

# THE DISRUPTIVE RELATIONS BETWEEN SOUND AND IMAGE IN *POÈME ÉLECTRONIQUE*

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## ABSTRACT:

This academic paper focuses on the installation art *Poème Électronique*, which involved the collaboration of a painter and architect (Le Corbusier) and a composer (Edgard Varèse) during the 1958 Brussels World Fair. The idea is to analyse the visual and sound dimensions, created from a combined set of rules, but independently developed by each participant. Based on a detailed and well-structured script written by Le Corbusier, Varèse developed a sound work without respecting the original guidelines. This important disruptive characteristic is structured in the relation between sound and image, and consequently in the interaction with the audience.

**Key words:** installation, audiovisual, multimedia art, *Poème Électronique*

The installation *Poème Électronique* involved the collaboration of an architect and painter (Le Corbusier), a composer and architect (Iannis Xenakis) and a composer (Edgard Varèse), who were commissioned by Philips to work on the development of a pavilion for the Brussels World Fair in 1958. Seen by over two million people, the pavilion provided new ways of working on the concepts of composition, performance and perception, as well as offering one of the first sound spatialisation initiatives.

The Brussels World Fair in 1958 was the first to be held after the Second World War and had as its theme the new technologies in the service of civilisation after the horrors of the war. The Dutch company Philips, instead of presenting its products, decided to create a pavilion demonstrating its technological developments applied to art and culture.

Defined by the architect Le Corbusier as an eight-minute-long electronic poem uniting sound, rhythm, colours and images, *Poème Électronique* consumed more than a year of work by artists in France, Holland and India. Le Corbusier entrusted the composer Edgard Varèse with creating the project's sound dimension, which represented a work, long-desired, with purely electroacoustic sounds, in a sound collage with spatialisation effects. Iannis Xenakis, who at the time worked on Le Corbusier's team, was chosen to design the architectural project. He based himself on his composition *Metastasis* to develop a building with parabolic forms.

In the imagistic sphere, Le Corbusier worked with the concept of surrealist *assemblage* and on conceiving the visual project, the architect divided the components into five different

groups, with different performances in order to compose the visual narrative (Kalf, 1958, p. 38):

**1. Film** (*écran* in the original): projection of a black and white film.

**2. Ambiances** (*ambiances* in the original): projection of chromatic illuminations with the intention of creating atmospheres and sensations.

**3. Tritrous:** Projection of simple geometric shapes and images on the walls of the pavilion. As a complementary effect, two projectors were used that had been specially adapted so that the entire projection area would become opaque, except for three areas (*trois trous*, in the original, hence the name *tritrous*) in which colours or figures were inserted. These projections took place in specific areas of the projection surface, usually surrounding the main movie.

**4. Volumes:** two suspended three-dimensional shapes, hanging as if they were "floating in space" in two of the pavilion's peaks: one is a geometric shape consisting of a tubular structure and the other the dummy of a female body. During the presentations, when illuminated with ultraviolet light, the Volumes would really stand out: the female figure in red and the geometric one in blue-green.

**5. Sun, moon, stars and clouds:** different sets of lights provided the introduction of elements related to the sky.

During the second half of 1957, Le Corbusier prepared an ingenious script to coordinate and synchronise the use of the five

groups of visual elements. He used a sheet of paper mimeographed with the profile of the Philips Pavilion and hand-painted, with gouache, the light effects he desired at each moment of the projection. Besides painting in detail the colours and *ambiance* effects desired, Le Corbusier also included the duration of each element and written notes, apart from the *tritrous* effects.

On the opposite page, another sheet shows how each of the visual elements should be applied and used, based on the following fields: a visual score, second by second; the colour effects to be applied on the Volumes; the images projected by the film (*Écrans*), divided into *Notes* (observations), *Vision* (which image should be edited) and *Référence* (image reference number); which *Tritrous* should be projected and *Paroles*, for general observations (Treib, 1996, pp. 142-147).

A complex structure was assembled inside the pavilion to provide the lighting effects dreamed up by Le Corbusier. The same structure was replicated on both sides of the pavilion so that the projections could occur simultaneously on the opposite sides.

Specifically in relation to the film to be projected in the pavilion, Le Corbusier created an intense sequence of still images in black and white. There are only two sequences of moving images. In addition to the technical issue of the need for projection in black and white, another point to bear in mind is that most of the images used came from photographs, mainly of sculptures, showing a range of styles from tribal figures to contemporary art.

Le Corbusier intended to tell the story of humanity based on free associations between images that often do not seem related. A series of images in counterpoint creates a mosaic that combines art, culture and society.

On removing these images from their original context by means of photographic reproductions and creating new relationships between them, Le Corbusier first alters the artistic appreciation, because he changes size scales and prioritises details and gestures. This is what Malraux calls fictional art, which originates from the institutionalisation of museums and especially from the advent of image reproduction mechanisms.

This juxtaposition of distinct references creates new affinities that were not present in the original works in their respective contexts and produces a culture of fragments from the past, juxtaposed until they become unrecognisable. This manipulation of images is the central point of *Poème Électronique*'s visual dimension and it provides a particular insight into Le Corbusier in relation to twentieth century art and culture.

A copy of the original projected version of *Poème Électronique*, reassembled to include the light projections, can be seen on the UbuWeb website. Le Corbusier divided it into seven sequences (Table 1):

Sequence	Duration	Elements
<i>Genesis</i>	1'00"	Darkness, bull, bullfighter, Greek statue, video of a woman
<i>Matter and Spirit</i>	1'00"	Skulls, shell, scientists, African image, statues from different cultures, skeleton, monkeys, ritual masks
<i>From Darkness to Dawn</i>	1'25"	Eyes, birds, tribal statues, lightning, skeletons, concentration camps, toys, religious images
<i>Manmade Gods</i>	0'35"	Tribal and Moai stone statues from Easter Island, cubes, plant forms, Buddha, solid colours
<i>How Time Molds Civilization</i>	1'00"	Workers, crowds, technological devices, Charlie Chaplin, children, rockets, radars, nuclear explosions, video of a shapeless mass
<i>Harmony</i>	1'00"	Eiffel Tower, mechanical parts, owl, bull, workers, Charlie Chaplin, Stan Laurel and Oliver Hardy, images of space, a couple hugging, babies
<i>To All Mankind</i>	2'00"	Images of New York, drawings and photos of Le Corbusier's projects, babies, people

Table 1: Imagery sequences of *Poème Électronique*

Le Corbusier and his assistant Philippe Agostini emphatically combine visual contrast in *Poème Électronique*. The architect provided the first indication when he named each sequence, but the syntactic relations transcend the initial concepts.

Sequence 1, *Genesis*, presents one of the central points of the film: the eternal struggle between humanity and nature, since the beginning of time, represented here by dawn. The tension and confrontation between the brute force of nature, represented by the bull and the civilising rationality of the bullfighter, which observe and study each other for a continuous confrontation. Wisdom, in the figure of the Greek statue, observes everything. The sequence ends with one of the only two filmed sequences. The back of a half-naked woman, lying languidly on her stomach, hair splayed. She slowly turns to face the camera with a smile on her lips and a look that quickly turns to horror.

In Sequence 2, *Matter and Spirit*, the question that is presented concerns the transience of life, represented by several skulls and skeletons. The finitude of life is inevitable, even if scientists focus on the subject matter. At the same time, ancient civilisations, represented by masks, attempt a connection to the spiritual as a way to bypass this issue. Darwin's theory of evolution is placed at the same level as the tribal masks that attempt to explain the relationship between humanity and the cosmos.

In *From Darkness to Dawn*, Sequence 3, the owl's fixed stare, which represents night-time, observes everything and connects us to the primal fear of the unknown, of untamed nature. The three tribal statues represent different stages of human development: the most ancient looks like a menacing dinosaur, the second represents a tribal phase in which the power of the sword outweighs any argument, and the last wears

something resembling a tie and represents modern man, who still bears similarities to monkeys. The three are grotesque, threatening and aggression is their main characteristic, showing that even though the human race has evolved, its principles have not changed.

This fact is proved soon after the appearance of a supposed shaman who, with the power of life and death, reveals the horrors of modern warfare, represented here by the Nazi concentration camps of World War II. The interpolation of real scenes with tanks, guns and toy soldiers indicates that the new generations, by playing with these games, will perpetuate this relationship with destruction. It is a destiny that perhaps not even religion can change.

As a counterpoint to the horrors of war, *Manmade Gods*, Sequence 4, shows harmony between religiosity and nature. The pursuit of what is sacred, whether in anthropomorphic figures, in relations with nature or in the stability of the four cubes, must be a goal for the human race.

