The Harmonies of the Unheard

Kaitlin Creswell

My greatest thanks
to my family, for lifting me up through this
journey,
to my partner, for gifting me the book that
sparked my fascination,
and to my advisor, for reminding me of the
world I needed and missed: the world of sound.

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Introduction

When a hum is removed from a moment filled with sounds, its absence becomes strikingly recognizable. Before isolating and removing it, it is likely that no one would have ever noticed it was there. In moments lacking sounds, the hum we can then hear within the silence may feel exposing, vulnerable, or deafening. A hum can be perceived as annoying and unwanted, or a hum can be perceived as beautiful. Regardless, the hum is a peek into the vulnerability of a space, or of oneself.

We can connect to a harmony of hums if we allow ourselves to acknowledge the existence of sounds at all levels. Containing the audible and the inaudible. Containing what we actively hear, and what we drown out as "background noise". This can facilitate a beautiful moment of reflection internally and externally, and as a connection to all graspable representations of time and space. My goal in this thesis is to speak of this beauty, to create an audio project, and to defend this beauty and its existence in writing.

My initial fascination with the hum came from the recognition that people occasionally will hum without the awareness that they are doing it. Someone who may be too nervous to sing a song in front of others could succumb to the hum if their favorite tune begins playing in their mind. Particularly, this circumstance created my first fascination with how hums are remarkably exposing. Similarly, the hums we hear in moments of silence or the hums we hear providing a solid background noise to any given sonic environment evoke a range of reactions from the listener. The listener could become calmed, great-

ly irritated, or even scared. The listener's level of consciousness can become heightened from the awareness of a hum. In all cases, my takeaway is that the hum at any level has the power to make a listener vulnerable and more conscious within a moment, beyond what they would initially expect.

My second fascination with hums is what "sold" me on dedicating my thesis to the hum, and sound at all levels of audibility. While reading the novel *A Fórmula de Deus* by José Rodrigues dos Santos, I was introduced to the existence of the Cosmic Microwave Background (CMB), which is the faint remnant glow of the Big Bang. The CMB can also be represented sonically via radio or by means of sonification (McGee et al., 2011), which is how it was officially discovered in June of 1963 (*June 1963: Discovery of...*, 2002). I was engrossed in this concept.

In Rodrigues dos Santos's novel I also learned that, if you turn an analog television to a channel that is not currently broadcasting anything, and you are met with a screen full of static imagery and noise, you are connected to the CMB in a way. From this static, ≈1% is from the CMB (*Cosmic Microwave Background*, n.d.). I will revisit this concept in the chapter in which I will discuss Hum, but for now I will say that I was in awe realizing how, in a way, **we can harmonize with the birth of matter**.

If we watch a channel of static and decide to hum along, we can create a dissonant harmony with the CMB (amongst other causes of the television's static of course). This was the spark that ultimately

set in motion my curiosity and drive to analyze hums, especially those which come from inaudible vibratory phenomena and those which can be considered “background noise”. I am now fascinated by all of the levels in which we can locate sounds. I use the term locate in order to account for more than just the sounds at the human ear’s level of perception. This will become evidently important throughout the text, as it is a key concept I explore through my analysis of the hum, and what there is to be gained through connecting to these unconventional levels of audibility.

Hums are parts of a soundscape. What allowed the growth of my fascination is the way in which hums have the power to either fade into the background or alternatively captivate an environment, or soundscape. Take the sound of cicadas in the summertime, the constant buzzing can be comforting for some, or irritating for others. “The most easily recognized insect sounds for modern man are the most irritating” (Schafer, 1994). Typically, noise would not be considered as a valued part of a soundscape. I debate this idea. There is also debate as to the necessity of the term “soundscape” in itself.

Sound cannot be observed without acknowledging its presence within any given environment, and without acknowledging all of the levels in which the hum can be found, including the inaudible. Therefore, I will contextualize my analysis of the hum using the development of the soundscape, beginning with the birth of the soundscape, found in the World Soundscape Project by R. Murray Schafer, and arriving at the conclusions drawn by Timothy Ingold, in his text

“Against Soundscape”, and Stefan Helmreich, in his text “Listening Against Soundscapes”. I will follow these conclusions with a review on the concept of acoustemology, invented by Steven Feld, including perspectives from Noise by Jacques Attali, leading into exploring vibration as sound, analyzing the hum through the perspectives and research of Lawrence Kramer, and finalizing the research through highlighting the technologies which allow these studies to occur, and the sound artists who are currently doing it.

Soundscape

Before entering the realm of the soundscape, it is necessary to first discuss the view and understanding of sound in itself that will be referred to throughout this thesis. Listening and hearing are extremely powerful actions. Actively choosing to listen to sound is valuable beyond plain function. There is a depth to hearing that can be accessed once the listener acknowledges how eye-opening sound is. "The sense of hearing cannot be closed off at will. There are no earlids. When we go to sleep, our perception of sound is the last door to close and it is also the first to open when we awaken…" (Schafer, 1994).

Sound can be defined in a variation of ways, to a varying level of depth. Sound is commonly agreed upon as vibrations that can be heard when they reach a person's ear. In the realm of physics, sound is defined as a pressure wave which is created by a vibrating object, setting particles in the surrounding medium, which we can commonly understand as air, in vibrational motion. For the viewpoints which will be discussed throughout this thesis, all vibratory phenomena, whether audible or not, will be treated as equals, as they have equal opportunity to be sonified and heard, assuming one gives them the chance.

This is the notion of sound that will be relied on within this thesis. The ideas that will arise and the focus this research will land on all are in agreement with acknowledging sound at all levels, even as an inaudible vibratory phenomenon being sonified, not just at the level that is naturally audible for human ears.

In this thesis all sources and interpretations of vibratory phenomena, including sound, will be acknowledged as carriers of an aes-

thetic fascination that has generally influenced the concept of sound, whether perceptible or not. The vibratory phenomena that are silent yet derive from natural occurrences will be treated as equal to sound. Furthermore, “noise” will not be considered as unwanted or as a distraction to the “true” sound of an environment, the sounds producing “noise” will be considered as just as active in participation to an environment as the sounds and vibratory phenomena one would naturally find in the environment.

Noise can be a pretentious term. Noise is considered noise under the assumption that the soundscape of an environment is intended to remain the same throughout all of time, or that it should remain the same. The term noise expects that neither animals nor humans will change their habits, and no evolutions will be made. The changing of a space, or of the habits of inhabitants of a space, creates new sounds that can abruptly enter a soundscape. Most likely, when one describes noise, this is what they are referring to. As the new sounds are not what one is used to hearing, it unpleasantly distracts from the previously known soundscape. Noise can frequently end up being a narrow-minded approach to viewing sounds. As previously stated, it assumes change will and should not happen. It assumes that the sonified representations of inaudible vibratory phenomena are not wanted within an environment.

It is impossible for an environment to experience no changes. Change is what characterizes an environment. Therefore, noise is not exactly noise, but rather it is just another new sound to accept into an

environment's soundscape. To clarify, I do still recognize noise's existence as a sound that can pollute an environment and cause distress to the listener.

Much of what has just been stated is in disagreement with soundscape. From here, background on the concept of soundscape will be provided. The source which increased the popularity of this term will be visited, along with the happenings of the beginning of the study of soundscape.

General Definition of Soundscape

The soundscape is the acoustic perception of an environment. The way the term "soundscape" can be used seemingly directly relates to the term "landscape", which is generally acknowledged as how one can perceive an environment visually. As stated by Murray Schafer in *The Soundscape*, "a soundscape consists of objects *heard* not objects *seen*." (1994). It is the isolation of solely a sonic interpretation of an environment. The soundscape has become the means in which we are able to discuss humankind's relationship with sound.

What can generally set the tone for a soundscape is a keynote sound. They are consistent sounds that become the stable background for other sounds. "Keynotes are rarely listened to consciously by those who live among them, for they are the ground over which the figure of signals becomes conspicuous. Keynote sounds are, however, noticed when they change, and when they disappear altogether, they may even be remembered with affection" (Schafer, 1994).

Keynote sounds show how we can best understand an environment's true soundscape when it is not the soundscape we live within. As an onlooker, the keynote sound of a particular environment will not hold the same significance as it will for a local. You are able to fully appreciate all levels of sound, and the true sense of the environment's soundscape, thanks to your view as an outsider.

Historical Background: R. Murray Schafer and The World Soundscape Project

The concept of the soundscape was popularized in the late 1960s and early 1970s by R. Murray Schafer through the World Soundscape Project. The project began with a group of likeminded students and young composers. Bruce Davis and Peter Huse started with a journey to go across Canada recording soundscapes in 1973. This was followed by Schafer leading a European tour in 1975 that also consisted of lectures and workshops (Truax, n.d.).

In order to determine how they would go about collecting recordings, some criteria were set. "First of all, we hoped it would be off a main road, that it would be self-contained and not contiguous with other settlements, that its buildings would be fairly closely grouped so that the sound making activities of the village would constitute the largest events in the quiet countryside beyond, that the village would have a strong and cohesive social life – but not so cohesive as to resist curious intruders like ourselves – that it would have a few acoustic

signals of distinction, a few unusual vernacular sounds, some good ambiances to record in, and a native speaker who knew both the regional dialect and spoke fluent English" (Schafer, 1977).

At the same time as setting these criteria, Schafer is of the belief that "only a total appreciation of the acoustic environment can give us the resources for improving the orchestration of the world soundscape" (Schafer, 1994). This idea is what led me to begin questioning the concept of soundscape.

If we want to improve the orchestration of the world soundscape, why only venture to places fitting such a specific set of ideal criteria? Of course, the original treks of the World Soundscape Project are not meant to be the one and only perception of the concept. Keeping this in mind, it can be seen that not only in this initial recording criteria, but additionally in Schafer's further explanations, he idealizes some soundscapes over others, staying away from those which contain "noise", or unfamiliar sounds to the environment which is being observed. Schafer states, "today the world suffers from an overpopulation of sounds; there is so much acoustic information that little of it can emerge with clarity" (Schafer, 1994). Yet how can one simply observe the audible level of an environment and claim that the world suffers from the sounds within it? Is that not just the soundscape of that particular place?

Criticism of Soundscape

Schafer states that the rural soundscape, being inherently quiet, experienced "two profound acoustic interruptions: the noise of war, and the 'noise' of religion" (1994). This raises a question within the concept of soundscape, to what extent is noise considered a participating party of the soundscape, and to what extent should we exile noise from our perception of any given soundscape? Who, or what, determines what can and cannot be considered an equally valid aspect of the soundscape? Sound is simply vibrations that humans can hear. Despite the reaction a sound can evoke in a person, a sound itself is not predetermined as "noise", it is simply sound, and therefore should be equally acknowledged in and welcomed to a soundscape.

As it has already become clear during the description of soundscape itself, and in the version presented and popularized by R. Murray Schafer, the ideas that will be discussed throughout this thesis do not align with Schafer's usage of soundscape. They do not completely differ, commonplace can be found, but overall, I find soundscape to be a restricting term that is potentially damaging to the study of sound. Through analyzing the perspectives of Timothy Ingold and Stefan Helmreich, more perspectives can be shown that better elaborate upon soundscape to serve the purpose of this research and goal for this thesis.

A note I am adding to this section quite a bit later than initially writing it is an anecdote. I am staying in an agriturismo (a farmhouse to stay in, commonly during a vacation) in the countryside of Sicily, and have arrived late in the evening. At this point, everyone of the

agriturismo has turned in for bed, there are no cars on the roads. The lights have been turned off for the night. Out of the pure excitement of arriving, I invited my partner to join me outside to take a peek at the surroundings. And, surely enough, taking this peek at the surrounding area of this secluded farm in the middle of the night also includes the act of listening to and observing the level of quietness, and all that can be derived from the silence.

I was met with a beautiful soundscape of cowbells ringing, neighboring dogs barking, and crickets chirping. The highlighted sound was my partner and I's feet walking on the gravel ground. And now my brief exploration is over, and I myself am turning in for the night, in what seems like the quietest bedroom I have ever experienced. In this moment, an idea has spawned in my mind, or moreso, a way to frame this idea I attempt to discuss. The idea is that, yes, I am currently amidst a truly beautiful and peaceful soundscape of the countryside of Sicily. This reminds me of what would be described as an "ideal" town for Schafer amidst his colleagues to record soundscapes during their European project. And with this in mind, I think to myself about the existence of cars.

In order to arrive at this secluded location, I had to take a car. In order for anyone in this type of environment (rural, to specify) to get from point A to point B, a car would be the most convenient mode of transport (surely there are other options, but I speak in the generalized sense). I think about the existence of cars in the sense that, if it were daytime, and I was enjoying the scenery of this agriturismo,

and a car drove up to the gravel courtyard, it would absolutely *add* to my perception of the soundscape. I would not interpret this car as noise, but, of course, this is solely my take on the matter. And to get to my point here, the car is manmade, the car is machinery, the car is a blatant metaphor for humanity's innovation, yet it *adds* to this quiet countryside's soundscape, especially when I envision its addition during the daytime. This car, this machinery that does not naturally come from the environment, is not noise.

As a neighboring idea, this soundscape would have been impossible to interpret if it weren't for the time of day in which I experienced it. As I said, the car would have added to my perception of the soundscape during the day time, with the world dressed in sunlight, but would have truthfully been a distraction at this current hour (the middle of the night) in which I was observing the environment. I will discuss this further in the analysis of Tim Ingold's text, but in brief terms, the act of separating sense from sense in the way of deeming them as their own individual "scapes" is limiting to say the least.

I bring up this real-life example in order to provide a clear structure to what I am trying to say in order to disagree with Schafer, and I still bring this up despite it not necessarily matching the direction in which I will go when discussing the opinions of Ingold, Helmreich, Feld, and Attali (who, at the same time, I agree with). Schafer's notion of "noise", his notion of what can and cannot be, or should and should not be a part of a soundscape, is purely restrictive and detrimental to the viewing of sound. I enjoy using the word "viewing" here, to also

add to my second point which I gave, regarding the importance of the collaboration of senses in observing an environment.

Timothy Ingold's "Against Soundscape"

Timothy Ingold in "Against Soundscape" believes the term "soundscape" has served its purpose, but at this point "outlived its usefulness" (2007). In this text, he presents the reader with four reasons why he believes the concept of soundscape would be better abandoned. First of all, Ingold deplores the fashion of assigning "scapes" of every kind. The environment we live in is not divided into definite lines between each sense. We all perceive the same world. It is so important to emphasize that the concept of "landscape", which Ingold describes as "prototypical", was never meant to be specific to a singular sense. Landscape is able to account for all senses to be perceived of the immediate environment.

Secondly, "we need to avoid the trap". By using the term soundscape, "we run the risk of subjecting the ears, in studies of the aural, to the same fate as the eyes in visual studies" (Ingold, 2007). "The trap" refers to believing the idea that "the power of sight inheres in images" is synonymous to the idea that "the power of hearing inheres in recordings". "For the ears, just like the eyes, are organs of observation, not instruments of playback".

Third, Ingold believes that "[soundscape] does not make sense for the same reason that a concept of 'lightscape' would not

make sense." He uses the example of how, on a sunny day, we do not see a lightscape, we see a landscape bathed in sunlight. And, similarly, he argues that when we listen to our environment, we do not hear a soundscape. He quotes himself in order to convey that he believes "sound is not the object but the medium of our perception. It is what we hear in." This, again, is synonymous to how we do not see light, but see *in* it.

Ingold states that once we understand light and sound in these terms, they cannot be perceived or studied separately. They align too closely to separate into their own individual "scapes". "Sound, in my view, is neither mental nor material, but a phenomenon of experience – that is, of our immersion in, and commingling with, the world in which we find ourselves" (Ingold, 2007).

With all of this in mind, we can arrive at Ingold's fourth and final objection to soundscape. "Soundscape places the emphasis on the *surfaces* of the world in which we live. Sound and light, however, are infusions of the *medium* in which we find our being and through which we move" (Ingold, 2007). To sum up how Ingold introduces his final point, he explains how, throughout multiple disciplines of study, scholars focus on "the fixities of surface conformation rather than the fluxes of the medium." He claims that these scholars have "imagined a world of persons and objects that has already precipitated out, or solidified, from these fluxes." To arrive at the mentality in which he proceeds with, Ingold states, "Going on to equate the solidity of things with their materiality, they have contrived to dematerialise the medi-

um in which they are primordially immersed. Even the air we breathe, and on which life depends, becomes a figment of the imagination." Proceeding, Ingold will refer to the fluxes of the medium as "weather".

"Wind is not so much embodied as the body *enwinded*." And to Ingold, what applies to wind can apply to sound. Just as the wind whistles, people hum as they breathe. "Sound, like breath, is experienced as a movement of coming and going, inspiration and expiration." "The body, as it sings, hums, whistles or speaks, … it is *ensounded*." And finally, "if sound is like the wind, then it will not stay put, [nor] does it put persons or things in their place." Sound flows in irregular paths, and to listen is to wander these paths. "We may, in practice, be anchored to the ground, but it is not sound that provides the anchor." Ingold presents to us an analogy of flying a kite in order to better understand this concept. "Though the flyer's feet may be firmly planted on the spot, it is not the wind that keeps them there. Likewise, the sweep of sound continually endeavors to tear listeners away, causing them to surrender to its movement. It requires an effort to stay in place. And this effort pulls *against* sound rather than harmonizing *with* it. Place confinement, in short, is a form of deafness."

Ingold's approach, in practice, contributes to including the analysis of the sound phenomenon in an increasingly multimodal-multisensory perspective, a perspective that is proper to the current state of research in the whole field of psychology of perception. What can be gained from Ingold's text in particular is the overarching theme

that soundscape implies emphasis on embodiment and emplacement, when sound and the study of sound should rather focus on the "weather" (as referring to Ingold's usage of the term). The movement, the immateriality, and the fluxes of the medium are what make sound, sound. The relationship to light is something that cannot be separated and then isolated. "Scapes" have no need to be assigned to each sense, for senses cannot be studied without the interaction of media. "Soundscape" does not act in harmony with any of these ideas, and instead promotes the study of sound in the way to which we would lose touch with sound in the same way we have lost touch with light in visual studies (Ingold, 2007).

Stefan Helmreich's "Listening Against Soundscapes"

Following Ingold's arguments against soundscape, Stefan Helmreich's "Listening Against Soundscapes" gets a step closer to what can be fair of the studies of sound/soundscape. Helmreich recognizes how, in R. Murray Schafer's conception, "soundscapes might be judged by the extent to which 'noise' – primarily, for him, mechanical and electric– had been exiled" (2010). This is exactly the issue that can be found with soundscape. This is the part of the concept that contradicts itself. Referencing Ingold, Helmreich states, "contemporary treatments continue to approach soundscapes as things in the world, waiting to be tuned into. Tim Ingold in 'Against Soundscape' suggests that soundscape objectifies sound rather than treating it as experimen-

tal."

"For the soundscape concept to function it must presuppose a listener with a distinct attitude toward spatiality… Such a listener must have an *acoustemology* that imagines persons as emplaced in space, possessed of interior subjectivities that process outside objectivities" (Helmreich, 2010). Please note that this term, "acoustemology", will be explained in the following section, but to clarify briefly, it is a portmanteau of the words "acoustic" and "epistemology".

Helmreich suggests, why not *listen against soundscapes*? And he asks, how might we listen against soundscapes? "Contrary to Ingold, the soundscape has become haunted by the notion of immersion– the arrival of listeners at a sense of being at once emplaced in a space and, at times, porously continuous with it. Such immersion has a history and an infrastructure." Helmreich suggests taking our perspective from immersion to transduction. While diving to the ocean floor, Helmreich "wondered how such immersion–as a sense of presence and immediacy– was itself produced." He considered the factors that could have caused him to disconnect from the soundscape that kept him located in this particular space, underwater, in a submarine, diving. "Against immersion, I arrived at the analytic of transduction– the transmutation and **conversion of signals across media** [emphasis added] that, when accomplished seamlessly, can produce a sense of effortless presence. For scientists inside Alvin to have a sense of being located in a space of sound, signals had to be transduced from the outside water to out interior air. The underwater realm is not immediately

a soundscape for humans. Sound travels four times faster in water than in air, and human eardrums are too similar in density to water to permit the transduction of most vibrations into tympanic movement in the ear. Moreover, conduction of sound by bone directly to the inner ear undoes differences between left and right, making sound omniphonic: coming from all directions at once. **Naked human ears have the underwater zone not as a soundscape, but as a zone of sonic immanence and intensity: a soundstate** [emphasis added]. The underwater circumstance made explicit the transductive work that is the foundation of an immersive soundscape" (2010).

Not suggesting that transduction is real while immersion is mystification, "the point rather is to gather a toolkit for thinking about how space, presence and soundscapes are produced. Transduction may work well in thinking through imagined sonic communities created by radio… It may also work well to think about the temporality of sound's duration" (Helmreich, 2011). Here, yet again, we can note a connection with Ingold's ideas, considering the temporality of sound, and how it is not solidified.

"Transduction may not work everywhere. It may not be helpful in getting at the ecologies of rainforest sound worlds such as those studied by Steven Feld". What Helmreich would advise to approach sound with is the concept of "listening against: a style of anthropology of sound, of transductive ethnography, of theorizing against immersion, of hearing inside, outside and–ultimately–beyond the notion of soundscape," (2011).

Acoustemology

In order to study acoustemology, a term invented by Steven Feld in 1992 after carrying out research of the Kaluli people of Papua New Guinea, the article "Acoustemology" written by Tom Rice in 2018 will be referenced. As previously stated, acoustemology is a combination of the words "acoustic" and "epistemology", making it a word defined as the "sonic way of knowing and being in the world" (Rice, 2018). Rice states that "building upon and critiquing existing vocabulary for theorizing human engagement with sound (such as Murray Schafer's [1977] "soundscape" and "acoustic ecology"), Feld used acoustemology to describe an accumulated set of hearing, listening, and sounding practices consolidated as culture."

Rice speaks on Feld's view and defense for the term, and reminds the reader that acoustemology is a representation of the effort to spread awareness of the potential of what we can know acoustically, of sounding, and of the awareness that can rise from sonic presence, which has the ability to shape how we make sense of experiences. "Acoustemology points to the existence of alternative ways of encountering the world and to the possibility of hearing other realities." It acts as a reminder that studies do not need to be so heavily reliant on the visual. This can connect with the arguments against soundscape, showing that we cannot simply study the world drawing lines between each sense.

Studying sound is just as crucial to learning about the world as studying what is visual. Rice highlights Feld's reasoning behind inventing the term acoustemology. He states, "This is illustrated in

[Feld's] work in Papua New Guinea, where he stresses that, for the Kaluli, place is heard and felt synesthetically, kinaesthetically, and affectively as they move through the environment, seeing, smelling, and feeling the textures and contours of the ground underfoot and responding to the forest in song."

Within the study of acoustemology, an agreement with the ideas presented in this thesis regarding soundscape can be found. Rice references Schafer, recognizing that, in practice, acoustic ecology prioritizes charting soundscapes in a way that promotes the idea that human-generated noise contributing to an environment is eroding sonic quality. On the other hand, "acoustemology encourages an approach that is reflexive, not preoccupied with an evaluation of sound environments but sensitive to sonic ways of knowing and the manner in which they are shaped by environmental, cultural, and historical factors." Additionally, "'acoustemology' is also informed by ideas of 'relational ontology,' which draw attention to connectedness as a condition of and for being. Relational ontology allows sonic knowledge to be understood as emergent and contingent, unfolding through interplay between humans but also a wider ecology of environments, materialities, technologies, and nonhuman forms of life."

Rice, importantly, mentions that "Feld has emphasized the need to acknowledge the interplay between sound and the other senses suggests an open-mindedness to the notion that acoustemology might expand beyond 'a limited definition of the auditory.'" This is referring to a recognition of Helmreich's ideas, and again, the idea of being un-

able to study using just one sense isolated from all others. Ultimately, this opens the possibility of acknowledging forms of inaudible vibratory phenomena as having an effect on sonic matters.

The Notion of Noise from Jacques Attali

Proceeding from discussing acoustemology, the ideas found in the book *Noise: The Political Economy of Music* by Jacques Attali will be reviewed in order to further the points criticizing soundscape that have been mentioned. Many ideas can be derived from this book which align with what is being conveyed in both this writing and my work. It has been found that there is plenty of commonplace between these concepts and the concepts surrounding the term acoustemology. With acoustemology leading into this book by Attali, the realm of what depth can be gained from exploring vibratory phenomena at all levels is able to be entered.

Schafer, in his book on soundscape, states, “All sounds belong to a continuous field of possibilities lying *within the comprehensive dominion of music*. Behold the new orchestra: the sonic universe! And the musicians: anyone and anything that sounds!” (Schafer, 1994). Schafer leads right into the opportunity to speak of music versus noise, as he claimed that musicians are “anyone and anything that sounds”, despite in his book considering some things that sound as “noise” that distract from the true soundscape. It seems that in this way, he contradicts himself. Although more notably, he contradicts the

very concept he is working to create.

What can be understood from a selection of information in Noise by Jacques Attali is a core level of comparison between “music” and “noise”. Attali arrives at the core of both music and noise in order to detail that they are not so inherently opposite, it is only a matter of how the nature of a moment of sound is perceived. He specifically takes the liberty of describing music as a “sublimation of noise” (2017). I wish to highlight Attali’s statement that “[western] science has always desired to monitor, measure, abstract, and castrate meaning, forgetting that life is full of noise and that death alone is silent: work noise, noise of man, and noise of beast. Noise bought, sold, or prohibited. Nothing essential happens in the absence of noise.” “By listening to noise, we can better understand where the folly of men and their calculations is leading us, and what hopes it is still possible to have.” Taking this quote from the book builds the criticism that has been given towards Schafer’s entire idea of soundscape, and it shows the new territory where this term will be taken. What Schafer infers is that noise, as caused by the innovations of humankind, is distracting from what should be our sonic perception of an environment.

What can be taken from Attali’s perspective, is that noise is the whole point. It is noise that can direct us. Without noise, everything would simply remain the same as it always has been. Utilizing the notion that music is organized noise, we can refer to Attali’s idea that “music is more than an object of study: it is a way of perceiving the world. A tool of understanding,” in order to continue claiming that

noise is vital to a soundscape and to our practice of listening. It is because of the noise that music is created. It is because of the unconventional sounds that we can hear the harmonies, some more pleasant than others, of sounds in an environment interacting with one another. This can be followed with the idea from Attali to "theorize *through* music" in order to justify that, in the combining of all levels of sound in order to better perceive our surroundings, creating an organization of noise, or music, it is worthwhile to theorize using this understanding of sound.

