ACOUSMATIC PARK: A PATH TOWARD AURAL AWARENESS

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This paper describes a sound installation designed to increase our aural awareness of animal sounds, aiming to reinstate our natural connection to our own habitat. Based on casual, semantic and reduced listening modes, we developed a sound installation that presents creative aural experiences to enhance our connection to the natural soundscapes by recreating lost or forgotten environments, thus contributing to the preservation of sound memory in the contemporary world. This paper explains the concept and implementation of the installation and offers a discussion of the role of listening in our society and strategies to make it a more conscious act.

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1 INTRODUCTION

A sound space is bound to the individual as a listener and to the state of their auditory surroundings: we are always in a complex sonic exchange with our environment. Because our society is increasingly creating a distance from the natural world and its sounds, it is important to raise awareness in the individual of the listening process. This in turn can encourage aural learning and expand our auditory consciousness.

This paper describes in detail the technical and conceptual process of an installation entitled *Acousmatic Park* that enhances our aural awareness through artistic practice. Usually, people are disconnected from the listening act. Most of the time, they are only hearing.

As Murray Schafer pointed out, there is a notable dominance of the visual modality in society. Consequently, children's ability to listen was, in his experience, deteriorating. Because of this problematic, he argued passionately for listening skills to become an integral part of the national curriculum (Schafer, 1977; Wrightson, 2000). Schafer also proposed a program, Ear Cleaning, designed to train the ear to listen with more discernment to sounds, particularly those of the environment (1969).

According to Pauline Oliveros, hearing is an involuntary process while listening is voluntary (2000). Also, Kai Tuuri et al. argue that listening is an active process that provides a means to select the information that meets our needs from the auditory environment; it is usually associated with voluntary attention and intentional focus (2007).

In a society increasingly connected to digital technologies and inundated with constant sound stimuli, aural awareness should be valued. Considering that we live in an urban context, used to a certain daily soundscape of electronic, machinery, industry, transportation, business, and many other technological sounds, the population has less access to sounds from nature. Natural environments are starting to be "forgotten." Regarding this condition, Wrightson argues:

> In the developed world, sound has less significance and the opportunity to experience "natural" sounds decreases with each generation due to the destruction of natural habitats. Sound becomes something that the individual tries to block, rather than to hear. (2000, 12)

Cities are more and more urbanized, and it is starting to become difficult to find quiet or natural areas. Even the parks or gardens we have access to within the cities are "contaminated" by the sounds of highways, airplanes, and construction, among others, leading to the masking of the real sounds that should characterize these areas.

In a context in which the awareness is being raised of the impact of urban sound on our society, we are beginning to face the problem of increasing noise in cities. One of the resulting dangers to ecosystems include some species of animals leaving noisy areas (Francis and Barber, 2013). According to studies in emerging fields such as soundscape ecology, we can observe, for example, how animal sound communication (bioacoustics) has been changing due to a soundscape transformation caused by increasing anthropogenic noise (Francis and Barber, 2013; Pijanowski et al., 2011). By developing these fields, we can increase our knowledge and understand how humans affect ecosystems (Pijanowski et al., 2011). Bernie Krause describes the dilemma in his latest work:

> More than 50% of the material recorded over nearly five decades comes from sites so badly compromised by various forms of human intervention that the habitats are either altogether silent or the soundscapes can no longer be heard in any of their original forms. (2015, 29)

Based on the links between science, sound, and technology and supported by both sonic architecture and urban planning, we are challenged to seek new approaches in sound perception and consciousness. In this paper, we present a sound installation through which we propose tools to increase awareness of sound in order to maximize the relationship with the listening process.

According to Michel Chion there are three identified kinds of listening states: causal, semantic and reduced listening. **Causal listening**, the most common mode of listening, consists of listening to a sound in order to gather information about its cause (or source); **semantic listening**, a mode that refers to a code or a language meant to interpret a message: spoken language, for example, as well as Morse and other such codes; and **reduced listening**, a mode that focuses on the traits of the sound itself, independent of its cause and of its meaning. This term, reduced listening, was first coined by Pierre Schaeffer in the context of concrète musique and is closely related to acousmatic listening, another concept introduced by Schaeffer. Acousmatic listening refers to a situation where the sources of the audible sounds are not visible for the listener (1994). Supported by the work done by the previous authors and by Chion's modes of listening we develop experiences that not only increase our aural awareness and raise consciousness of our listening act but also reinforce our connection with natural soundscapes.

