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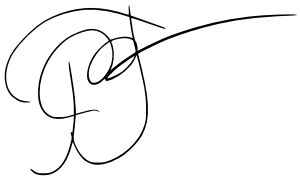

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SOUND RECORDING
IN COMPOSITIONAL PRACTICE

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BACHELOR THESIS

University of Music and Performing Arts Graz

Computer Music and Sound Art

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1. