

THE EXPANSION OF SOUND SCULPTURE AND SOUND INSTALLATION IN ART

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ABSTRACT

In this paper I study the interaction between sound and art, its development through time, and its behavior in different acoustic spaces. I will concentrate on the concepts of sound sculpture and sound installation, and on their aesthetic implications. I will analyze how they are to be found in a new expanded field. The works studied here belong to an interdisciplinary realm (often called *sound art*, *time based art*, or *intermedia art*), located between the music and visual arts fields. Different types of contexts that affect these works will be examined. I will analyze sound in its paradigmatic relation to space and time. Finally, I will propose different sound organization techniques for the creation of sound installations. I hope that through this research, I will be able to understand better the complexity of these “new” possible sound aesthetic languages that bring new paradigms about our perception and understanding of sound and its relationship with visual art and other media.

1. INTRODUCTION

In 2002 the Mexican curator Guillermo Santamarina asked me to write an essay on sound installation for a book with documentation of art installations at the museum *Ex Teresa Arte Actual* since its foundation in 1993. I did my research with the available sources realizing that very little had been written on the subject.

My work as researcher in the discipline of visual arts has been completely self-taught, and sound art is a relatively new field that includes music, technology, and the visual arts domains. At the time, I was a little bit flawed, because I did not know some important theoretical writings, as for example: “Sculpture in the expanded field”, by Rosalind Krauss (1979).

This new essay tries to develop some new ideas, as well as to review some older ones. Starting from the information that I have been acquiring through the years, I hope to gain a more objective and global vision of this still not fully explored subject. On the other hand, in my first essay published in 2004, I centered my research on the topic of sound installation, leaving a little bit to the side the issue of sound sculpture, a theme that had already been overviewed by several researchers since the seventies¹. Studying and understanding this subject is vital because it conceals the origin of sound installation.

1.1 Sound Sculpture. Origin and Definition.

Let us start with a formal definition of sound sculpture, a domain that exists as a valid category in visual arts and music. Where can we find the origin of this concept? Centuries ago, objects and instruments that produced sounds in an automated way were created in order to please the aristocracies. Evidently, we cannot define these artifacts as sound sculptures, because they were not created to be exalted. The origin of sculpture in modern art is found in its auto referential condition, an abstraction dismantled from its original base that was deprived of its specific use and context. Sculptures, as Rosalind Kraus explains, were originally monuments made to commemorate a site, and later on in history they became self contained independent objects, with the capacity to be moved around in different spaces while maintaining their condition of works of art (Krauss, 1979). Nevertheless, we can already find in these ancient sound objects - a mechanical bird for example - the idea of aesthetic beauty in their potential to produce music (Figure 1.1-1).

Sound sculptures seen as musical instruments do not easily find a place in the visual arts domain, but they can effortlessly have a niche in the realm of sound art, a field that is not so new if we think that different composers in the XVIII and XIX centuries (Haydn, Mozart and Beethoven for example) wrote music for flute clocks, mechanical organs and music boxes (Figure 1.1-2). Also, since the XVII century, well-tuned Carillons were constructed in Holland, Belgium and northern France. These instruments, made as a set of bells played by a keyboard or automatically as a clock chime, were installed in towers constructed in public plazas, and were sounded on market days and holidays². Their function was far from being close to that of a musical composition played in a concert hall. This is why these types of sounds existed in a different domain than that of lineal music, they were part of a non-linear sound art realm that at the time was not recognized as such.

¹ The first book on sound sculpture might be “Sound Sculpture”, by John Grayson. Arc Publications, USA, published it in 1975. The book included works of Harry Bertoia, The Bachet brothers, David Rosenboom, Luis Frangella, Charles Mattox, etc.

² “Surviving music from the first “golden age” of carillon playing is mostly arrangements of folk tunes, dance pieces and popular music of the period, although there were some original compositions for carillon” (<http://www.gcna.org/carillon-instrument.html>). According to another source, “Carillon performances were somewhat informal. Very often performances were in part improvised, leading to a spontaneity that established a closed rapport with the public below. Since the carillonneur performs atop a tower removed far from his public, the player must hold his listeners’ attention by projecting his imaginative to obtain dramatic qualities” (The Carillon: Vermmers musical companion: www.essentialvermeer.com/music/carillon/carillon_a.html).

1.2 Sound sculpture as a kinetic sound machine.

Sound sculpture as an aesthetic entity ended up appearing in art with the first XX century vanguards, and it was tied to the idea of kinetic sound “machines”. In 1915 the futurist Fortunato Depero realized the work “Colored Plastic Simultaneous Motorized Noise Complex of Decomposition into Layers”, and at the same time, Giacomo Balla produced a “Project for a Noise-Musical Instrument” (Figures 1.2-1, 1.2-2). In the manifesto “Futurist Re-Creation of the Universe” (in that same year) the artists declared:

“We Futurists, Balla and Depero, want to achieve total fusion, in order to create a happy universe; that is, to create it anew from the ground up. We shall give the invisible, intangible, weightless, non-perceptible skeleton and flesh. We shall find abstract equivalents for every form and element in the universe, then combine these at the whim of our inspiration into plastic complexes, which we set in motion.... Plastic complexes that simultaneously disintegrate, speak, make noise, and ring out....”. (Maur K, 1999).

These *sound sculptures of instrumental character* (that I will define afterwards in this essay), later had an effect on artists such as the French Jean Tinguely (1925-1991), who made sculptures that introduced percussion instruments (“Mes étoiles-concert pour sept peintures”, in 1958) (Figure 1.2-3), and who later created an event in NY in 1960 where a “machine” auto destroyed (“Hommage a New York”).

1.3 Sound sculpture in the plastic acoustic domain.

Other sculptures will rise purely in the plastic acoustic domain, for example those formed by cumuli of narrow metal tubes of different sizes in the work of Harry Bertioia (1915-1978) (Figure 1.3-1) in the 1940s, or later, “Penetrable blanco”, a hanging resonant plastic tube structure by the Venezuelan Op Artist Jesús Rafael Soto (1923-2005), that can be penetrated by the viewer, resulting in its elements hitting one another and making interesting flocks of sounds to be listened to (Figure 1.3-2).

1.4 The expanded sound sculpture.

Sound sculpture will find a more comfortable place in public spaces than in galleries and museums where interaction with people or with natural elements (wind, rain, etc.) is possible, or where automated mechanisms set them in motion. In this sense, these kinds of forms have somehow stayed within tradition and convention, and have avoided evolution. But sound sculpture has the capability to expand and become an ambiguous and open form of art like Rosalind Krauss suggests. Early examples of this could be some ancient pre Hispanic buildings in Mexico, where holes were devised in order to create sounds thanks to the wind passing through! This was a way to help predict changing weather so as to expedite finding shelter in the case of a big storm³. In recent times, some artists have realized the same procedures in rocky structures, but trying to search specifically for the aesthetic beauty of these windy sounds. In other more complex works, the natural landscape has become the central character of the pieces. An example of this could be the installations by the artist Leif Brush (n. 1932), who since the beginning of the seventies worked picking up the sounds of nature (rain and wind) with the aid of cables and contact microphones installed in an open field, which amplified these sounds⁴ (Figure 1.4-1). Here, we could speak of sculptures in an expanded field that find themselves between the *not landscape* and the *not architecture*⁵ (Krauss, 1979). However, they might no longer be sculptures but *sound installations*, or perhaps a new form of *land art* with added sound?⁶.