The entirely white screen, intended by Le Corbusier to represent *Poème Électronique's* midpoint, marks the beginning of Sequence 5, *How Time Molds Civilization*, and also acts as a turning point between old and tribal thinking and modernity, in which science and technology become modernity's main heralds. Machines, astronomy, construction, medicine, everything points to an optimistic future. We have reached modern times, the time of reason. However, this same technology transforms individuals into mere mass, without differentiation and without free will. The sequence ends with the second

moving image: a shapeless non-identified mass, like interwoven threads, moves as if it were pulsing.

The ironic tone is indicated by Charlie Chaplin, the critic of *Modern Times* (1936), looking to his left, at the same point where we can see the bombing that will transform the era of technology once again into an era of violence, this time with the power of the atomic bomb and of nuclear energy. To complete the sequence, there is a shapeless mass, humanity, without meaning or direction.

*Harmony*, Sequence 6, brings a more optimistic view of technology as a possible solution to a seamless integration with nature. Previous elements reappear, such as the owl, the bull, the worker and his technological apparatus, the miners and the astronomer, all interacting with the mechanical parts and technology in an attempt to create a world in harmony. Humour, with Charlie Chaplin, Stan Laurel and Oliver Hardy, can be an outlet for the growing spiral of violence in an urgent need for synergy between the human race and the cosmos. Finally, the power of love is represented as a way to construct a new generation no longer focused on violence and competition, but on development.

The final sequence, *To All Mankind*, complements the hope shown in the previous sequence, but presents architecture as a pathway, and at this point an ode to Le Corbusier is made, as the only works shown are the architect's. In contrast to New York's disorderly skyscrapers and to the rustic stones and bricks are drawings and pictures of different projects by Le Corbusier, in addition to his architectural model, the *Modulor*.

*Poème Électronique* is brought to a conclusion with an optimistic message: the photo of two children together, one Eastern and one black, and the *Open Hand Monument* by Le Corbusier indicate that peace is possible. However, the last sequence is ambiguous. What do women alone on the street, the close-up of a poor child, a person sleeping on the street, people sitting down for a simple meal, a muddy road and several babies, the last one being observed by the mother mean? Two interpretations are possible: one, more optimistic, showing that through salvation by architecture, this scenario can be changed; another, more pessimistic, indicating that even with the advancement of technology, the quality of life of the low-income population will not change. Thus, *Poème Électronique* is open-ended, without a conclusion.

Edgard Varèse starts working on the sound dimension of *Poème Électronique* based on the sketches of light scenarios that Le Corbusier had envisioned for the project. The architect gave the composer free rein to create, saying: "I will give you complete freedom, think about your music as a presence surrounding a man reading, for example, a book or short story and whose ears pick up the sounds from outside" (Ouellette, 1973, p. 197). He requests just one silent moment exactly at the midpoint (at 240 seconds), to synchronise with the white lights that will be projected.

This collaboration by Xenakis in Paris, Le Corbusier in India and Varèse in the Netherlands provides an important characteristic: the autonomy of the media (video and audio), which, far from being synchronised and correlated, is worked by them in a contrasting manner. This results in several independent structures acting together. Xenakis also approves this

method, revealing to Matossian (1986, p. 121): "[...] for years I have been an advocate of an opposing sound and light technique. I am glad we are in full agreement."

For Varèse, it is everything he has been dreaming of for almost 20 years: "I need an entirely new means of expression: that of sound production (and not sound reproduction)." (Varèse, 1998, p. 200). A studio with state-of-the-art technology available for six months was something that Varèse had never dreamed possible. He would be able not only to combine and work with concrete sounds captured from the environment, but also with recordings made in the studio itself, sound producing devices, instruments manipulated with filters and distorted voices, besides oscillators and sine wave generators to create the most varied sounds.

The sound spatialisation applied in *Poème Électronique* expands the notions of sound dimensions. The proposal was to involve participants through sounds that came from all sides, exploring the auditory ability to perceive sounds in 360°. In a technical article, Tak (1958, p. 43), one of the engineers from Philips who worked directly with Varèse in *Poème Électronique's* creation, explains that "[...] the listeners should be under the illusion that multiple sound sources were moving around them, rising and falling, coming closer and moving away again".