2 RELATED WORK

This work, entitled *Acousmatic Park*, is framed in artistic, scientific and social science fields, and it features original contributions based on sound recording. The main contribution of this work is offering the community a more conscious sound approach, strengthening its relationship with the natural environment and promoting environmental education. We want to promote more "attentive" citizens in a world with constant sound evolution, thereby providing work that can increase people´s awareness. As the composer and creator Oliveros states:

> Deep Listening involves going below the surface of what is heard, expanding awareness to the whole field of sound, while finding focus. This is the way to connect with the acoustic environment, to all that inhabits it, to all that there is. (2000, 39)

For Pauline Oliveros deep listening is "a practice that is intended to heighten and expand consciousness of sound in as many dimensions of awareness and attentional dynamics as humanly possible" (2005). The deep listening act can be considered a kind of meditation in which people can achieve relaxed mental states. The goals set for *Acousmatic Park* intend a creative exploration of the listening modes in a controlled environment in order to provide an incentive for a conscious approach to the listening act. In fact, sound strategies implemented in *Acousmatic Park* have been shaped to convey quick and easy experimentation with sound compositions with different degrees of interaction and immersion and allow engagement with several natural environments. This installation draws upon our search for aural awareness and for the relationship between nature and its sounds. The project is supported by research on artistic work that shares the same ideas and concepts that we will present shortly.

Chris Watson, in his work *Whispering in the Leaves* (2008-2010),[1] uses sound recordings from tropical forests of South America to create immersive soundscapes. He created two compositions of vocalizations, voices and songs from different species corresponding to dawn and dusk, the times of transition in the rainforest. In his piece visitors are meant to concentrate on the listening process.

Another relevant work is *Chairs* (1995-2007),[2] by **Peter Ablinger**, that foregrounds listening as the main purpose of the piece. For Ablinger, the most important element is not the piece or the composition, but the listening process itself. It is not the sounds themselves but instead the act of listening that becomes the piece. This work is interesting because it directs the listener's attention through the action of "sitting." In this way, the public will be more aware of the act of listening.

1. http://www.chriswatson.net/

2. http://ablinger.mur.at/docu01.html

Another artist that relates to our goals is **Leah Barclay** with the *Listen(n)Project* (2014),[3] a piece that explores remote embodied experiences of natural environments through sound. It focuses on community awareness and sustainability by studying how rich digital media environments and acoustic ecology practices can be used to broaden discussion about the value of precious, yet fragile, environments. It explores how virtual ecological engagement through sound can nurture environmental awareness and community agency.

The work led by artists and activists from the documentary *Racing Extinction* (2015),[4] that transformed the St. Peter's Basilica in the Vatican in a public art project to raise awareness on climate change and endangered species is also a reference project for the themes of community and global awareness. The artists want to inspire more people to care for the planet and be more conscious about saving it. This is a very important issue because we are starting to see the impact that these kinds of art practices may have on communities by encouraging a shift in behavior and a change in people`s habits in order to protect the natural environments.

In **Bearnie Krouse's** latest book *Voices of the Wild* (2015),[5] he gathers a set of recordings in the same place in different years and shows how the habitat´s sounds have changed through times. This book can be read in conjunction with a website in which the audio clips are stored, featuring recordings from all over the world.

Finally, we also consider the work of **Francisco Lopez**,[6] an influence because of his approach to sound and the listening process. In his live performances, Lopez calls our attention to the sounds themselves rather than to their sources and suggests that the audience should wear blindfolds to enhance the experience.

3 DESIGNING THE SOUND INSTALLATION: A CASE STUDY

3.1 PROPOSAL: *ACOUSMATIC PARK*

Research study of the subject—aural awareness and listening modes
Initial proposal—development of a site-specific sound installation for Casa da Música,[7] Porto, Portugal.

In *Acousmatic Park*, we aimed to expose members of the public to a new sound approach so that they could use the sound in a creative way, thereby improving their aural experience. With the

3. http://invisibleplaces.org/2014/pdf/ip2014-barclay2.pdf

4. http://ourcommonhome.world/

5. http://insidewildsanctuary.blogspot.pt/

6. http://www.franciscolopez.net/live.html

7. Casa da Música is a concert hall with two auditoriums and several rooms, that houses most of the cultural and musical events in Oporto city. This project is housed by Digitópia, a platform for creating digital music and performance, emphasising collaborative environments, software design and music education. www.casadamusica.com

development of these capabilities, we enable people to listen to their environments with greater awareness. We offer an exploration of the listening modes of Michel Chion, believing that this process helps exercise our auditory perception on a deeper level. Given these elements, we believe that through the development of sound installations, we can raise public awareness of not only a different approach to sound but also a reinforced relationship between society and the natural environment, thus preserving memories of these almost "lost" sounds.