1.5 Sound sculptures of conceptual character.

³ But I am sure that people enjoyed the sounds when the wind was not so strong.

⁴ This and other works of Leif Brush could be considered more as installations than sound sculptures, but because the definition of Rosalind Krauss seems to include installation in the concept of “Sculpture in the expanded field”, I decided to keep talking about sculpture but in an expanded sense.

⁵ In her essay, Krauss tries to understand the expanded sculpture in the negative addition of landscape and architecture. Here, sculpture is neither landscape nor architecture, but is a little bit of both. This paradox is understood in the “oppositions between the built and the not-built, the cultural and the natural, between which the production of sculptural art appeared to be suspended...attention began to focus on the outer limits of those terms of exclusion” (Krauss, 1979).

⁶ Rosalind Krauss does not make a differentiation between an expanded sculpture and an installation in her text. It seems that this later form of art that originated in the 1960's could be one of the multiple possible forms of expanded sculpture. Later on this text, I will state my point of view regarding the differences between sculpture and installation in a more traditional sense, and I will explain how their expansion with the sound element will convert them in new art languages.

There are finally other kinds of sculptures and objects of *conceptual* character that produce sound, or which are completely silent, but where the artist is making a discourse around it⁷. Probably, one of the first works of art that fall into this category could be *Box with the sound of its own making* (1961) by the minimal artist Robert Morris (Figure 1.5-2), who prepared a small cubic wooden box that carried a speaker inside reproducing the sound of its fabrication⁸. Another example is *Acoustic Wall* (1969) by Bruce Nauman (Figure 1.5-3), where the artist places a sort of huge mattress against a wall with an angle of 40 degrees or so, forming a space where the public can explore and experience a drastic acoustic change that takes place in this encapsulated space, contrasting with the remaining open space⁹.

1.6 The ambiguous nature of sound sculpture.

We can find an axis where sound sculpture moves between the poles of an automated musical instrument, or one that sounds by the action of a speaker or a natural element, and a sculpture with conceptual character that contains sound in a potential way, alludes in an imaginary way to the sound realm, to the absence of sound, or to different acoustic phenomena that exist in space. Within this axis, we find sound sculptures that produce more or less musical sounds, or that are more or less conceptual. These characteristics will place them in different points of a triangle formed between the fields of music, sound art, and the visual arts¹⁰.

1.7 Immersion in sound art.

To end this introduction, I would like to expand the concept of sound installation introducing a new element: immersion. The idea of immersion in art has been applied only in recent decades around media art. Immersive virtual reality has been explored in electronic art. It is a situation where the public becomes part of the artistic work, and where people cannot differentiate between virtual reality and daily reality, where they can't establish a distance from the work of art. The idea of immersion is not new, Walter Benjamin criticized the *immersive contemplation* of the bourgeois individualistic character of the XIX century, giving as an example the Dada criticism of Bourgeois Art, which attempted to destroy the aura of the Bourgeois creations, cataloging them as reproductions made with the express purpose to create the ability for mass production that could reach a larger audience (Benjamin, 1936). Theodor Adorno on the other hand, speaks of immersive contemplation as an important factor for the liberation of the immanent processional quality of art, through the individual freedom of the spectator. Yet, Adorno also criticized cinema where the public is absorbed and ends up with a necessary critical distance from the work of art (Adorno, 1970).

For Daniel Palmer, the immersive act is analogous to contemplation, and in it there can be an "intermedia critical attitude between reflection and total immersion". For him, "immersion is a spatial experience tied to digital art in the sense of enveloping the spectator in a discrete and often panoramic zone". On the other side, "the temporal experience of digital art – as live, responsive, real time – involves a process of specialization that challenges the tradition of aesthetic distance" (Palmer D, 2007).

For me, sound installation is immersive thanks to the special qualities of sound in relation with space (reverberation, echoes, resonances), but it is immersive in a critical way because the spectator does not have a passive role like in cinema. Here, he has to walk through the space in order to discover the work, to listen to it and to complete it.

As we can see, immersion has been criticized due to the little reflexive distance that exists between the perceiver and the work, but it is impossible to deny that one of the more important qualities in music is its immersive power, and that it is amplified even more when we introduce space, and this is why a sound installation, an *intermedia* field found between the sound and the visual, between music and art, cannot ignore it.

⁷ There are "sound" installations where there is only an allusion to sound or to its absence. In the work of Joseph Beuys "Homogeneous infiltration for piano" (1966), a grand piano is covered in felt: legs, pedals, keys lid, case. This image could transmit the idea of drowned sound (Figure 1.5-4).

⁸ An important antecedent of these works that appeared in the conceptual art movement in the sixties is the ready-made "With hidden nose" by Marcel Duchamp (1916) that consisted of a ball of string held between two screwed brass plates. The artist instructed his collector friend Walter Arensberg to open it in order to place an object inside the ball. Duchamp never knew what it was, and so, the noise that rattled inside remained a secret (Figure 1.5-1).

⁹ Nauman did different versions of this piece. The one I am referring to appears in the catalog of the exhibition "Soundings" in the Neuberger Museum in NY USA in 1980, one of the first sound art exhibitions. In the book "Bruce Nauman" (Morgan, 2002) he explains his intent in these works: "When the corridors had to do with sound damping, the wall relied on the soundproofing material which altered the sound in the corridor and also caused pressure on your ears, which is what I was really interested in: pressure changes that occurred while you were passing by the material. And then one thing to do was to make a V. When you are at the open end of the V there's not too much effect, but as you walk into de V the pressure increases quite a bit, it's very claustrophobic".

¹⁰ Sound installations are also sensitive to being found in different points of this triangle.

2. SONUND SCULPTURE AND SOUND INSTALLATION.

Sound sculpture and sound installation belong to a relatively new interdisciplinary field. To understand how sound interacts with the visual arts, how it affects the objects, and how it is unfolded through time and space; we need first to consider some important premises:

1. Sculpture and installation become **expanded disciplines** when sound is added to them. In this case the sound element attached could be part of the object, related with the object, or completely alien to the object.
2. When we add an element that has an alien language to the visual field, we inevitably create an **x connection** between the senses of our ear and our sight.
3. The experience of the artistic visual work is modified completely when we use sound as an integral element, due to the generation of a new **temporal perception of space**.
4. The characteristics of a **place** modify completely our perception of the sound element of an installation; this specific place will also determine an **x context** that will alter the interpretation of the work.
5. We do not necessarily need a visual element to have a *sound artwork*; an installation can be structured only with sounds.

I will concentrate in this text on the concepts of **sound sculpture and sound installation**, hoping to be able to understand better the language of these complex and relatively new genres.

2.1 Sound Installation. Defining the concept.

The concept of installation in art appeared for the first time when the artist Dan Flavin used it for his neon pieces (1967). He staged spaces with them that then became the work of art. Then, in 1971 the musician and artist Max Neuhaus coined the term sound installation (Seffarth, 2012) because his sound creations were conceived not to be placed in the traditional musical time, but rather in space.

Only in the last decade there has finally been serious theoretical writing about the nature of sound installations. When I wrote the first version of this text in 2002 there was very little information on the subject, but the texts of some pioneer researchers that I found at that time continue to be the foundation of my research. I will keep then my original text almost intact, but I will add some important new ideas that are pertinent.

Let us begin by defining what is an installation. In some dictionaries we find "conjunction of installed things". And if we look for the definition of "installing", we discover "To put or place something on its proper site". By this, we infer that an art installation could be a conjunction of elements placed in particular locations that are chosen by the artist. However, the space factor is not specific enough here, and in visual arts it is essential to know if the elements of an installation can be together or separated; then, we need to look up for more specific and proper definitions that have been established in the art field.