In fact, it is possible to argue for the possibility of gaining a deeper understanding of the world around us through listening to sounds at more levels of audibility by noting Attali, stating that "*music is prophetic and that social organization echoes it*" (2017). In this sense, if we can listen to the music of all sounds that can be presented in an environment, including the inaudible vibratory phenomena, we can use the knowledge and perspective we gain to look forward, into what the future holds for us, and to justify our actions in the present. "*Noises* (in other words, the calling into question of differences) ... are *prophetic* because they create new orders, unstable and changing," (Attali, 2017).

"Music is a credible metaphor of the real," (Attali, 2017). "All music, any organization of sounds is then a tool for the creation or consolidation of a community, of a totality. It is what links a power center to its subjects, and thus, more generally, it is an attribute of power in all of its forms." Here, Attali bluntly acknowledges the re-

lation of noise to music (when it is organized), and music to power. He is relating with Schafer, acknowledging that noise can be representative of power, but he then immediately creates distance again, as Attali continues to acknowledge noise as being valued in his idea of a sonic environment and how we can go about perceiving it. “Our music foretells our future. Let us lend it an ear.” (Attali, 2017)

“A creator, he changes the world’s reality” (Attali, 2017). This quote arrives at the final point, the final connection to be made with Jacques Attali’s *Noise: The Political Economy of Music*. Attali’s understanding and acknowledgement of noise most similarly intertwine with my idea of **the value of including inaudible vibratory phenomena along with noise when studying an environment sonically**. So with this quote, “a creator, he changes the world’s reality,” Acknowledging these sonic environments as music, which would be foretelling of the future as stated by Attali, can change the world’s reality. These sonic environments, containing all levels of vibratory phenomena in an audible sense, can create music, and they can create our perceptions, which if we open our minds towards this new level of listening, the new understandings we could gain, could change our future. This idea is where value in this topic as a whole is found. It raises the question of not what sound do we want to expel from our understanding of an environment sonically, but what could we **add**?

Vibrations as Sound, Sound as Vibrations

As previously stated, sounds are vibrations that are able to be heard by humans and animals. All sounds are vibrations, but not all vibrations initially present themselves as sounds.

Sound is measured in two ways: frequency and amplitude. Amplitude, measured in decibels (dB), measures how forceful a wave is, while frequency, measured in hertz (Hz), measures how many sound vibrations there are in a single second (*How do you...*, 2022). The average healthy ear can hear a range of 20-20,000 Hz. Sounds below 20 Hz are referred to as infrasonics, which commonly include various types of weather (*Infrasonics*, n.d.). Sounds above 20,000 Hz are referred to as ultrasonics. Commonly, these are sounds that can be heard by animals (*Ultrasonics*, n.d.). “Studies have shown that many people experience adverse reactions to large intensities of infrasonic frequencies, developing headaches, nausea, blurred vision, and dizziness” (*Infrasonics*, n.d.).

What is crucial to mention at this point is the existence of the transducer. A transducer is a mechanism which allows energy in one form to be represented in another form. A sound transducer consists of input sensors which convert sound into electric signals, along with output actuators which convert electric signals into sound (Storr, 2022). Transducers are necessary tools to bring vibrations that are out of our range of hearing into sounds that we can observe.

Transducers can be used for sonification, which is the process

that translates data into sound (*A Universe of Sound*, n.d.). It is a fascinating way of processing data that can evoke an emotional response from the audience, as it can seem that the data, which would be originally inaudible, is directly reaching out to the listener, communicating to them (Colahan, 2023).

Alongside discussing vibration as sound, the mention of acoustic resonance must follow. “Resonance occurs when a system preferentially vibrates at a certain frequency. This frequency is called the ‘resonant frequency, and the system will respond very strongly to any periodic force at that frequency” (Farrell, 2020). There are resonant frequencies of most things we interact with, and it is quite often the sound that is actually heard. An example of resonance can be found in Alvin Lucier’s *I am sitting in a room*, which will be further introduced later.

The Hum

What originally fascinated me, and what largely encompasses the project I have created, is the concept of the hum. “In all earlier societies the majority of sounds were discrete and interrupted, while today a large portion-perhaps the majority-are continuous,” (Schafer, 1994). As stated in the introduction, the hum is a captivating source of power. The hum provides so much structure to any environment through its unwavering presence yet drastic absence. This is exactly why, in order to begin this thesis, the concept of soundscape along with its criticism needed to first be discussed.

The power of the hum comes from the environment it is placed in, along with the way in which it is placed into said environment. The hum cannot fit into Schafer’s idea of soundscape, and rather, it fits into an idea of soundscape that harmonizes with the mentalities of Ingold’s four objections, Helmreich’s expansions on Ingold’s points, Feld’s portmanteau of acoustemology, and finally, Attali’s notion of noise. Hums, or inaudible vibrations as well, are the sounds that must be actively incorporated into the sonic understanding of an environment, as they can frequently be ignored, yet in the moment of their absence, they become crucial.

Kramer’s Theoretical Reflections

In order to analyze Hum, the book *The Hum of the World* by Lawrence Kramer was referred to. Kramer takes care to provide his insight through a variety of lenses which help to guide the purpose for focusing in on the concept of Hum through the final stages of this

thesis, including my audio project in accompaniment. “Sound is the measure of life. Sound is the primary medium through which the presence and persistence of life assume tangible form. The sense of life spreads outward from sound, which conveys it as feeling and imparts it as meaning. This relationship is primary. The positive experience of aliveness is not merely in accord with sound, but inaccessible and perhaps inconceivable without it. The second idea is that this animating power of sound acts as a general background to sense perception. But it does not always remain in the background. The diffuse hum of the world can also become audible in its own right” (Kramer, 2019).
In the introduction, it was stated that I would revisit the idea that we can harmonize with the birth of matter in a way. This quote which was just included, claiming that “sound is the measure of life”, is the moment in which this idea can be revisited.

The CMB can be viewed as this great, ultimate, constant source of the potential of sound, just waiting to be tuned into. It is everywhere, and it is inescapable. At the same time, it ebbs and flows. If Kramer theorizes that sound is “a general background to sense perception”, utilizing the CMB as an inaudible vibratory phenomenon (which has the potential to be sonified or accessed via radio at any moment) is a perfect comparison to this concept. It is a general background that we cannot sense, yet it is the measure of life. It is this general background to all that we as humans sense and experience. And all that we do is in harmony with it. After reviewing the previous texts that were spoken of in this thesis, Kramer finally begins referring

to sound as having quite a deeper personal effect. To be fair, this can also be found in *Noise* by Attali, but in *The Hum of the World*, Kramer gives such a sense of matter to sound, to hums in particular, which is refreshing. “The vitality of the auditory becomes the medium that connects the feeling of being oneself to the feeling of being one self among others, and among things other than selves. We buoy ourselves up on the hum of the world” (Kramer, 2019).

Kramer makes a key point that aids in the understanding of soundscape which had been spoken about earlier: “We see in scenes but we hear in layers. We split the soundscape into melody, countermelody, and accompaniment.” This can suggest an altered view of noise, and rather posing it as “countermelody”. It is simply a part split off from the rest, yet still just as much a part of a soundscape. I take this mentality into the execution of my project, which will be spoken about later.

Alongside this, Kramer discusses the phenomenon of the persistence of sound that can be found amidst the silence of a space. He states that we can view “the ether less as a gauzy border between matter and spirit than as an enveloping murmur, song, or whisper, a continuous and permanent series of ambient sounds.” It leaves us with “a strange dilemma, perhaps, because there is no need to resolve [the curiosity this phenomenon creates]. At its root is a vibrancy that we can choose to let flourish in the cleft between what our senses say and what we say to make sense. The vibrancy is bodily; the romance comes from what it embodies,” (2019).

The sound we find in the silence of a space is a piece of my initial fascination with the hum. Within the silence of a space, our acoustic awareness becomes heightened. Sometimes, when met with the silence of a space, we can realize that the space is not silent after all. There could be a hum that had faded into the background, that only becomes prominent when left with nothing but that very sound. The listener becomes much more active in the silence of a space, as they are met with the need and wish to truly *hear*, not just listen.

At the same time as Kramer's reflections on sound in the silence of space, he poses his ideas on the effect music has on the listener. "And when being alive feels painful? If that pain finds expression in music, the music may seem to dissolve itself or its listener into an elemental medium heard as the rush of a fluid basic to life. Such, at least, is the testimony of… writers… who heard the music of Chopin as a transmutation of piano to voice and of voice to such primary fluids: blood, water, tears, milk."

In the sounds of music, either intentionally or accidentally created, humans find themselves "dissolving" into the sensations it arises. Kramer is able to convey the depth to which these sensations sink, by referencing the testimonies of those who have interpreted Chopin's music as comparable to the rushes of such basic liquids including blood, water, tears and milk. These liquids are basic, yet full of life. Music, or sound, is full of life, thanks to the eye (and bodily reactions) of the beholder.