The stereophonic effects were produced by five sets of speakers called *clusters*, positioned above the entrance and exit and in the pavilion's three peaks. In addition to these, group N has three lots of speakers for the same purpose. A group of 25 speakers dedicated to the bass frequencies was installed in concrete boxes behind the balustrade that surrounds the

pavilion, remaining hidden from the spectators, but with great impact in bass reproduction. Of greatest interest was the implementation of various groups of specific speakers for mid and treble frequencies, called sound routes, and designed to provide the sensation of sound objects moving in space. There are nine different groups, which can be operated independently.

It was then decided that there should be a phenomenological evaluation of *Poème Électronique* by hearing the work in the version mixed for two channels by Varèse soon after the World Fair. As additional support to the evaluation, a minute by minute spectrogram of *Poème Électronique* was designed, in which one can visually observe the sound development of the work. This resource transforms the sound objects into graphic components, allowing the complex movement of the various elements to be tracked, isolating them graphically for individual analysis. It is possible, fairly easily, on hearing the work, to

correlate the spectrogram's graphic component and to search for desired characteristics, similarities or differences.

When doing a survey of the sound objects, this analysis compiles their syntactic characteristics and promotes a gathering of syntaxes that relate to each other. Initially, *Poème Électronique* displays a diversity of sound objects, primarily associated with two antagonistic groups: the consonants, such as bells, vocalisations and percussions, and the dissonants that do not fit into the tone scales and are not associated with Western musical instruments, such as metallic noises, electronic sounds and noises from aircraft.

Some of these sound objects, rich in different and complex textures, are repeated and punctuate temporal segments that indicate structural groups. After surveying these objects, we reach a possibility of differentiated syntactic groups, listed in Table 2:

Groups	Duration	Syntax
Group 1	0'16"	Bells
Group 2	0'42"	Electronic sounds
Group 3	1'36"	Three musical notes, percussion, electronic sounds, metallic sounds
Group 4	0'51"	Bells, electronic sounds, sine wave sounds, percussion
Group 5	0'50"	Male and female vocals, percussion
Group 6	1'23"	Explosion, percussion, chorus, distorted voices, voices at varied speeds, electronic sounds
Group 7	1'07"	Sine wave sounds, percussion, organ, sound of aircraft taking off
Group 8	0'44"	Female voice, male choir, metallic sounds, percussion, organ
Group 9	0'32"	Three notes, sound of aircraft taking off, sine wave sounds, explosions, electronic sounds

Table 2: *Poème Électronique's* syntactic groups

The rhythm in Varèse's composition is not necessarily related to metric or cadence, but it is the element that not only gives life to the work, but also acts as the stabilising, merging and binding element of the other components. Or, as defined by Varèse in an interview with Alcopley:

In my work rhythm derives from the simultaneous interaction of independent elements that intervene in calculated, though not regular, time frames. This corresponds more to the definition of physics and philosophy as a succession "of alternate and opposite or correlative states." (Alcopley, 1968, p. 190)

The relationship of distinct sound elements in irregular time frames is one of the main characteristics of *Poème Électronique*.

What is noticed not only on hearing the work, but also when analysing the spectrogram, is a constant switching between disparate elements, a calculated opposition of sound elements from different planes that intersect and interact, creating new sound aspects. This opposition can occur in many respects such as in pitch, intensity, rhythm, duration, location and movement in space, or a combination thereof.

By semantically analysing the groups defined above, it is possible to find numerous links between these various "sound collisions". At a more basic level, the sound objects make reference to drills, elevators, sirens, cars, birds etc. However, in a deeper semantic analysis there is an interrelationship between these various elements composing more complex and dynamic concepts, presented in Table 3 below:

Groups	Syntax	Semantics
Group 1	Bells	Tradition, time
Group 2	Electronic sounds	Space, technology
Group 3	Three musical notes, percussion, electronic sounds, metallic sounds	Urbanity, technology
Group 4	Bells, electronic sounds, sine wave sounds, percussion	Tradition, existence
Group 5	Male and female voices, percussion	Human existence
Group 6	Explosion, percussion, chorus, distorted voices, voices at varied speeds, electronic sounds	Primitivism, human evolution
Group 7	Sine wave sounds, percussion, organ, sound of aircraft taking off	Passing of time, awareness raising
Group 8	Female voice, male choir, metallic sounds, percussion, organ	Religion
Group 9	Three notes, sound of aircraft taking off, sine wave sounds, explosions, electronic sounds	Modern life, future, nuclear age

Table 3: Syntactic and semantic groups in *Poème Électronique*

In Group 1, the bells represent tradition and the measuring of time on earth. The Netherlands, where Varèse produced *Poème Électronique*, and Belgium, site of the World Fair, are countries traditionally associated with the construction of bells. There are also a lot of churches in both countries, which may have influenced the composer and even have been a source of the sound object.