In the text "Artistic territories for hearing and seeing", the curator and sound artist José Iges quotes a definition of installation by the Spanish artist Concha Jerez:

"The installation is an expansion of a three-dimensional space, with the notable difference with sculpture that the axes with which matter is being organized are not exclusively internal to the work, but also external".

Later on Iges asserts:

"A work is an **installation** if it establishes a dialog with the surrounding space, and the **installation in situ** is the installation per se, although there are installations that could be adapted to different spaces" (Iges, 1999).

Having covered the space element, we now need only to define what is a **sound installation**, and again, I quote José Iges who has realized an excellent theoretical work about this concept:

"Sound sculptures and sound installations are **intermedia works**, and they behave like expansions of sculpture and installation".

The American artist Dick Higgins (former member of the Fluxus movement) created the term in a 1966 text (Higgins, 1966), as a way to understand the phenomena of perception of works that are to be found **between** different media or artistic languages. In this way, sound sculpture and sound installation could be placed between the visual arts (including conceptual art) and music, sound poetry between literature and music, etc. The vagueness of the existing

borders between these fields obliges us to fuse them, creating in this way a new expanded field¹¹.

2.2 Connections between sound and the visual aspects.

What are the existing connections between the sound and the visual aspects of a sound installation? José Iges suggests two structural possibilities:

1. Perceptive reality, dialectic or complementary, which has to do with a poetic statement more than with a musical one, and where the sounds can be antagonistic (whose structure is opposed to the visual), or to dialog with the visual discourse but in an abstract way.

A good example of this point is the sound sculptures of the German artist Rolf Julius (1939-2011) who united speakers with the sculpture matter (Figure 2.2-1). Nevertheless, he was not interested in the physical interaction of these two elements, but in the poetic discourse generated from the contact of both things, something similar to what happened with some surreal sculptures (like one by Joan Miro which consisted of an egg placed on a chair for example). Besides, the sounds that Julius fabricated did not have anything to do with the visual objects he used, they were organic and seemed like a new kind of matter but made out of sonic elements.

2. - Works that present a visual element that behaves practically as an instrumental part for the fluidity of the sound discourse¹². That is to say, that the visual invites us to understand, discover or complete what occurs in the acoustic field, as a kind of clue or synesthetic transcription.

A clear example of this idea could be the visual function of a "Machine" that produces sounds of bicycle wheels in movement in my sound installation "Rebicycling" (2000), where two transparent CD players lets us visualize the two records that rotate, producing an antagonistic and metaphoric relationship between the inert and static bicycles on the floor, and the rapid and constant movement of the discs that reproduce the sounds of the imaginary bicycles wheels turning on (Figure 2.2-2)¹³.

I would like to go deeper on the first point proposed by Iges and make a new classification founded on how close or distant the relationship is between the sound and the object. Here, the visual element will interact with an alien sound element, and their relationship will be established on an abstract and psychological level that can only exist in our mind. It becomes necessary to make a division of the interactions that occur between these two different elements, obtaining then:

- a) A close relationship, where the sound attached to the object was produced by it.
- b) A distant relationship, where the sound added to the object doesn't have a connection with it, excepting the association established in our mind.
- c) An intermediate relationship, where the sound attached was produced by the object or by a similar object, and was possibly transformed by the artist up to a certain degree where the existing connections would become ambiguous, giving place then to possible metaphors¹⁴.

¹¹ Higgins never wanted to define or invent a new field in art, as it happened with video art, performance, etc. It is true that **the term** sound art is a kind of crutch, an artificial way to be able to talk about these intermedia phenomena between sound and other artistic languages. Yet, I think that both sound sculpture and sound installation were able to create in the XX century the grounds of a new artistic language that is moving and will keep progressing between the visual arts and music. Of course, here we need to define music in the broadest sense; starting from the texts written by John Cage, we could infer that music is the action of listening to any combination of sounds, noises, silences, including any soundscape found in daily life.

¹² In this case José Iges quotes the sound installation "The bird tree" by the German artist Christina Kubisch. In this work an audio cable is placed along the wall, in such a way that the design simulates trees with branches, the audience uses headphones and walks forward listening to sounds from different kinds of birds (Figure 2.2-3).

¹³ This work was presented for the first time in the SURGE gallery in Tokyo Japan, a country where bicycles are left in the streets as trash. My intention was to rescue some of them and awake them from their comatose dream induced by their abandonment and lack of use.

¹⁴ In my sound work "Ligne d'abandon" made in collaboration with Gabriel Orozco (1993), the sound of a screeching wheel was transformed enlarging it and creating new sounds with different durations. They recall the wind, a subway passing through a tunnel, and other meta-sonic images. When the duration of the transformed screeching sounds approach their original duration, it is possible to recognize their origin.

2.3 Sound sculpture as a musical instrument and as a constructive entity.

There are sound sculptures of *instrumental character*. They are sound instruments with a sculptural quality, in other words, aesthetic objects with the capacity of producing sounds, either played by man, by natural elements (rain, wind, etc.), or by a mechanical device¹⁵. A sound installation could be constituted by various elements of this kind interaction with space¹⁶.

We can include here sound sculptures where a sound source (a speaker cone for example) interacts in a physical way with an object. Here, there will be an abstract and psychological interaction as well as a real and concrete one, because the sound vibrations can alter the consistency of the physical object making it move or resonate in a particular way.

There are various sound artists that have worked with speaker cone vibrations interacting with different kind of materials like water recipients (Hiroshi Yoshimura, Mickel Arce, etc.), aluminum plates with Ping-Pong balls (Manuel Rocha Iturbide) (Figure 2.3-1), sand (Gary Hill), etc. In most of these cases we are dealing with sound-kinetic experiments, but in some others the effects produced by these interactions have to do more with a poetic effect resulting from the contact between sound and matter¹⁷.

3. PLACE AND CONTEXT

Let us talk now about the importance of place and context of the sound installation. A common place for an installation is an artistic space, that is, a gallery or a museum. Yet, we can contemplate the possibility of placing sounds in a public space that has nothing to do with art. In this case, the sounds introduced will change the perception of that place in the same way that the music specifically designed for supermarkets or waiting rooms (better known as *Muzak*) changes our mood while being at those places¹⁸. Max Neuhaus (1939-2009) liked to work in public places. In *Times Square* NY for example (1977), he placed speakers under one of the grills of the subway in order to create an island with an harmonic drone capable of changing the mood of the people passing by, and establishing a *new perception of the place* thanks to these sounds that are mixed with the noises of traffic.

Speaking about change of context, I can refer to my conceptual sound work *Ligne d'abandon* (Figure 3). The first presentation of this work (that deals with expanding the screeching sounds of a car wheel) was in a gallery¹⁹; later on, I presented it in a four floor underground public parking lot at the *World Trade Center* in Guadalajara, during the FITAC art fair in 1996. This time, the screeching wheel sound traveled with more liberty through the huge space of the parking lot, obtaining also a clearer relationship between the ambiguities of the screeching transformed sounds and their locomotive origin.

4. SOUND, SPACE AND TIME

“In installations, sound contributes to delimitate actively a place, reabsorbing the dualist opposition between time and space. One of the principal properties of sound is to *sculpt the space*”²⁰ (Bosseur, 1998).