Ultimately, after reviewing Kramer's ideas on sound being the

“measure of life”, the phenomenon of sound within silence, and the way in which the body can succumb to music as a sense of expression, I can proceed towards the core connection I have with Kramer’s writing: “The silence of the other is the space into which the aggrieved party pours her utterance and from which she receives back an acoustic image of her romantic destiny.” It is exactly this, that in the silence is where the listener can find the space to truly listen, and from this act of listening into what is not necessarily the “usual”, it is possible to find a deeper understanding of oneself and the world surrounding you, or as Kramer says, “an acoustic image of her romantic destiny”. “The notorious fact that one cannot avert one’s ears as one can one’s gaze makes sound an index of vulnerability,” and within this idea, is that if we lean into this vulnerability that is created through the inevitability of sound, we can go further with our understanding. “The health or sickness of the living body announces itself primarily by making noise,” so sound can be a direct view into our deeper selves physically.

“In a famous passage from Song of Myself, Walt Whitman thinks about collecting and incorporating as many auditory inroads as he can:

‘I think I will do nothing for a long time but listen,

And accrue what I hear into myself. . . . and let sounds contribute toward me.

I hear the bravuras of birds. . . . the bustle of growing wheat. . . . gossip of flames. . . . clack of sticks cooking my meals.

I hear the sound of the human voice. . . . a sound I love,

I hear all sounds as they are tuned to their uses' (Whitman, 1855). In other words, [Kramer's], not Whitman's, the moment reverberates, and in the reverberation, being becomes the audiable."

"It is the assurance that the world is there to be sensed, that the presence of the world in the sense and senses of transient creatures such as ourselves is inherent in the world itself and will continue, if not forever, then the next best thing." This idea from Kramer is simply implying that *the point is to sense*.

To sense is to be alive, to sense is to analyze the world. To sense is to know yourself and the world, and to sense will continue to happen no matter what. And to do more than sense, that is to *grow*.

As already stated, Kramer assigns life to the hum and to the experience of listening, which is exactly as I was seeking in this research. There are plenty of ideas in his book that do not create a perfect harmony with one another, yet it is unproblematic as he speaks of life and experience, he does not try to promote one concept only. The moments where there is an absence of sound, and the moments where sound is being thrusted upon us, are the moments when we must lean into this vulnerability in order to broaden the desire for understanding.

The Audible vs. The Inaudible vs. The Unheard

One of the many topics Kramer covers in his book is discussing the audible versus the inaudible. Here, an additional layer, which is the unheard, can be added. The audible is simply what can be heard

by human ears, and the inaudible is what we cannot hear. The unheard is what is audible, but we choose to not focus on, or purposely leave out during our experience of listening (or during our experience of what we do not realize is us listening). “The basis of the visual is resonance. What allows a scene to become visually intelligible is the scene’s sonority, and it is sonority that defines the general meaning of this intelligibility: that the scene is alive, that it is lived, living, animate, animating. The condition of lived visibility is—the audiable” (Kramer, 2019).

“What about the inaudible? … Is it entirely separated from the heard world or does it impinge on the world at certain junctures or even extend into otherwise unknown regions? The category is complex. It includes, at a minimum, the familiar sounds I happen not to hear (the rustle of windblown leaves through a closed window), the sounds I cannot hear in principle (grass growing, the beating of a butterfly’s wings, the whinny of a unicorn), and the sounds that no one has ever heard but that someone—who knows, even oneself—may hear at a later day.” Here it is clear that Kramer, in fact, would include the unheard in his idea of the inaudible. In a typical listening experience, the unheard would have a similar active effect on the listener as the totally inaudible, or the “unsounded”. This way of viewing this topic aligns with the experience I am trying to promote in my project, which is bringing light to the unheard and the inaudible, creating unheard out of the inaudible, and showing the value of it.

“The inaudible is the lived potential of new sound, a touch of

the future promised by sound as presence in action. The unsounded is a negative plenitude, like the dark matter that fills most of space" (Kramer, 2019). With this, it can be reiterated yet again the idea regarding the importance of tuning into the unheard/inaudible. It is in the act of connecting with the inaudible that we can access this negative plentitude, and who is to say what does and does not exist there?

Westerkamp's Reflections

In order to approach a personal connection with sound recording and microphones, the text "The Microphone Ear: Field Recording the Soundscape" by Hildegard Westerkamp was referenced. This text is so incredibly rich. It both personalized and broadened the resonance of sounds, and Westerkamp did not hesitate to mention her personal connections with her process and findings. Through her personal mentions, it was possible to connect deeper with the concepts she spoke of.

There were a number of parts of this text that stood out to me most. First, I'd say her goals of the Soundwalking radio show align wonderfully with a suggestion I'd like to get at (this suggestion being the connection humans can form to sounds of all levels, as long as we set forth with the intention to do so). Second, the utmost connection with her text could be found through her acknowledgement of the inherent connection humans can have with the environment through sound, "They revealed sonically what should be obvious to us all: that human beings and their environments are intricately intertwined with each other. If we learn to listen in depth to our interactions with sound-

scapes, we can hear when we are in tune with our environment and when we are not. It highlights sonically that human beings do not exist as separate entities in this world" (Westerkamp, 2021). Third, during her experience recording the sounds of a creek, where Westerkamp encountered a clicking sound that would not seem to go away, realizing it was simply the stem of a dry leaf obstructing ever so slightly the flow of the water, she reflected with the statement, "Since then, I have often brought the microphone within inches of moving water, whether it was a creek, or the shoreline of lake or ocean, exploring with a curious ear how water and shore create these fascinating sounds together" (2021).

Particularly "exploring with a curious ear how water and shore create these fascinating sounds together" alludes to the goal of this thesis. The interaction of these two separate aspects, in this case (and all the better to defend the goal) the two separate forms of matter, water and solid land (that at the same time is not solid as it is a shore which is ever changing), is exactly what creates the sound we must strive to listen to. Only with the combination of these two separate aspects can we achieve this state of listening. If it was only water, it would be different. If it was only land, it would be different. Only in the interaction of the two are we able to hear this sound. "Resonance thus created between community and its radio station had the potential for a participating listenership—that is, participating not simply as more active listeners to the broadcasts but also to the community's life" (Westerkamp, 2021).

Posing the Inaudible in Resonance

My general belief regarding sound and the hum is that if one tunes into any inaudible vibratory phenomenon through non-traditional microphone transducers, and if they ponder its existence alone and amidst other vibratory phenomena, it can change their reality. It can change the reality of how they will perceive an environment as a whole or just sonically. It can even change the reality of how one views oneself or their community in the present or future. In order to pose this belief in reality, it is necessary to review various types of microphones that allow such listening practices to occur.

As I am writing this, I have just experienced the opportunity to experiment with a few types of these special microphones that are able to pose the inaudible in resonance. In particular, I experimented with the contact microphone, the geophone, and an electromagnetic microphone. I must now bring up my second anecdote of this entire writing, because along with the first (regarding soundscape in the countryside), it is experiences such as these that allow me to connect these ideas I have theorized into real life. These experiences have allowed me to *feel* what I am choosing to speak of in this thesis.

Certainly I have listened to various sound artists' works who utilize the microphones I was able to experience, and I have enjoyed these pieces of art. But in order to hold the microphones themselves in my hands, and experiment with recording sound in various areas of a classroom, I was deeply fascinated by the process of creating these pieces for the first time. Truly, from what I feel after this experience, I see everything around us as alive in sound. It is great thanks to these

microphones that allow us to pose the voices of inaudible vibratory phenomena into resonance.

Hydrophone

The hydrophone is a microphone that can record sounds from underwater environments. Most hydrophones work by using a technology including a specific type of ceramic that responds to changes in water pressure, creating an electric current (*What is*, 2018). These electric currents are amplified and recorded, and this is how we can gather sounds from underwater.

Electromagnetic

The electromagnetic microphone is used to record ultrasonic sounds and electromagnetic signals. The electromagnetic microphone "uses an induction coil to pick up and convert electromagnetic fields into sound. It uses magnetic waves from anything that produces electric signals" (Sones, 2022).

InfraSound

An infra-sound microphone is a device used to record low frequency sounds, particularly those which are lower than 3 Hz, the usual cutoff for microphones. "To achieve a very low low-frequency cut-off of down to 0.09 Hz, a special microphone combined with a special preamplifier and a low-frequency adapter is used" (*Infra-Sound*, n.d.)

Contact Microphone

A contact microphone records vibrations from solid matter, rather than the air. They record the isolated sounds of the way in which a solid is interacted with, lacking any ambient sound in the background. A contact microphone is used by attaching each microphone to the surface of a solid object that is in motion/being interacted with in some way (Zumer, 2019).

Geophone

The geophone is a microphone that detects sound from ground vibrations, but is not limited to that. “The geophones are analogue instruments, with a spring-mounted wire coil moving past a magnet. This creates the electrical signal which [can be] recorded by a seismograph” (Villeius, 2021).