We developed *Acousmatic Park* in order to achieve these goals. *Acousmatic Park* is a route through four rooms that work as listening spaces. In each room, we present a different sonic experience with a specific soundscape and a suggested listening mode. These listening experiences are based on a simplified model of Michel Chion's three listening modes. Bearing this in mind, every room provides a sound approach on cognitive and emotional levels inviting the public to actively engage in the listening act. Currently there is a more complex listening model brought by Tuuri et al. that defends, for example, multimodal listening, but for this installation we decided to explore the basic model. (Tuuri et al., 2007)

3.2 EXECUTION / IMPLEMENTATION

After a careful survey of Casa da Música's facilities, we selected the spaces based on the possibility of a narrative between the rooms, proximity between rooms, acoustic properties and physical characteristics, dimensions, localization, acoustic potentiality, general ambience, illumination, and the presence of windows. We also had in mind the logistics of the rooms, the normal operation of Casa da Música, and a logical evolution through the listening modes.

To enhance the immersive experience, we selected four rooms that we will describe in the next section. These four rooms are contiguous, which allowed us the possibility of a path. Also they have quite different characteristics, which permitted us to have a creative approach in the use of spaces.

With the support of Macaulay Library of Ornithology that kindly provided part of the sounds, and by original recordings made by our team in Zoo da Maia (Fig. 1), Parque Ornitológico de Lourosa, Centro Veterinário de Exóticos do Porto, and Sealife, we built an original sound library mainly composed of animal sounds. For the recording process we used Sound devices 702T Portable digital recorder; custom made hydrophones; CS-1 Shotgun Microphone; Rycote windshield kit 4; Zoom H4 Handy Recorder; and Zoom H2 Handy Recorder. This experience *in loco*

was important to understand the expressiveness and the artistic potential of the sounds. We could define which animals would be most appropriate to use within the installation. This original library provided a more consistent basis for the project and actively contributed to the preservation of sound memory of the chosen species.

> The recordings made today will eventually become "acoustic fossils," possibly preserving the only evidence we have of ecosystems that may disappear for lack of ability to protect them. (Pijanowski et al., 2011, 213)

Fig. 1. Zoo da Maia, 2015, sound recordings.

A digital platform with a website (Fig. 2) was developed as a complement to the installation so that the visitors could obtain more information regarding the work and the sounds. We also used QR (Quick Response) codes in rooms, which allowed us to increase the user's relationship with the project, directing the user quickly to the website.

Fig. 2. Screenshot from www.acousmaticpark.org

3.3 DESCRIPTION OF THE ROOMS

In all the four rooms, we propose a soundscape essentially composed of animal vocalizations that stimulates and challenges our listening awareness from different perspectives. For each room, we provide a brief description of the concept and context, the type of composition, and the suggested listening mode.

Table 1. Room characteristics.

ROOMS	CHARACTERISTICS	SUGGESTED LISTENING MODE
1. Cibermúsica (Cybermusic)	Natural light with a glass wall Acoustic treatment promoting sound amplification Connected to Foyer Renascença	Open, creative listening
2. Foyer renascença (Renaissance Foyer)	Natural light with a glass wall No acoustic treatment Connected to the Sala Laranja	Causal listening
3. Sala Laranja (Orange Room)	Artificial light, no windows Interactive room Kinect Connected to Sala Roxa	Semantic listening
4. Sala Roxa (Purple Room)	Artificial light, only presence lightning Dark room Immersive room	Reduced listening

Acousmatic Park explores the listening modes covered above. The modes can be engaged in any room; however, some rooms are more suited for a particular type. The listener can have a free approach to the experience by moving through the rooms and deciding how long he will spend in each room. The listening modes are designed not only to help the listener increase their aural awareness, providing different conditions for the listening act, but also to draw his attention to environmental education. Connor writes:

> Perhaps it is the sound of animal sounds that most impresses us with the sense of a specifically sonic field of action and awareness, precisely because the sound of unowned animals is usually separated from visual confirmation. Whether it be the whirr of cicadas, the twittering of birds, or the hum of bees, the animal sounds that we hear are normally separated from their sources. (2014, 19)

