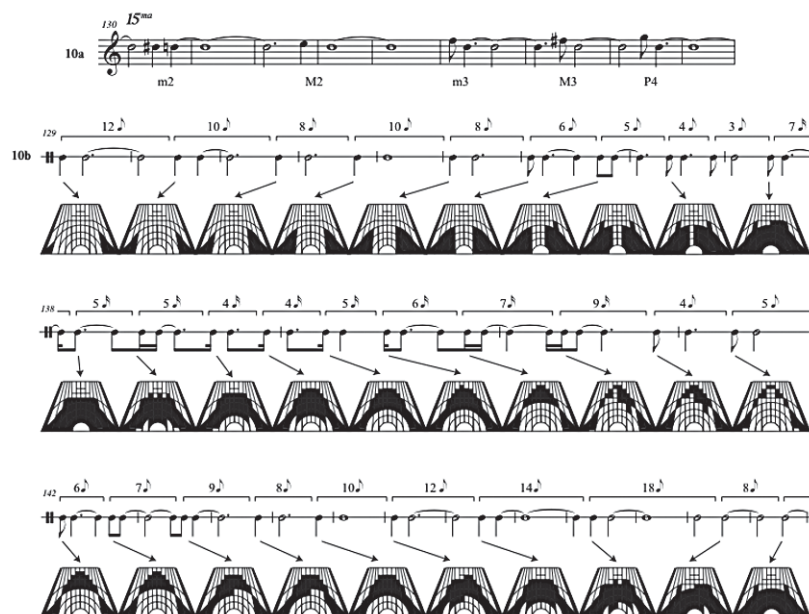
The distinct character of these superimposed lines, as opposed to those in Figure 8, results from the two distinct harmonic rhythms (see top example of Figure 9, in which one voice moves in syncopated half notes, while the other is non-syncopated), and to the contrary motion of the lines (which mirror symmetrical motion). This results in voicings of the chord in inversion (m. 177 and m. 179), and in wide spacings (measure 178), as if space itself were folding in on itself.

Space Begins to Stretch

When the beginnings and endings of the line are not the pitches of the *Hommage* chord, the strong sense of acoustic space that has been painstakingly established in the piece begins to falter. The acoustic space of the piece seems to ‘stretch’ in Section III (mm. 121-169), as the ‘poles’ of the chord are interrupted by its surrounding pitches (figure 10).

Figure 10a illustrates the stretching of musical intervals, in this case from the first violin line. Figure 10b illustrates the rhythmic compression and the orchestral motion that it accompanies. Here, structural pitches are attenuated by foreign pitches. The ‘stretch factor’ that determines the outside pitches

FIGURE 10. Stretching in Section 3



increases from an initial major second to a perfect fourth at the apex (see Figure 10a), and then decreases back to the major second.

- An acceleration in the rhythmic activity moves towards a climax at measure 138 (the symmetrical half-way point), before decelerating (see Figure 10b):
 - The frequency of the interruptions steadily increases, beginning with a period of twelve eighth notes and accelerating to a period of a quarter note at the apex, before re-expanding.
 - The length of the interrupting note decreases from an initial quarter note to a sixteenth note, before increasing back to a quarter note.
- The rhythmic acceleration and deceleration accompanies a movement of sound through the orchestra. Section three begins with the strings at the front edges of the orchestra, and then spreads across the strings to cover the stage. At the climax in measure 138 most of the orchestra is playing, before the sound is then transferred to the wind and brass instruments. The sound moves back to the strings for the end of the section.

Bending Space, Stretching the Grid

When the lines of the ‘grid’ move, in other words, when the harmony that has been used for the first 210 measures of the piece changes, the effect is so startling as to seem as if the acoustic space of the piece has been bent. This is in fact what occurs for 11 measures, as the *Hommage* chord is stretched over a new ‘grid’, somewhat in the manner in which shapes in Vasarely’s paintings are stretched over different grids. The new harmony, heard at a point that is approximately the golden mean of the piece, is consistent with the principles of the work: it is a symmetrical construction based on the original *Hommage* chord. The pitches of the *Hommage* are progressively stretched from a plane of symmetry between G-flat and G. The pitches of the ‘frame’, the low E in the double bass, and the A two-octaves above the treble-clef in the violin, still obtain (figure 11).

Musical Shapes

The fourth and fifth sections realize different shapes in the configuration of the orchestra (figure 12).

A literal *Hommage* is paid to Vasarely near the end of the piece, as V-A-S-A-R-E-L-Y is spelled out in the orchestra⁵ (figure 13).