The Hum: Sound Artists' Cases

Before introducing and explaining the project I have produced as a result of this research, a few of the sound artists who have already produced works that can fit into the category of the phenomena I am fascinated with will be highlighted. In general, these artists focus in a direction which represents the essence of this topic that has been discussed throughout this thesis. Presenting these artists and their individual researches helps to materialize the ideas of the hum, sound as vibration, resonance, sonification, and sound at all levels of audibility.

Alvin Lucier

Alvin Lucier was a contemporary composer who was considered to be one of the pioneers in this field. His works largely focused on the relationship sound's natural properties hold with their space, being "based on the concepts of echolocation, the physics of sound, and psychoacoustics".

I Am Sitting in a Room is a work by Lucier, performed in 1969, that consisted of him reading a text into a microphone, followed by playing back the recording and recording that, followed by playing back this new recording and recording that, etc. As this process continues on, Lucier's voice disappears, and the resonant frequencies of the room become the only recognizable sounds. Since the initial performance and recording of this piece, it has been redone by Lucier, and it also has the accessibility to be recreated by anyone. In each new version of this concept highlighted in this audio piece, the resonant frequencies vary depending on which particular space the speaker is

in. As stated in a 2015 MoMA blog post by Martha Joseph, the project by Lucier realizes theorized phenomena: “No longer just an auditory phenomenon, this was a physical, material, and spatial experience”.

Christina Kubisch

Christina Kubisch’s process is what is crucial to mention in the light of the research which has been completed. She has developed a system of electromagnetic induction, which “is the creation of an electro-motive force (EMF) by way of a moving magnetic field around an electric conductor and, conversely, the creation of current by moving an electric conductor through a static magnetic field.” Since 2003, her project of electrical walks in various cities traces the electromagnetic fields throughout urban spaces. Kubisch uses a technology where coils, which are built into the headphones, transmit the sound by responding to the electromagnetic waves surrounding the listener.

In order to experience these unique city walks, the listener receives a pair of wireless headphones, which are meant to recognize and amplify these frequencies from both above and below ground. They are basically headphones with electromagnetic microphones built-in. The listening experience varies from city to city. “The sounds are much more musical than one could expect. There are complex layers of high and low frequencies, loops of rhythmic sequences, groups of tiny signals, long drones and many things which change constantly and are hard to describe. Some sounds… sound much alike all over the world. Others are specific for a city or country and cannot be found

anywhere else."

Jana Winderen

Jana Winderen produces works using field recordings, recorded on the hydrophone. She takes sounds that are inaudible to humans (without assistance) and first, poses them in an audible state, and then, as she states, "sculpts" them, rather than viewing her process as creating something from nothing. In a number of Winderen's works, she utilizes recordings of animals communicating in the ultrasound range, which humans cannot naturally hear, yet certain animals can. Particularly, in her work *Ultrafield* (2013), a sixteen-channel ambisonic sound installation, she "recorded the sounds made by certain species of bats, fish, and underwater insects and pitched these transmissions down to the human range, allowing us to experience sonic realities that are otherwise out of reach."

Toshiya Tsunoda

Similarly to Jana Winderen's perception of her own process, Toshiya Tsunoda sees his recordings as moving sculptures, feeling that the landscape which can be accessed through sound is boundless, compared to that of which a photograph would capture. His works focus on vibrations in all forms of matter, in all spaces, including those which are inaccessible to the human ear, and "his pieces always raise questions about the perceptual process, the ways in which particular vibrational phenomena contour the subjective experience of time and

space."

Tsunoda studied oil painting when he attended university, which has guided him into a focus on the idea of landscape in his works. He explores various instances of vibratory phenomena in order to "fix" our understanding of landscape. He strongly directs the listener into any given acoustic environment. *Low Frequency Observed At Maguchi Bay* is a particular work of his that he has expressed he is fond of. This fondness is due to his connection with the place in which he recorded, where he could not quite identify a low frequency sound that was taking over his aboveground field recording. Through speaking with locals, he realized that the sound was coming from a rugged terrain under the water, and this led him to process his field recordings by removing any sounds that were above 20 Hz (the lower threshold of human hearing). Therefore, there is no sound to hear throughout this piece, but on the even-numbered recordings, a loudspeaker would move due to the frequency, which Tsunoda values as "like a moving sculpture in the listener's room".

The Project: The Harmony

After the literature I have reviewed, the background knowledge of how to produce the sounds in which I am discussing, and some examples of artists who accomplish this, I will end my thesis reviewing the project I have created: The Harmony. The project itself is an audio piece, layering field recordings with musical instruments in order to create dissonant harmonies acting symbolically as my goal of this thesis.

The Past

It has been only about one year since I have begun attempting to work with sound, and so far, I have only embarked on quite simple personal projects including audio recordings. When I was reading *A Fórmula de Deus* by José Rodrigues dos Santos in January of this year, and I was introduced to the CMB and the idea of the analog TV static (see Introduction), I knew I needed to refocus my artistic research towards sound, or more specifically, hums. I felt this drive especially for the research and writing of this thesis, and in hand with the project I would embark on creating.

This book was my first true moment of realizing that, within art, anything can be done. This book did not speak of art whatsoever. It spoke of spirituality, physics, life, and death. It did not speak about sound at all. It was purely myself who picked out this one tiny piece of information, about the Cosmic Microwave Background, that I gained further perspective regarding sound thanks to this book.

This book left me in a place of having a new understanding of

life, but with nowhere to put it. I also had a newfound drive to further explore the CMB. Nothing has ever come across as this fascinating to me. Thanks to this novel, which was simply a Christmas gift to me, I have a new direction that I have begun with this thesis and project, and that I will continue for the rest of the research during my artistic career.

Previously, in my artistic research, I had always danced around including sound as a core aspect of any given piece. Within the past year, I have managed to put more emphasis on the existence of sound within my work, creating two new audiovisual installations along with one sound sculpture. All of these moments in which I have utilized sound included a general experimentation with layering and altering sounds, and playing with an attempt to confuse the listener. I knew, going into this thesis and particularly my project, that I enjoy playing with the reactions of the listener. So far, I have chosen in all of my audio pieces to give some moments of pleasant listening paired with some difficult moments to sit through. And to me, as this thesis can detail, again along with the project, this is the whole point of creating, listening, hearing, and experiencing.

The New Perspective

Certainly, sounds can be lovely if arranged into a pleasant song, and certainly, one can create an entire piece of loud, irritating sounds. But in my opinion, the interest comes when these two concepts are combined, played with, and passed back and forth. I think

it is crucial within the understanding of sound and Hum that I am conveying within this thesis to put the “music” and the “noise” in conversation with each other. To reference a perspective from Attali, it is to put killing in conversation with killing.

A conversation I love to hear and experiment with is hums with one another, and then with other sounds. Refer to my Introduction, and it is clear that this is what sparked my fascination. There was just something so endearing to me about them. The experience that hums create can sink so deeply inside of a listener, with their constant presence which can turn into a sudden and drastic absence. And with the newfound knowledge of the sonic representation and understanding of the Cosmic Microwave Background Radiation, I approached a new level of what hum can mean. I realized that sounds, particularly hums, are all around us. This is not difficult to grasp. But furthermore, I realized that if there is no sound, if there is no hum, there is a space that is in all levels dressed in the possibility of hum, just so long as we tune into it with any of the tools at our fingertips.

The concept of hum and the consideration of all vibratory phenomena has become fundamental to my understanding of life. Learning about the simple way in which we can connect to the CMB, through watching the static of an analog television, completely changed my perception of the world around me. The CMB is something I have never knowingly experienced, yet one day, when I came across this knowledge for the first time, it shocked me to know that it exists 100% of the time, it is always around me in some way, but I nev-

er would have known it if it was not sonified. It was never important to me until it was made known to me, and now that it has been made known to me, it has changed my understanding of life.

Thanks to this, I felt the need to write about and research inaudible vibratory phenomena, which was surely mind-opening until now. But, further, it arose the question of how can I convey these learnings and this new perspective in the sense of an artwork? As previously stated, I had only recently begun making audiovisual pieces, so to jump straight to an audio piece was nerve wracking to me.

I started with familiarizing myself more with the CMB, and this of course allowed me to wonder where else are these inaudible vibratory phenomena that have the possibility to even *further* alter my understanding of the world around me? And so, as you have read by this point, I have reviewed various pieces of literature, from various time periods, and from various lenses. And to realize the concepts I read within the literature, I studied special microphones and the sound artists who use/have used them. Through this further study, which was all initially motivated from learning of the CMB, I have come to learn that **we can develop a sonic understanding of anything and everything**. And this is exactly what I tried to do.

My literature review skewed my interest a bit, to be quite honest. It was absolutely a necessity to first review the concept of soundscape before proceeding into the specific interest I had come to hold. In the process of developing my opinion, understanding, and usage of soundscape, I became newly obsessed with the concept of noise, and

the way in which it is largely considered: noisy. My overarching question I had realized was: Who's to say what is and what is not noise?