ROOM 1: CIBERMÚSICA[8]

8. https://vimeo.com/148042491

The room Cibermúsica (Cybermusic) is characterized by a nocturnal or crepuscular soundscape in which listeners are mainly presented with nocturnal species. The narrative for this room is based on a night walk in a lake area, and we can listen to a full range of animal sounds that alternate with a quieter ambience. The sound composition is based on calls from several amphibians, such as frogs and toads, but also from birds, insects, bats, and some natural sounds such as water or wind. In order to encourage the visitors to engage the first listening challenge, the strategy for the composition was based on two essential aspects: the expressiveness of the sounds and the relationship between them.

Our strategy for this first room was to present a preliminary listening experience to the visitors. As this room is the first connection with the installation, the idea is to encourage the listener to become more aware of the sound environment by engaging with the listening act in an open and free way. We intend for the visitor to have no specific concern with the listening mode but instead to focus on the conscious listening act. In order to keep visitors engaged with the soundscape, we offered sounds to arouse curiosity and alternated between known sounds and less familiar sounds to promote interest. For a more immersive experience, people are invited to lie down and are encouraged to close their eyes (Fig. 3). In order to facilitate concentration on the listening act, we had blindfolds for the eyes (Fig. 3).

Fig. 3. People listening in Cibermúsica room, Casa da Música, Porto, 2015 (left)**.** People using blindfolds in Cibermúsica room, Casa da Música, Porto, 2015 (right).

ROOM 2: FOYER RENASCENÇA[9]

In Foyer Renascença (Renaissance Room), we present a soundscape easily recognized by the listener in order to explore causal listening. When we find a direct relationship between the sound and its source, we further develop the capacity for sound interpretation. The narrative for this room is based on the transition from a sunny day to a thunderstorm in a tropical forest, and the sound composition is mainly comprised of diurnal birds, monkeys, insects, and some natural sounds such as rain, water, and thunder. There are animals that can predict these events and even emit specific vocalizations before the rain starts, so the strategy for the composition was based on the relationship between environmental events and specific responses in terms of animal behavior.

We took advantage of the large glass windows in the first two rooms (Cibermúsica and Foyer Renascença) and searched for new approaches of sound transmission. Thus, in both rooms we questioned the use of a traditional stereo system that interferes visually and gives the listener an indication of the sound source. After exploring different types of sound transmission through unconventional surfaces, we came to the solution of using speakers from the brand Feonic.[10] These are quite small speakers, almost imperceptible with a 4 ohm impedance and 100 watts power, and they transmit the sound to other materials through vibration. We used two exciters in each room to transmit the sound through the entire glass window (Fig. 4), making the most out of the building materials.

Fig. 4. People listening in Foyer Renascença room, Casa da Música, Porto, 2015; detail of the Feonic speaker in the window.

9. https://vimeo.com/148042998

10. http://www.feonic.com/technology#products

ROOM 3: SALA LARANJA[11]

11. https://vimeo.com/148044366

The sound environment in the Sala Laranja (Orange Room) is composed of alarm or distress calls from different species that are usually presented when a danger or threat appears (defending the nest, warning a predator, or crossing the security perimeter). The listener has the opportunity to interact with the space, and the sounds proposed are related to semantic listening. We used Sonorium, an application developed by Digitópia that creates a sound map of a physical space, which triggers specific sounds according to the presence and position in space of the visitors. Sonorium is an electronic virtual instrument that detects and interprets even the slightest movement, captured through a motion detector. It applies a tridimensional virtual grid to a physical space allowing the creation of a set of hotspots that are activated by the user's position, thereby triggering a predetermined sound or MIDI note.

This room is characterized by empty space exploration (Fig. 5) and requires the presence of the public, which introduces the concept of participatory installation. There are specific areas in the room that act as sound triggers. Most species presented in this room vocalize or react when they feel the approach of a predator, so we thought it would be appropriate to play with the distances in order to create danger zones in which sounds are triggered. To help the listener to detect sounds, a path was designed on the floor (Fig. 5).