Formal Proportions

The form of *Hommage* is based upon the same symmetrical principles upon which the smaller parameters of *Hommage* were generated:

- Section I: 71 - mm. 1-72

5. [Ed. note] Coincidentally, this procedure is strikingly similar to that used by French composer Philippe Leroux in his piece *Voi(rex)*, as discussed in the previous issue of *Circuit*: cf. Nicolas Donin, “Pour une ‘écoute informée’ de la musique contemporaine”, *Circuit*, vol. xvi, no. 3, p. 51-64; cf. especially the figure on p. 58.

The image shows a musical score for a section titled "Homage chord" and "Chord in mm. 219 - 230". It features four staves (treble and bass clefs) and a central vertical line of symmetry. The score is divided into two main parts: "Homage chord" on the left and "Chord in mm. 219 - 230" on the right. The "Homage chord" part includes labels for intervals: P4, M3, m3, M2, m2, w5, w3, w3, and b4. The "Chord in mm. 219 - 230" part shows a complex chord structure. A vertical dotted line labeled "Line of symmetry between G and Gb" runs through the center of the score.

- Section II: 49 - mm. 72-121
- Section III: 48 — mm. 121-169
- Section IV: 47 - mm. 169-216
- Section V: 79 - mm. 216-297

The sections are delineated by an attenuation of movement which lasts between 4 and 10 measures. At these moments, only the frame and the grid upon which the lines are painted remain, reminiscent of the empty walls of a museum.

FIGURE 12. Triangles (12a) and Circles and Squares (12b)

Figure 12a Triangles - measures 258 & 259

Figure 12a shows a sequence of eight triangles, numbered 1 to 8, arranged in two rows. The top row contains triangles 1 through 7, and the bottom row contains triangles 8 through 1. The triangles are arranged in a way that they appear to be part of a larger, continuous structure. The triangles are labeled with numbers 1 through 8. The triangles are arranged in a way that they appear to be part of a larger, continuous structure. The triangles are labeled with numbers 1 through 8. The triangles are arranged in a way that they appear to be part of a larger, continuous structure. The triangles are labeled with numbers 1 through 8.

Figure 12b Circles and Squares - measure 253

Figure 12b shows a sequence of five circles and squares, numbered 1 to 5, arranged in a single row. The shapes are arranged in a way that they appear to be part of a larger, continuous structure. The shapes are labeled with numbers 1 through 5. The shapes are arranged in a way that they appear to be part of a larger, continuous structure. The shapes are labeled with numbers 1 through 5.

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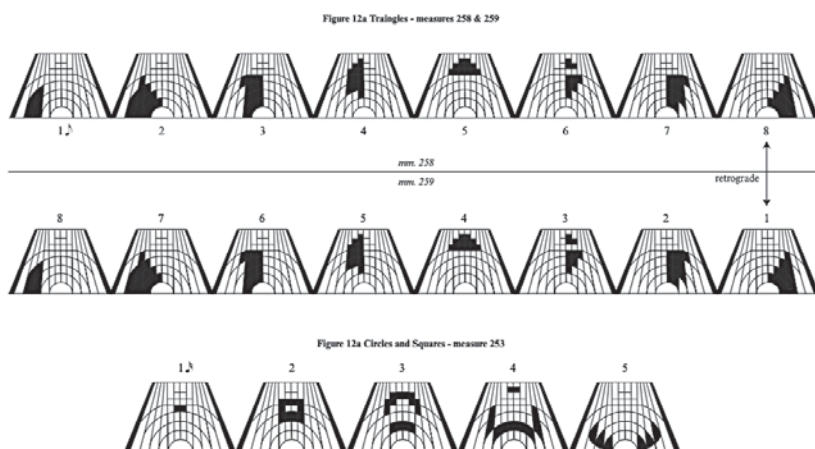


FIGURE 13. V-A-S-A-R-E-L-Y



Last Thoughts

Can you hear lines? Curves? Trajectories? Shapes?

No doubt we can't. Music, for all its evocative powers, can never explicitly 'say' anything. All that moves is thought through sound. These thoughts were Vasarely's — the transposition of visual effects onto two-dimensional art works through the use of optical illusions — and Xenakis', which led to John Rea's thoughts — transferring the idea of Vasarely's optical illusions into sound — which then inhabits the imagination of the listener. It is not only the lines and shapes that are important, but the space between the lines, which suggest things to the imagination, stimulating new thoughts and ideas. This space between the lines, between mediums, between disciplines, between dimensions, a space where imagination and thought exist, is the contemplative space from which to ponder John Rea's work. It is, after all, the space from which it originates.

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