Now, certainly, there are emotional and physical responses that we have towards sounds that are our nature. This would require further psychological research which I did not focus on, as it would have functioned more as a tangent to what I am trying to accomplish. But despite these natural responses to some sounds versus others, my opinion is that at the end of the day, they are all sounds. And at the end of the day, they are all responses. So in this sense, how can it be claimed that some are tainted whilst others are not?

To take a quick pause, I must introduce now alongside this (which goes to now a different lens of discussion briefly) a connection with religion. Through my research, I came across a surprising amount of information that led me to my largest change of mindset regarding sound, and that is its connection with religion. This is largely thanks to reading *Noise: The Political Economy of Music* by Jacques Attali.

"It will be recalled that Girard demonstrated that the majority of ancient societies lived in terror of identity; this fear created a desire to imitate, it created rivalry, and thus an uncontrolled violence that spread like a plague… By his account, in order to counteract this destruction of systems of social differences, all of these societies established powers, political or religious, whose role it was to block this dissemination of violence through the designation of a scapegoat. Whence the peculiar status of the sacrificial victim, at once excluded and worshipped" (Attali, 2017). The scapegoat becomes the sacrificial

victim. I can compare the scapegoat to noise. Noise is the sacrificial victim.

I make this claim in order to revisit the idea of noise being unwanted within a soundscape, because in this notion, it is wished to abolish noise, to murder noise (I say this for the sake of the analogy, despite understanding that I am sure no one would wish to completely abolish noise). Noise is sacrificed in order to bring peace to the rest of the environment, to block the dissemination of violence. Noise is designated as the scapegoat. And in fact, this makes noise the victim.

And if the victim is as victims usually are, which is unheard, then this adds to my whole point, of wishing to include the unheard in a dissonant harmony. I want to allow the victim to be heard, and I wish to reframe the mindset we have that made noise the scapegoat in the first place.

Noise can be compared to the saying, "at once excluded and worshipped" (Attali, 2017). It is attempted to be excluded, yet worshiped simultaneously. Because noise is typically machinery, or anything man-made that represents power. This is worshiped, and so it can be claimed that noise is also excluded and worshiped.

"Power and Submission. God and Nothingness. In order to show that, before the commodity, music was a simulacrum of the sacrifice of the Scapegoat, and that it shared the same function, we must establish two things: First, that noise is violence: it disturbs. To make noise is to interrupt a transmission, to disconnect, to kill. It is a simulacrum of murder. Second, that *music is a channelization of noise*, and

therefore a simulacrum of the sacrifice. It is thus a sublimation, an exacerbation of the imaginary, at the same time as the creation of social order and political integration." "Thus in most cultures, the theme of noise, its audition and endowment with form, lies at the origin of the religious idea. Before the world there was Chaos, the void and background noise. In the Old Testament, man does not hear noise until after the original sin, and the first noises he hears are the footsteps of God." "Noise and music both kill. The motives may differ" (Attali, 2017).

In terror of identity, of accepting the truth of oneself/of something, therefore we think towards religion, which provides a sense of safety amidst the terror of the truths of society. We have been presented with a part of an ultimate truth when we observe inaudible vibratory phenomena. If we connect to them, we connect to our identity. Both noise and music kill, but "the motives may differ". Both music and noise can do strong things.

This connection with religion had a large impact throughout the completion and thought process of my project. Religion, being such a massive force, is quite inspiring. Religion, in the sense Attali spoke of, is able to be used as an analogy for noise and music, and sound as a whole. Spirituality weaves its way into unconventional places, and can be a driving force of deeper understanding for anyone, in whichever way they choose. So sound, being compared to religion, can weave its way into unconventional places, and can be a driving force of deeper understanding for anyone, in whichever way they choose.

I connect this understanding of sound using religion as a metaphor, along with the understanding I interrupted in order to talk about this connection with religion, the understanding that regardless of the sound, there will always be a reaction evoked, and who is to say what is and is not noise. With this connection I felt that, for my project, I needed to create a combination of sounds, all that would certainly evoke somewhat stronger reactions in the listener. I knew I needed to combine sounds at all levels of audibility, especially those which present themselves as hums. I wanted to find a connection from the sky, to the ground. I wished to connect sources from large to small. I wished to connect the sounds we hear with the vibratory phenomena we cannot. I wanted to find a higher purpose in this sound, and I wanted to use sound to create a higher purpose.

The Execution

I approached this project as if I had building blocks in front of me. As I do not have access to professional microphones, I utilized BBC's sound library in order to collect these building blocks. During a trip back to my home, I recorded the sounds of me playing each instrument that I once loved to play, and now only visit twice a year. I used these blocks to build a collection of dissonant harmonies, a collection of resonance, hums, loud, and soft sounds. "The twentieth century has merely reduced the limitless spaces where the imagination soared to rare altitudes to specific air corridors of no intrinsic significance whatsoever. Listen to the sky. The whirring and scraping against the air

is nothing but the wounds of a crippled imagination made audible." (Schafer, 1994)

I briefly return to Schafer, with whom I had an interesting relationship throughout this text. If there is one point of his which I can agree with, it is his wish to expand the spaces where our imaginations can soar, and encouraging us to "listen to the sky". I gained so much from the realization that I did, in fact, disagree with his notion of soundscape. It drove my research in the direction I took. It also is what inspired the dissonance of my project. But despite this, his actual theory, views, and perspectives regarding sound and its value (excluding his opinion on noise) were very agreeable and put a great weight on the importance of studying sound and looking into it deeper than we initially would.

Alternatively to the soundscape in the way it was intended, I wished to make this audio piece difficult to listen to. I did not want to produce something pleasant, or easy to listen to. It is as if it is noise, but I do not call it noise. What I have produced is sound. It is music. It may sound irritating at moments, it may cause feelings of unease, and it may trick the listener into enjoyment at parts, but it is not noise. I used the recordings of things we would normally deem as noise in order to create this music, because music is just organized noise after all, thanks to Attali's statement.

The sounds I sourced from BBC included "varying electrical hum", "refrigerator hum", the "deep sea ocean bed underwater", "flight through space", "human heartbeat 58bpm", "foetal heartbeat,

direct contact recording at 38 weeks", "tv static", "wind gusting at times", and "bees and flies medium close-up". I collected these sounds in order to attach a few levels of sound together. I took some from everyday life, from places that are difficult for humans to reach, from inside of us and outside of us, and the television static in order to give the small percentage of the CMB a space to communicate. From my personal recordings, I included sounds of me playing guitar, ukulele, piano, and violin. Some sounds were left unaltered, while others were edited in various ways.

Choosing to use sounds from an external source was an interesting decision. Of course, it was not at my own hands, the accumulation of all these sounds, but it was mind-opening to realize the accessibility of some of the sounds I wished to include. Anyone is able to access the website for BBC Sound Effects, and anyone can search for and listen to these sounds. Anyone has the ability to piece together multiple sounds, creating their own dissonant harmonies to curiously listen.

I also found this choice of collecting sounds considerable as an homage to the research. I have never researched sound to the extent I have during this thesis, and I was pleasantly surprised by all that I managed to find and by what was recommended to me. I have no special equipment, and no experience in editing sounds either. Using the tool of accessing pre-existing recordings that are free to use in my project felt like a connection with the accessibility of my research and new perspectives thus far.

As I stated earlier, it has not been very long that I have been working with sounds. Playing with audio can be found only in works of mine that I have produced within the last year. However, prior to entering university, my passion was, and still is, theater and the performing arts. Only since beginning to learn about sound design a little over a year ago, thanks to my advisor, Fabio Selvafiorita, did I realize how deep of a connection this passion of mine has with sound. What makes performance so captivating is its sound. It is the way in which the speakers take hold of a room, the way the music flows, the sound effects which jolt the audience.

And with this, I can say that all soundscapes can be a production in their own way. They are all a performance of the world exhibiting its sounds and trying to evoke these responses from the audience. Every audio piece, audiovisual installation, sound sculpture, song, etc. is a performance. Every production of sound, intentional or not, is a performance. There are hums that we can find within the Earth, within our bodies, and from the creation of matter, and these are performances. All of it can evoke responses from us, humanity, as this one collective audience to all that we could experience.

I pieced the building blocks of sounds together in my project in order to create an intentional performance. To place the sounds in front of an audience, for them to react, and to watch them react. I have gained new perspectives from these sounds, from this thesis, from all the information I have collected throughout the process. Now, who knows what the next person I share this with will learn? How might

their perspective grow? What may they discover?

Hearing sounds can be a performance, or a spiritual experience, or both. To finally touch on the title of this thesis, I can discuss what I mean when I use the title "The Harmonies of the Unheard". The unheard and the inaudible are not the same things. The inaudible is not able to be heard, while the unheard is not heard, yet still audible. In this thesis and project, I wished to bring to light the unheard, the sounds we allow to fade into the background, or that we choose to not hear. I wished to also bring to light the inaudible, because it is also unheard, and I wanted it to become something that we can choose to access and listen to.