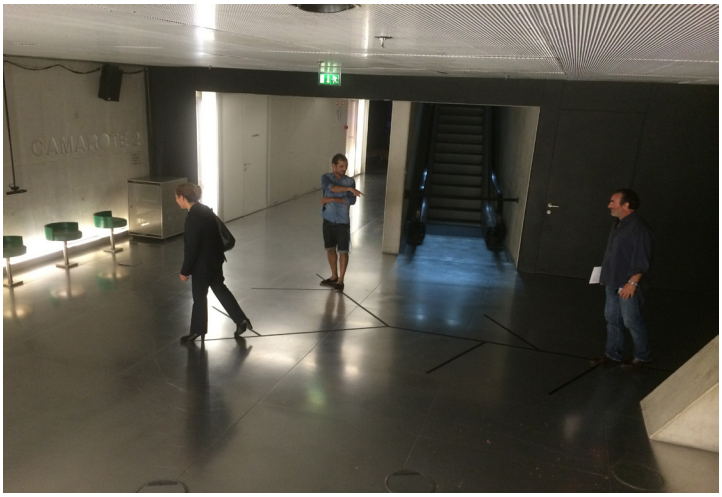

Fig. 5. Sala Laranja, Casa da Música, Porto, 2015 (left). Sala Laranja, Casa da Música, Porto, 2015; detail of the path on the floor where sounds are triggered (right).

ROOM 4: SALA ROXA[12]

12. https://vimeo.com/148044045

The characteristics of Sala Roxa (Purple Room) led us to design a narrative of an underwater environment. The sound composition is based not only on species of marine mammals such as dolphins, whales, seals, elephant seals, but also on fish and water sounds. Because the strategy for the composition was promoting a confrontation with very rich and deep sounds, we used vocalizations with a very different range of frequencies that combined together to give rise to a very unusual soundscape. This challenges the listener to approach the auditory process in an unusual manner. Here, we intended to develop reduced listening without any attempt at sound interpretation. We explore not the connection with the source but the evaluation of the sound itself. The characteristics of the sound, such as pitch and timbre, are the focus of attention.

Because it is the last room, we engage the listening mode that requires the most training. To help the listener, this room remains in almost total darkness (Fig. 6). The soundscape is composed of abstract sounds to encourage the listener to focus on the characteristics of the sound and not on the source.

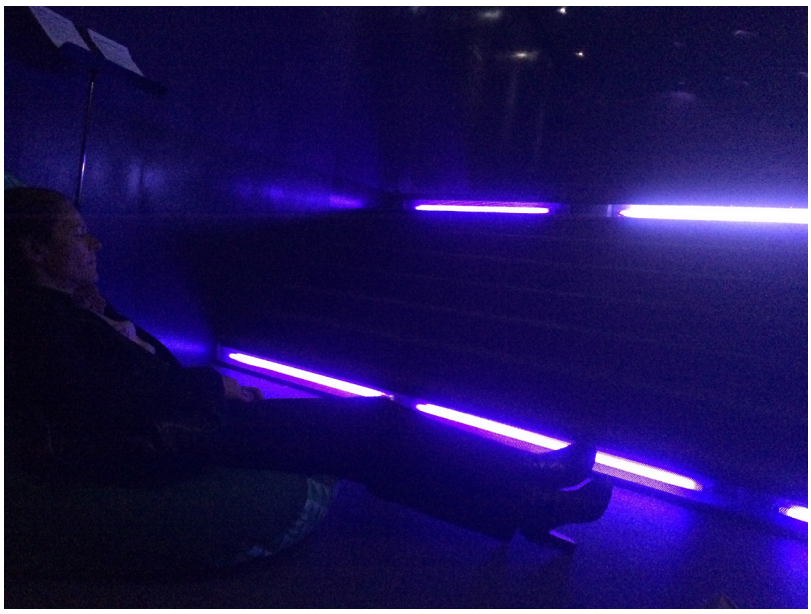

Fig. 6. Sala Roxa, Casa da Música, Porto, 2015.

4 RESULTS

In order to understand and evaluate the reactions of the visitors, we collected feedback using direct observations, photography and video records, and interviews with the guides that followed some of the visitors within the installation. This way, we could obtain information without interfering in the experience. This

feedback allowed us to better assess the preferences and behaviors of the visitors within the frame of our artistic objectives. We had a total of 720 visitors: 352 individual visitors that explored the installation by themselves and 368 that had a guided tour. In these tours, the visitors got to know all the Casa da Música facilities, including the rooms with the installation. The guides followed these groups through the installation, explained the concept of each room, and observed the overall reactions of the visitors. They also were available for any simple questions regarding the work.