Let us study now the specific case of a sound installation. We will develop the space element, decisive in the enrichment of the experience of a work of art. There is a natural interaction given between the public and the work in space. What would be the primordial difference between an installation that uses sound and one that does not take advantage of it? In the case of the existence of sound, it could serve as a way to obtain a more tangible experience of

¹⁵ This device could be a musical instrument because it has aesthetic qualities. If we place for example a guitar in a gallery or museum of contemporary art, we would automatically convert it into an art object.

¹⁶ Sound sculptures could be conformed simply by speaker cones or loud speakers, in which case they will become objects with aesthetic qualities. Nevertheless, in this case there cannot exist a sound that is specifically fit to a speaker because the speaker reproduces an infinity of different sounds, so the only natural element of a speaker is its vibratory effect, which poses a visually neutral aspect.

¹⁷ This is the case of Rolf Julius sound sculptures quoted before, or in the video piece “Meditations” (1986) by Gary Hill where the speaking sounds of a subwoofer speaker cone are little by little being buried by sand.

¹⁸ Talking about supermarket music and context, the Mexican artist Fernando Ortega brought about an action in which he hired a *Muzak* company in order to install their music system during the inauguration of a photo exhibition in the museum “Centro de la Imagen” in Mexico City. The three artists and the audience did not know anything about this, and the reactions were varied. Some people did not notice, others came moved to the museum director to cheer her for the nice music, and others were outraged.

¹⁹ “Ligne d'abandon” was first presented as part of Gabriel Orozco’s exhibition at the *Crousel Gallery* in Paris in 1993 where he showed his famous sculpture made out of a Citroen Car (*La DS*).

²⁰ Bosseur specifies in his text that the phrase to *sculpt a space* was coined by Erick Samakh.

space, due to the sound reverberations and the subsequent resonances in the structures that encloses them²¹. On the other hand, the presence of the sound element in an installation can produce a physical elongation of the public in the site that harbors the work, because sound has a temporal character, and the development of that temporality obliges the perceiver to wait, to listen, and to be attentive to gradual or sudden changes that are produced by sound and its interaction in space. In general, the structure of this type of work must have a temporal factor of relativity²², namely, that the aesthetics of the work should be manifest whether we stay with it an instant, a couple minutes, or even hours. Later on I will talk about the aesthetics of the *open work*, and how this form of art could be ideal for the creation of sounds in an installation. I will talk now about the relationship of sound, space and time, citing various artists and musicians that have thought about these phenomena.

4.1 Space only exists through sound.

The Japanese sound artist Jio Shimizu tells us that: “it is only by means of the individual sounds existing in the space that the space itself is perceived” (Shimizu, 1999). Meaning, that without sound space does not exist. On the other hand, Giancarlo Toniutti writes: “Phenomena happen in space. Or even better they appear and happen with space, peculiarly with a localized space, and it is at this stage that they receive a meaning from us. Sound as a phenomenon is thus part of space, since it can only exist in a space. We could think of sound as the inner movement of a space, it’s rising in the air” (Toniutti, 1999). Here, the musicologist makes us understand that the signification of space can only happen through the action of sound in it.

4.2 Traveling through space by means of sounds.

John Cage (1912-1992) made an analysis about the importance of sound crossing through space, about how we can perceive the interaction between one sound and the other:

“We have a tendency to forget that space. We leap across it to establish our relationships and connections. We believe that we can slip as in a continuity from one sound to the next, from one thought to the next. In reality, we fall down and we don’t even realize it! We live, but living means crossing through the world of relationships or representations. Yet, we never see ourselves in the act of crossing that world! And we never do anything but that!” (Cage J & Charles D, 1981).

4.3 Space as an instrument.

Space can be also surmised as a musical instrument. Lets imagine for example a giant guitar that becomes an architectural acoustic space. People could be inside while a mechanism or other people play the strings from the outside. Or lets think of a symphonic orchestra distributed in a big space, having some one giving instructions to make sounds on the different instruments at different times. The artist Achim Wollscheid writes: “Space, with its assembly of sound producers, listeners and sound producing objects, becomes the instrument...” (Wollscheid, 1999). In the installation “Internal sound” (1979) by North American artist Terry Fox (1943-2008), the artist converts a church into an instrument.

“Two 100 meter (300 feet) piano wires were stretched the length of the church. They were fastened to the large wooden door of the church at one end, and to a wooden covering over the crypt at the other. The crypt covering and the door became the resonators for the sound of the wire, which was rosined and played with the fingers to create a continuous but constantly changing drone”²³.

In this way, the nave becomes the arm, while the crypt becomes the resonance box of an invented church instrument!

²¹ In a recent text, Volker Straebel (2008) states that sound installations are influenced or determined by the properties of the spaces where they are presented, and that those should be planned for a specific space (**in situ sound installation**). For him, it is always important to take in account the acoustic characteristics of the space where they are to be presented.

²² Temporal relativity factor is a non-linear conception of time, where there is no specific beginning and end. The sound artist Max Neuhaus speaks about the relationship of sound and space:

“In my sound works, I don’t work with a temporal *continuum* tied to specific places. There is no beginning and no end; these productions are textures of the continuous sounds produced, not made by the diffusion of a fixed tape, but by the set up of a processus that generates the sound. This processus is not developed in time like music is. It can be sometimes a dynamic texture; these events will be produced, but not in the sense of going from a beginning to an end” (Neuhaus in Bosseur, 1992).

²³ This text is part of the Audio recording excerpt of this piece from an 18-hour performance in ex-church of Santa Lucia, Bologna, Italy, October 1979 (4 minutes 21 seconds). Originally published in *Revolutions Per Minute (The Art Record)*, Ronald Feldman Fine Arts, Inc., and The Charing Hill Company, Ltd., 1982.

If we consider space as an essential part of a musical instrument, how does it sound? That space is enclosed in the acoustic box of the instrument, and its characteristics, its particular resonances, become the musical qualities of this space. In the sound work "I am sitting in a room" (1970), the composer Alvin Lucier writes instructions where the performer of the work has to record his voice reading a text in a determinate room (an enclosed space like the acoustic box of an instrument!), then, he has to reproduce the recording of his voice in that place, and record that reproduction with another recorder, and then he has to repeat this process several times until the recorded voice disappears completely. At the end, only the resonances of the space driven by the speaking voice will remain.

4.3 Space and silence.

The futurist Tommaso Marinetti was perhaps one of the first artists to consider art in a conceptual way. In one of his radiophonic experimental scripts (*Radio Sintesi*) created in 1933, he suggests how to build a silence:

The building of a silence

- 1) Build a left wall with a drum roll (half a minute).
- 2) Build a right wall with a din, a down town car / street car horn, voices and screeches (half a minute)
- 3) Build a floor with a gurgling of water pipes (half a minute).
- 4) Build a ceiling terrace with chirp srschirp of sparrows and swallows (20 seconds). (Concannon K, 1990).

Silence can be then interpreted as the emptiness that exists in space, and it is a necessary element for sounds to be able to speak to each other. Silences can be also be considered as anti sounds, in the same way that matter has its counterpart in anti matter, but they can also have a dialog between them and be interconnected thanks to the existence of scattered sounds in time²⁴. In the sound work *Ligne d'abandon* (Rocha Iturbide, Orozco, 1995), silences are considered at the same level as sounds because both constitute musical durations, and because both are a complement of each other. In this work based on the transformation of the noises generated by the screeching wheels of a car, listening to silence after the different stretched sounds disappear, is equal to be submerged in a dramatic suspension of time²⁵.