If I can already find a spiritual depth and religious analogy with sounds that can be heard, along with the moving nature of viewing the sounds as performances, there is a whole world to be discovered when posing the inaudible in resonance, and actively seeking out the unheard. There is a depth that can happen when this is able to sink in, when it becomes a choice to listen, and when it becomes realized the impact listening can have.

In my experience with the process of this project, I knew sound was a topic that interested me, so I made the commitment to follow through with exploring it on a much deeper level than I had ever known before. I went through a process of reading books which had been recommended to me, and listening to audio pieces that resonated with the direction I was stepping in. I learned of the processes that sound artists use in order to accomplish their own understandings

of sound at the level I wished to reach. I completely forced my mind into a new realm of understanding all that could initially seem quite simple, but in fact is intricately layered.

While realizing how intricately layered the study of sound is, I knew my project needed to be made in that fashion as well. Amidst this study I stumbled across many new ideas for how I view art, sound, the way I live life, and how I interpret the world around me. Again, I knew this needed to be conveyed somehow in my project.

I learned how important the aspect of sound is in all art. I realized that, when you go to a museum, or a gallery, and if either space is quite empty, you are met with a hum as you view whatever physical works are being presented. In the manner of sound being tossed aside, the hum of the silence finds a way to creep into you as you try to focus on a mainly visual perception of what is in front of you. I have learned how all sounds can become perceivable as hums if you give them the space to resonate with themselves. And I have learned that everything is sound if we give it the chance to be. All you need is a contact microphone!

It is crucial to take care of sound. It is crucial to acknowledge inaudible vibratory phenomena. Every space and every moment is affected by them.

Within my project, I incorporated 14 layers of sound. They all come and go at some points, but regardless, there are 14 of the layers. I aimed to marry the music with the sounds of life. I wanted to look towards life from inside of us, to life beyond us. I found a connection

through the fetal heartbeat with the regular heartbeat in order to access this idea of connecting something so lively yet not even born with something that is "a given" to us. I took sounds that can only come from inside, or even sound from underwater or outer space, to access the places it actively requires effort and special tools to understand.

The Conclusion

The project comes with a sense of my personality towards the end, with the appearance and addition of musical instruments. These sounds were recorded at my childhood home, during a period I spent resting, recharging, researching, and writing. At a particular moment when I was home alone, I remembered that, unlike in my apartment in Milan, I have access to musical instruments to play! It was such a joyful moment that I was able to tie into this research of noise, strange vibrations, and unpleasant or unheard sounds. I actually allowed myself to enjoy the beauty of these instruments, despite spending the entire thesis discussing how we should be able to look past just the beautiful sounds, and we should strive to comprehend *beyond* only the beautiful.

I was home alone, and the house was quiet, except for those scary noises an empty house makes sometimes. This moment of realizing that I could play instruments was liberating, and here is exactly why. My dog was scared. My dog was scared when I strummed the guitar, or played a note on the piano. And I was confused, how could she be scared? She has walked past these objects in the house during

her four years of life. And I realized, I have not played these instruments in at least three years, probably more. She was not used to these random objects creating these sounds. It was a wake-up call: I desperately needed music, and creation, back in my life.

Each of these instruments holds such fond memories. My ukulele, which was probably $20 on Amazon, used to be my favorite thing. I would quietly play it outside in the summertime, hoping my neighbors would not hear me. I just wanted to enjoy the feeling of playing ukulele outside in the summer, with the warm humid air causing my skin to feel sticky, the fan on my deck working double time to cool me off, and the twinkle lights within my screened-in deck providing a beautiful ambiance. There was someone who went to my high school who would always walk around carrying a ukulele through the hallways. Because of this, I was hyper-fixated on keeping my enjoyment of learning the ukulele private, so that no one could comment on it or form an opinion on my skill level (or lack thereof). The ukulele symbolized a time of social awareness, and the wish to remain connected to myself amidst a time when so much was changing.

My guitar was my prized possession that I had wished for for years. Truly, I just wanted it because I viewed it as the “step up” from the ukulele. Sure, it was, because never having proper lessons I never managed to play any chord right. But, when I would find a song that required only easy chords, I fell in love with the connection that can be formed with this instrument, and the resonating sounds that it produced. I believed I was as good as a professional once I mastered

the introduction to “Blackbird” by The Beatles. I would record videos of me playing it, and deleting them immediately afterwards when I realized I hadn’t nailed it.

The violin holds a lot of family sentiment. This violin was passed down from my Grammy to me a few years ago (disclaimer: Grammy is still alive and well). She used to be able to play a few simple songs on the violin, but at some point I must have expressed some interest that I wanted it, and as Grammy’s beloved grandchild, I got it. I never managed to learn the violin at all. Even without having lessons for the ukulele or the guitar, I managed to play them each a bit. The violin, on the other hand, was beyond me, and I had no self-driven motivation as a 13 year old (so what do we think it means, considering I still haven’t touched it for years?).

There were two notable things that I did with this violin. First, I broke the bow. I do not remember how. And second, I painted it. During my second year of high school, I decided to paint a large still life of a violin sitting on a piano, with sheet music behind it for the song “Larger than Life”. This painting was quite large itself, it was over 1.22 meters tall. This painting was entered into my county’s local art show, and it won the highest award, being entered into the gallery’s permanent collection.

It was risky, leaving this violin sitting in the back room of the art studio in my high school, but somehow it had the power to scare away any students from messing with it. This violin, despite me never mastering (or even trying to master) it, brought me great success, and

a sense of confidence I never had before: maybe I'm "good" at art?

Finally, the piano, which was the only instrument of these four that I studied. I practiced the piano for a little over six years if I remember correctly. I was very young, and I stopped at approximately age 12. So, it was enough to give me some basic musical capability going into the rest of my life, but not enough to ever excel technically.

When you are young, you do not always have a sense of what you need. You also have a completely different understanding of peace. But one thing I knew was that when I practiced the piano, with my cat, Max, sitting by my side on the bench, I was at peace. On the days leading up to when Max died, I would make him a cozy bed next to the piano, and play and sing simple songs to him. I was nowhere near as good at piano as I was when I was younger, but I did my best.

Sometimes my mom would sit in the room and listen to me practice piano. She has snapped a few nice photos of Max accompanying me. My dad and sister would be existing throughout the house, paying no mind, but I would be doing the drills my teacher assigned me, miserable in the moment, but simultaneously, somehow, at peace. Once, I played in a little show for the retirement home nearby. My great grandmother was living there at the time. I played "Popeye the Sailor Man", and I think I remember I messed up and had to restart.

Since quitting piano lessons, every time I would be home alone, I would go straight to the piano, which was near my front door. I would play whatever song at the time made me want to sing my heart out, and I would do just that. I would peek out the front door to know

when someone would arrive home, and I would stop belting.

And so, when I was at home now, three years after moving away, four years since I had last been connected to theater or music at all, I finally came back to myself through the usage of sound. Through seeing, touching, and hearing instruments I had ignored for years. After working on elaborating upon my state of mind regarding sound in all ways except musical, coming back to music was extremely necessary. Even if the notes I played and the chords I strummed were not "beautiful", they were necessary, and they were music.

It hit me like a ton of bricks, when I realized that my dog was scared because she had never heard these sounds before. There is everything in life to take you away from yourself, your passions, your loves. There are sounds that will ring so loudly in your ears, you cannot imagine anything else. Within these moments is when a new sense of strength can be located within yourself.

It was through the process of spending three years away from home, losing my passion for theater and music, rediscovering this passion, revisiting my home, and playing my old instruments, that I was able to come back to myself. Connecting with sound, connecting sounds, and realizing sound from inaudible vibratory phenomena has reminded me of the depth of understanding that can be felt when we open ourselves up to this sense of understanding. There are so many sights to see, and tastes to taste, smells to smell, and feelings to feel, but to hear is to know. To hear is to find balance. To hear is to find connection.

Your body will feel, and change, and be hungry and be full. Sounds will be loud, and quiet, and too much, and not enough. You will be freezing and you will sweat. You will become sick, and you will get better.

You can put your headphones on, or take them off. You can play your speaker, or listen to nothing at all. And there will be something within the nothing. You can listen to the mosquito in your ear at night, or you can slap it and hope it dies.

Time flies by. Now you have new knowledge, new perspective. You know better than ever before how to experience. You learn value, you value time, you value space. You learn that things either fall into place, or you place them. And you learn that there is always a choice, no matter what.

Nothing is as it used to be, and it never will be as it used to be. There is so much more than the eyes can see. All it takes is the effort to seek.

I hope "The Harmony" leaves the listener with a sense of thoughtfulness, connection, and curiosity. I hope that it is irritating yet beautiful to listen to.

I hope that the piece of audio I have created along with this thesis can go hand in hand at saying the same thing, but with different sounds.

I hope that you *hear*, and I hope this allows you to *feel*.

To listen is to learn, and to hear is to know.

There are infinite harmonies to be found within the unheard.

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