In any case, this beginning, which refers to the unconscious and creates a momentary identification in the audience, is opposed to Group 2 in which technology is present for the first time. Sounds commonly associated with space rupture this measuring of time on earth and indicate that, in the modern era, time should not be registered in the same way it always was.

Nature transformed into urbanity is the theme of Group 3. Its urban sounds, such as cars, lifts, tools and sirens, in a disjointed rhythm, show modern life moderated by machines. The group's three opening notes act as an identifying element for the urban question, as they are repeated in Group 9. The end of Group 3 is also a foretaste of the upward spiral of the end of the work.

In Group 4, the bells reappear with less intensity and represent time in the sense of transcendence. The ephemerality of life is referenced in the percussion resembling heartbeats, followed by continuous sine wave sounds as if foreshadowing the end of life.

Human existence appears clearly for the first time in Group 5, with the female voice, mother earth, generator of life.

Human evolution appears in Group 6, with the primitive vocalisations embedded in an environment that goes back to the still unchanged force of nature: thunder, birds, ancient rituals in which the occult is present with voices varying in speed and pitch. Life as an eternal dichotomy between the human and the occult.

As a counterpoint, after an eight-second pause, Group 7 resumes topics related to technology, but this time with the realisation that time, represented by the alarm clock and the plane taking off, is inherent to human existence, both primitive and contemporary.

Another dichotomous relationship can be seen in Group 8, this time between the human and the divine, represented here by religious singing and the church organ. These religious signs, however, are deconstructed, representing religion's loss of influence in the twentieth century, owing to modern society and technology, represented in the next group.

In this last (Group 9), modern life is displayed in all its fullness, with technology pervading human life, in a mixture of aeroplanes, lifts, explosions and urban sounds in an upward spiral, representing the future of humanity faced with the new nuclear era that is emerging in the early 1950s.

The theme of *Poème Électronique* is, therefore, modern human life in the twentieth century, with all its tensions and relationships. Varèse demonstrates perfectly what it is to be human in this century, a mix of tradition, modernity, primitivism, spirituality and evolution. These elements, however, do not necessarily relate harmoniously in all of their nuances. Rather, the

tension generated between each one of them is what is going to compose the unfolding of the work.

The most interesting point about Varèse's work inside *Poème Électronique*'s installation is that, unlike Le Corbusier, he abandons linear narrative in favour of a fragmented discourse, in which the sequence of the groups may be interchanged without detriment to the final narrative. While Le Corbusier sees human existence as an evolution from primitivism to the contemporary, Varèse questions this alleged evolution. For the composer, there is no better or worse, evolution or stagnation, beginning or end. For him the reading of the work will depend on each individual, because the human being is a kaleidoscope made out of different nuances, which, depending on each one's disposition, results in a different view of the world.

In *Poème Électronique*, sound and image develop disruptively during the performances, in which the auditory acts in an intrusive way with the images' dimensions, interrupting and changing the understanding of the images (Tee, 2015, p. 158). This characteristic, innovative for the time, distances *Poème Électronique* from the hitherto traditional forms of presenting audiovisual projects, whether in concert halls, where the sound dimension prevailed, or in cinemas, in which the image gained more prominence.

In the field of sound, Varèse explored to the utmost the synthesis of sounds and the capture of sound objects from the environment, concepts that Pierre Schaeffer and Stockhausen, for example, had already used. This new and vast field has since been exhaustively exploited by composers and artists,

who have set aside the traditional musical structure to engage in sound art.

With regard to the images' narrative, *Poème Électronique* indicated different paths for the projection of moving images. The main one is the simultaneous projection of multiple screens, which, combined with the use of lights and colours, complement the visual ambience of countless multimedia works in the second half of the twentieth century.

In summary, *Poème Électronique* becomes a reference for the multimedia performance of the second half of the twentieth century, which comprises an immersive space constructed (or altered) especially for the work, in which both sound and image attempt to explore to the maximum the environment's spatial aspects. Based on these premises, artists created installation experiences that are based on the concepts developed by the pioneer work.

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