5. THE ORGANISATION OF SOUND IN AN INSTALLATION

To finish with this paper I would like to explain in detail, which are the essential factors to be undertaken by the musician or artist in order to realize the sound elements of an installation. This will determine the type of interaction that will be established between the public and the work.

To start with, there are artists that aren't necessarily musicians, and we have to contemplate that they need to organize sounds in time, if not in a musical way, at least in an artistic way. Furthermore, it is important to be conscious that a sound installation could simply consist of sounds diffused in a space by loud speakers, preferably from different points in favor of best underlining its acoustic qualities, and thinking that the movement of the audience in it will enhance the sound perceptual results of the work.

5.1 Linear sound

Many artists that do sound installations use a short audio track that repeats over and over by way of the well-known *loop* artifice. This simple and sometimes boring technique has a lineal character, and thus, the surprise factor doesn't exist. On the other hand, there can be longer audio tracks where there is a development of sound in time, however, when they have a linear nature we risk keeping the audience at the site of the installation only a few minutes, missing then a possible dramatic outcome or conclusion.

5.2 Open form

There are artists that try to go further in the sound organization. Having a more organic conception of sound, they have chosen to use an open form (Eco, 1962). It is important to say that in these types of works the participation of

²⁴ John Cage reasons that silence in reality does not exist, because even in an anechoic room isolated acoustically we are able to listen to our nervous system and to the circulation of our blood inside our veins.

²⁵ In the CD booklet of this conceptual sound piece we can read: "...were intrigued by this noise and its relationship to a possible accident. The uncertainty about what can happen afterwards: the screeching noise generates a sort of feeling that could be related to void, suspended time or collapse" (Rocha, Orozco 1995).

the audience is often essential²⁶. Moreover, there are different kinds of interaction between the open work and the public: there are works in which the individuals create the result, others in which we find a balance in the interaction, and finally those that are completely autonomous from the public, but where the individual can nevertheless experiment with the spatial and temporal sound relationships by moving in space.

5.3 Computer music technology in sound installations

The development of computer music technology in the last decade has permitted the creation of interactive software²⁷, as well as sophisticated interfaces that use different kinds of sensors. This technology is now available for the public and many artists have been using it in the last few years. In addition, there are artists and musicians with a programming background that have developed non-interactive musical software, but with a high degree of complexity. These programs generate sounds in an automatic way by way of auto-generative processes. In this case, the sounds produced should always have the same basic structure in order to maintain some coherence, although they will always be changing in time.

In the creation of a sound installation with the help of a computer, we have to contemplate the essence of the auto-generative processes, that is, the type of algorithms and sounds that we will use, but also the degree of interaction that we will have with the audience. The range of these types of processes go from the auto-generative work that uses evolution algorithms (cellular automata, neural networks, etc.), to chaos, and other kind of processes that can be transformed by an external agent²⁸ and where the response of the program will influence the transformation that follows the agent²⁹ (Row, 1992). Finally, when we use the computer to create a sound installation, we have to be well centered in the balance we wish to obtain between the interaction process and the final product (Dannenberg & Bates, 1995)³⁰.

5.4 Alternative low technology techniques

Using a computer tool for the generation of a sound installation may naturally have an open aesthetic character³¹. In the past, due to the technical complications that this entailed and to the economic difficulty of having a sophisticated computer system in a gallery or museum for one month or more, sound artists were sometimes obliged to make use of simpler technological means to create their works³². For example, to realize a sound installation without a computer we could record various CD's with different tracks and then activate the Random function of the CD players. Also, we could record and play various cassettes in loop mode, letting them gradually get out of phase with each other and creating works that changed in a continuous way³³. Likewise, they could simply create several audio tracks of different durations that were repeated, and because they were out of phase for a long period of time, we would have the impression of always listening to different sound combinations³⁴. Nowadays, it is easy to have a computer with a patch running and driving the sounds of an installation, having much more sophisticated possibilities to create different kinds of interactions. Despite this, some sound artists prefer to keep working with cheap technologies because the kind of gadgets you find in electronic stores can drive them to a Low Tech aesthetic way of working, commenting for example about the obsolescence of technology with a political attitude.

²⁶ Nevertheless, there are open works in which the audience doesn't participate at all, such as the auto-generative computer processes, but I will talk about this later.

²⁷ Like MAX MSP, the software that has become more popular since the end of the 90's.

²⁸ An external agent can transform evolution and Chaos algorithms. Computer music researchers working with them have also been so interested in other automatic processes; yet, they have left sometimes aside interesting possibilities of breaking the rules in order to create hybrid processes.

²⁹ In these retro-feeding processes we can find the highest degree of interaction.

³⁰ There are art works in which the process is the goal, and others in which the result is more important than the process. "In some cases, the process of interaction is the art. In others, there is a clear product of interaction such as a music performance or an image. The ambiguity of where the art is, for us, is one of the attractions of this approach" (Dannenberg & Bates, 1995).

³¹ Because if we wanted to create a repeating fixed thing we wouldn't necessarily need a computer.

³² Museums and galleries don't have often the means to buy or rent computers that use specific software, that need a specific sound card, etc. Thus, the artist is obliged to lend his equipment and it is unlikely that he will be willing to leave it there for long time since it constitutes his daily working gear.

³³ In these two cases, the work becomes open because it changes continuously but there is no concrete interaction with the audience (in terms of sensors changing the parameters of the audio elements). However, in a good sound installation using electronic mechanical devices without sensors, there will always be an important interaction with the public if we create sound phenomena that interact with the acoustic space when we move around.

³⁴ My sound installation *Mechanisms for the absolution of waste* (1997) (Figure 6) is structured by way of three speakers placed in a bathroom. One in the WC, another one in the socket of the light bulb, and the third one in the sink. Each speaker has its own on/off switch in order to be activated, having then three different kinds of combinations of these sound mechanisms (number one alone, number 2 alone, 3 alone, 1 and 2, 1 and 3, 2 and 3, or 1, 2 and 3). Also, activating each mechanism at different times throws out as a result 3-minute looped sequences that will always be out of phase.

6. CONCLUSIONS.

In this paper I have proposed different types of interactions between sound and art. I have suggested that sound sculpture and sound installation have a valid place in the visual arts, proposing a new expanded field that emerges thanks to the inclusion of sound and to the subsequent temporal perception of the works. Sound sculpture and sound installation belong to the sphere of sound art, a territory that has stayed out of the music and visual arts domains. Since the decade of the nineteen sixties of the last century, there have been theorists that proposed a new way to understand these two genres, but did not want to suggest a new category in art being afraid that the rich ambiguities of the works belonging to this possible area, would be constrained³⁵. I am conscious that this is a genuine preoccupation, but I think that both sculpture and installation with added sounds have already created a new discipline with different rules to those applied to these two genres of art. They have evolved from tradition to their diversion from conventional art spaces (to be confounded even with landscape and architecture), but even in this expansion, the theorists have not understood them when sound has become an essential part of their structures. This is possibly due to the art critic's incapacity to create aesthetic discourses based on the sonic element, naturally alien to their academic training. Nowadays there are new academic programs that contemplate the preparation of artists, art historians and art critics in the inter-disciplines. In a near future it will be then simpler to understand these "new" phenomena that in reality are not so young, because they exist since the appearance of the first vanguards of the XX century.