From our conversations with the guides we assessed that Sala Laranja and Cibermúsica captured the most attention from the public. The visitors spent much of their time interacting with the sounds in Sala Laranja, and it was interesting to observe that the use of a Kinect promoted the dislocation and use of the body in the physical space. The conditions provided in Cibermúsica helped the listener concentrate and primed him for the listening act, and this room kept visitors for the most time. At Foyer Renascença, visitors spent less time and very few sat down for a longer experience, probably because they came from Cibermúsica, where they had spent time sitting or lying down. We observed in Sala Roxa that visitors engaged with the sounds but left the room quickly, perhaps because the presented soundscape was more abstract. We experienced some problems when dealing with large groups that interfered with the behavior of solo visitors, leading to distraction and consequent loss of attention. This also happened when occasional external sounds overlapped the soundscapes.

Based on our observations, feedback gathered among participants, and information from the guides, we inferred that the causal listening seemed to be the most immediately used mode among the visitors (and people in general) in all the rooms. Even in Sala Roxa, where the suggested mode was reduced listening and the visitors were meant to disconnect the sounds from sources, people tried to guess the original sound. Michel Chion also explains this when he refers that an acousmatic situation may create favourable conditions for the reduced listening, however it may also increase the listener´s effort to identify the source (1994). On the other hand, we also observed some visitors repeating rooms to try the different modes. We conclude that these challenges and practices should be more regular so that people may learn these methodologies, and develop their skills, in order to use them in daily life.

Regarding the enhancement of aural awareness, we conclude that if we provide the necessary conditions, people can become conscious of the listening act itself. We also learned that people are easily distracted from their focus and that listening is a

process that needs practice and training, especially the listening modes less used on a regular basis, such as reduced listening. We are confident about the transmission of our objectives because, through the exploration of these procedures and from the information collected, we perceived that visitors left with an understanding of the purpose of the installation. In all the rooms people engaged with the soundscapes and with the listening act. We attained an enhancement in their aural awareness in certain moments of their time within the installation. We could also conclude that if people are reminded of the act of listening, they become aware of it. At this point we also assume that these reminders need to be on a regular basis to promote a more comprehensive awareness of sounds.

What we could not conclude was if people after the installation where challenged to maintain this consciousness of the sounds from their environment and if the installation helped them with this behavior. In the future we would like to track whether this behavior disappears immediately after the visit to the installation or if people left more attentive to their surroundings.

5 CONCLUSIONS AND FUTURE WORK

Because of the lack of aural awareness in society, we searched for solutions to raise our consciousness of sound and the listening act in our daily life. We developed an interactive sound installation as an answer to our problems. Currently we are witnessing excessive environmental noise, which usually leads to the need to “clean” our ears. There is a lack of connection between people and nature and its sounds. This work offers a way to outline this issue from an aural point of view, allowing an engagement with nature through the compositions used in the project. By creating spaces that simulate natural environments, we proposed innovative acoustic experiences to the listener. The documentation available in the rooms regarding the explanation of the listening modes and the concepts of each room, together with the information and sounds provided on the website, were central for achieving the intended listening experiences. Otherwise, it would be difficult for the visitors to attain the level of attention and awareness required for the overall experience. The strategies described in this paper provided us a better understanding of how people approach sound and the listening act. We can conclude that this kind of art practice can be a starting point for a more conscious approach to the listening act and a heightened awareness of sounds.

Acousmatic Park is going to be presented at the Zoo da Maia facilities, and we plan to continue the sound recordings. We aim to catalog their animal collection, integrate more sounds, and expand our original library by updating the website with new information. We also want to add sound walks and sound maps to the installation in order to improve the exercises for practicing the listening act. Through our artistic practice, we want to enhance environmental education, promote a better understanding of wildlife, and encourage people to respect the animals in their environments.

Finally, although the main objective of the project is increasing aural awareness, its scope can be expanded to other areas such as live performance, visual arts, and educational practices, among others. Future work will include improving the conditions of the listening act to allow a more complex and permanent response in the individual. At the same time, we are also planning a more medical approach (sound frequency therapies) for the use of these natural soundscapes in order find treatment options for tinnitus problems. Searching for the relation between aural practices and treatment approaches for these conditions can be a challenge and a way of connecting medicine and sound art. We seek the possibility of developing new auditory practices by proposing innovative approaches to sound in a critical and creative perspective. We question how the listening act will evolve in our society.

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