Regarding sound organization in sound sculpture and sound installation, the experiences I've had using different sound structures have made me believe that the open work aesthetic is the most interesting one due to its complexity in terms of sounds always changing. I also conclude that the open aesthetic has a quantum character (Rocha Iturbide, 1999). In one hand because of the rapport of determinist and indeterminist elements, and on the other due to the interconnection of these elements, because their sequence in time will not be important as long as the open structure of the work is successful³⁶. However, there will always be cases in which the simplicity of constant repetition of an audio track will be more valued in a sound installation, and in this sense, this will always depend on the conceptual nature of the work³⁷.

Finally, it is important to say that even though the new technologies offer new possibilities of experimentation, many of the works created with these sophisticated media have resulted in lacking artistic content. This happens because the artists have paid more attention to the electronic interactivity programming mechanisms than to the aesthetic and conceptual content in which these works are founded, or to the necessary equilibrium that should exist between form and content.

"If we subdue to the possibilities of technological means, which are only apparently unlimited, we risk of missing the necessary reflection about the conflictive relationships between the visual and the sound aspects concerning all interactive processes. Instead of a dissolution of the old artistic categories, we assist to an accumulation of gadget effects perpetuating the redundancy spirit and the parallelism that rules after various decades in most of the attempts for a dialog between the arts" (Bosseur, 1998).

The new technological means provide tools with a great potential for the creation of new languages. However, we must never leave aside our main objective: the successful communication of aesthetic ideas with an organization and disposition in space and time, which will coalesce into a complex and interesting **intermedia artwork**.

³⁵ Dick Higgins was perhaps the first person to be critical towards creating a new category (see foot note number 11). Later on, in the nineties, William Furlong wrote: "Sound has never become a distinct or discrete area of art practice such as other manifestations and activities were to become in the 1960s and 1970s. Although it has been used consistently by artists throughout this century, there has never been an identifiable group working exclusively in sound, so one is not confronted with an area of art practice labelled 'sound art' in the same way as one might be with categories such as Pop art, Minimal art, land art, body art, video art and so on. Another factor is the diversity of functions and roles that sound has occupied within various artist's works. This failure of sound to construct a distinct category for itself has in fact proved an advantage, given that categories in the end become restrictive and the work circumscribed and marginalized. Therefore, in spite of the frequency with which sound has been utilized within artists work, it remains remarkably clear of prior associations, historical precedent or weight of tradition. Sound has in fact provided an additional ingredient and strategy for the artist with the potential of addressing and informing senses other than the visual" (Furlong, 1994).

³⁶ The perfect open work of art is a *Mobile*, a sculpture in which the elements change continuously in the space, but that keep a clear connection between them; this structure establishes certain movement boundaries giving it certain coherent organization.

³⁷ In my installation *Rebicycling* (2000) where I use five abandoned bicycles laying in the ground, four small preamplified speakers and two transparent CD players, I ended up making four synchronic sound tracks that are repeated every 12 minutes (with two minutes of silence in between). In this case, the audio is completely linear and it becomes a sort of composition that develops canon structured sound sequences built up from the noise of a bicycle wheel spinning. These sounds that grow and evolve continuously, simulate a noise machine that is generating energy in order to revive the dying bicycles. When the process is over, silence seems to be the result of an automatic regulator that turns the sound off when enough energy has been produced.

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8. FIGURES.

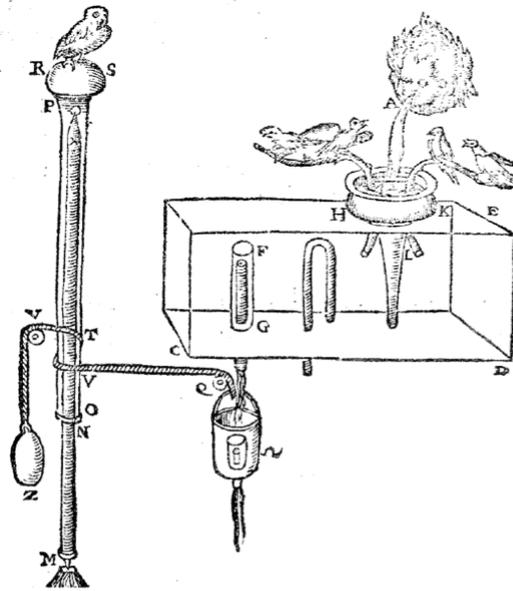


Figure 1.1-1. System for Pneumatic birds designed by Heron of Alexandria (10-70 DC).

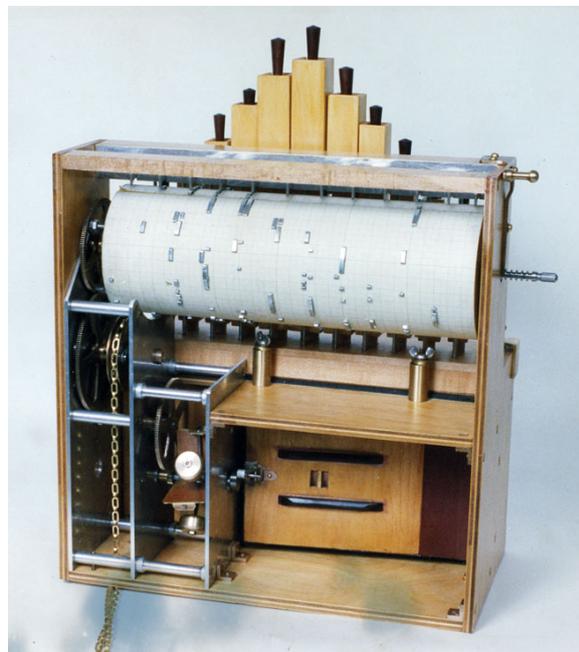


Figure 1.1-2. Contemporary *flute clock*. Designed by Robert Moore.

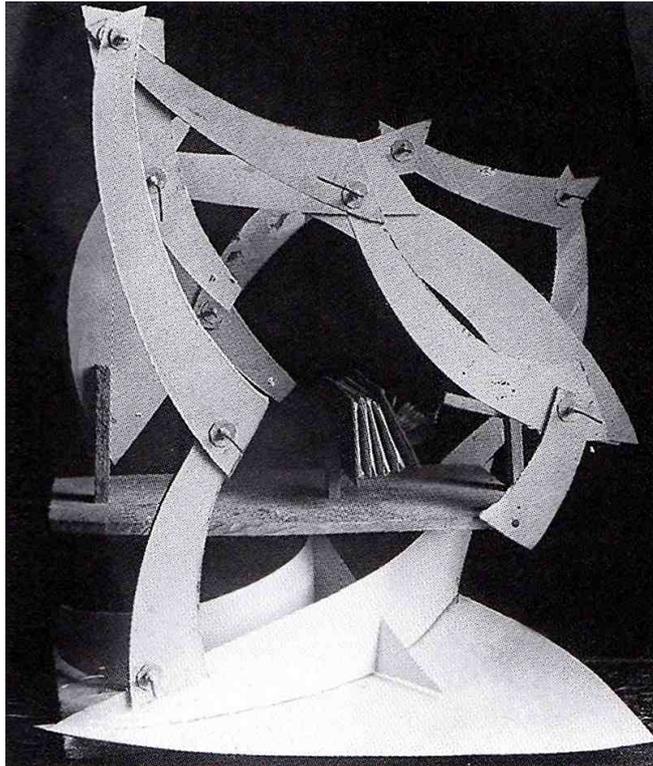


Figure 1.2-1. *Colored Plastic Simultaneous Motorized Noise Complex of Decomposition into Layers.* Fortunato Depero

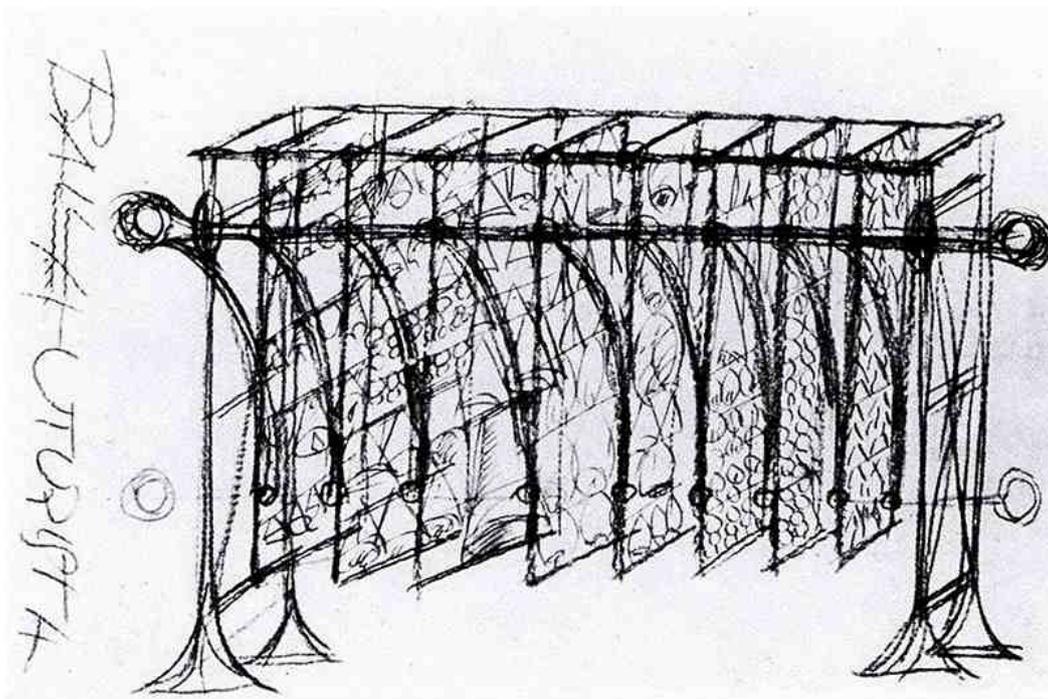


Figure 1.2-2. *Project for a noise musical instrument.* Giacomo Balla

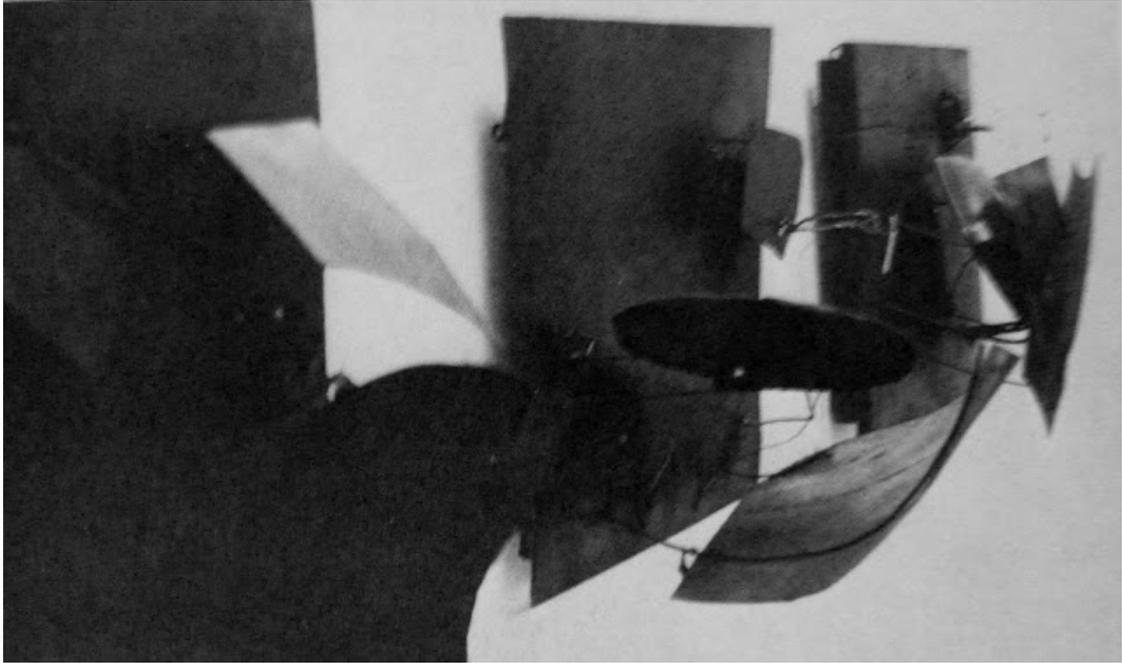


Figure 1.2-3. *Mes étoiles, concert pour sept peintures*. (detail) Yves Tanguely 1958.



Figure 1.3-1. Sound Sculpture by Harry Bertoia (1915-1978).



Figure 1.3-2. *Penetrable blanco*. Museum Jesús Soto. Ciudad Bolívar Venezuela.



Figure1.4-1. *Windribbon*. Leif Brush. Reconstruction of the work that the artist created in his garden in 1975. It deals with an 0.8 mm brass cable extended between two trees. The cable picks up and amplifies sounds of the wind, snow and other kind of vibrations.



Figure1.5-1. *With a hidden object*. Ready made by Marcel Duchamp. 1916. See footnote no.8.

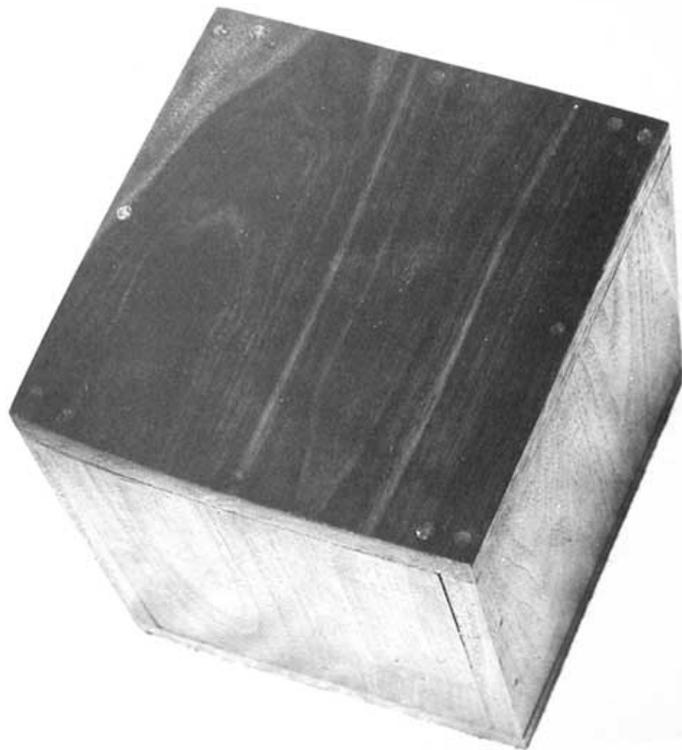


Figure 1.5-2. *Box with the sound of its own making*. Robert Morris. 1961.

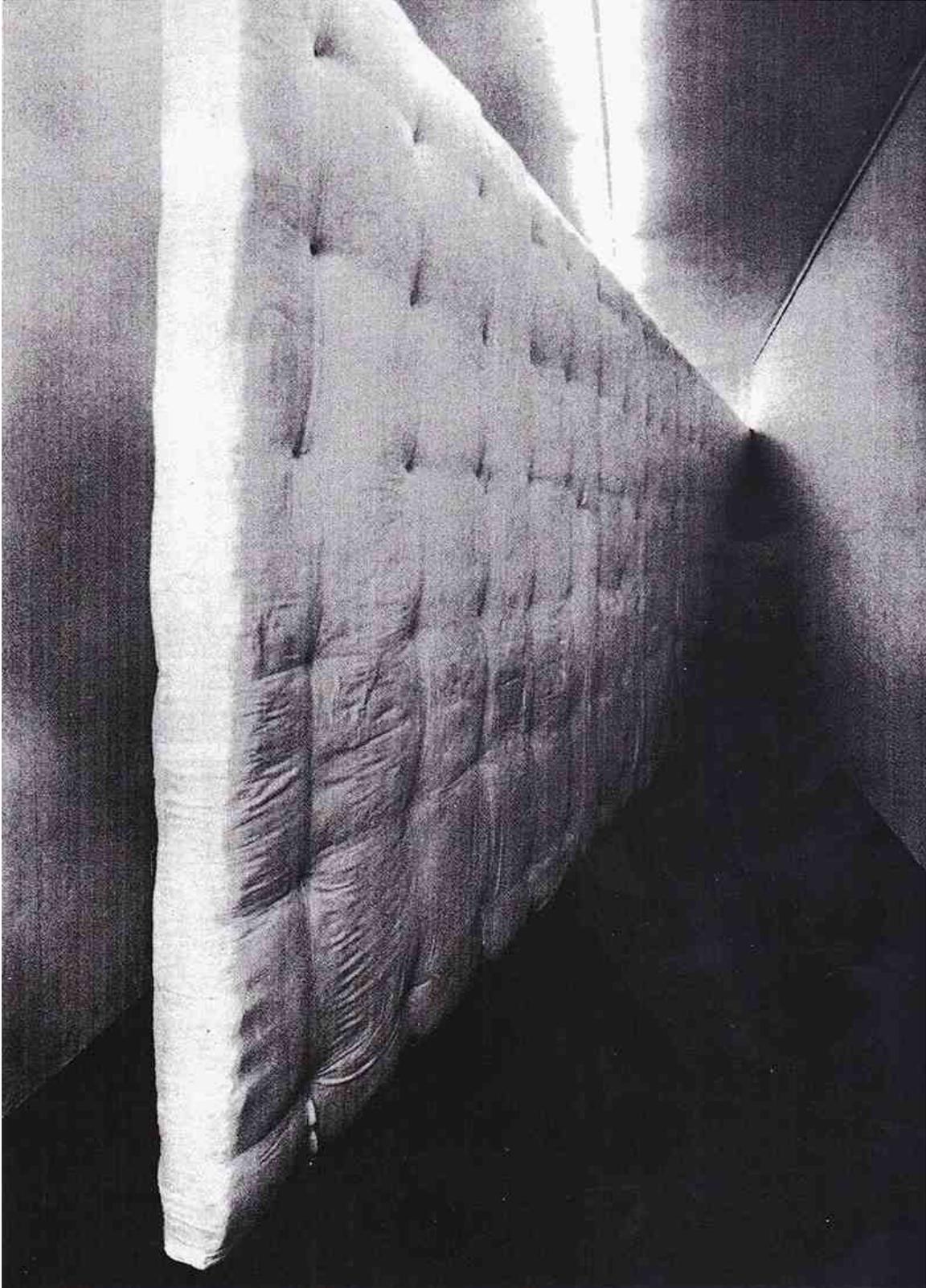


Figure 1.5-3. *Acoustic Wall*. Bruce Nauman. 1969.



Figure 1.5-4. *Homogeneous infiltration for piano*. Joseph Beuys. 1966.



Figure2.2-2. *Rebicycling*. Manuel Rocha Iturbide. Surge Gallery. 2000.
<http://www.artesonoro.net/artesonoro/Rebicycling/Rebicycling.html>



Figure 2.2-3. *The Bird Tree*. Christina Kubisch.
<https://soundcloud.com/soundart-exemples/the-bird-tree-christina>



Figure 2.3-1. *Ping Roll*. Manuel Rocha Iturbide. 1996.
<https://www.youtube.com/watch?v=47HUTOvqD0Y>

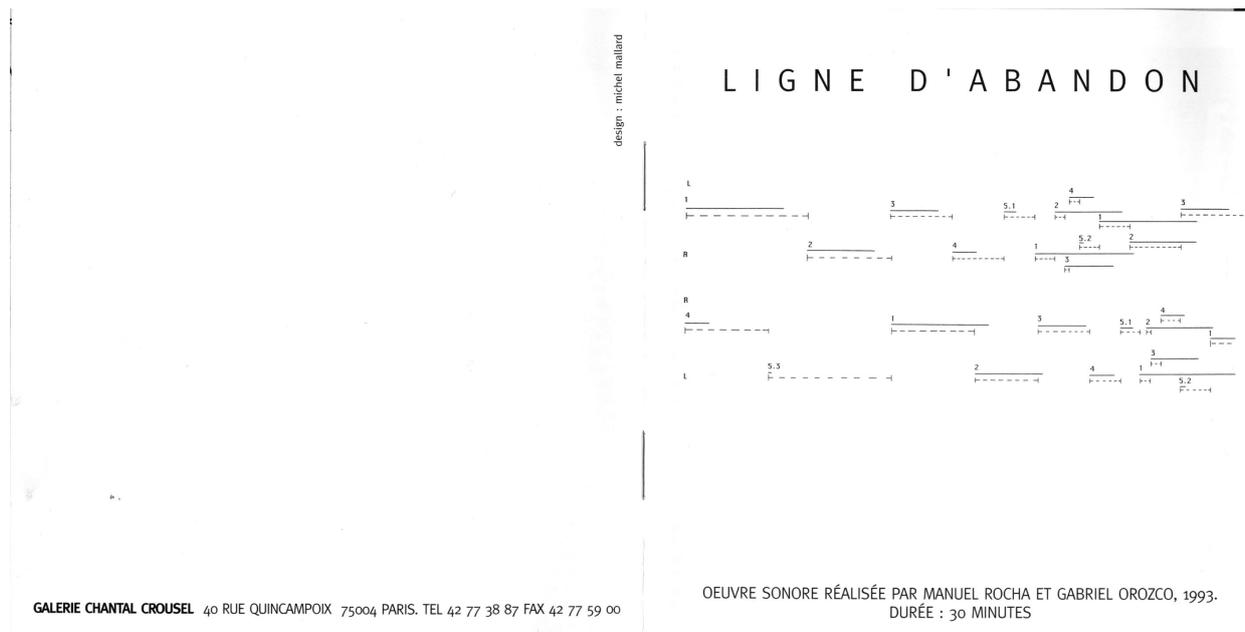


Figure 3.- *Ligne d'abandon*. Manuel Rocha Iturbide and Gabriel Orozco. 1993.
<http://www.artesonoro.net/artesonoro/lineade/lineade.html>



Figure 6.- *Mechanisms for the absolution of waste*. Manuel Rocha Iturbide. 1997.
<http://www.artesonoro.net/artesonoro/mecanismos/mecanismos.html>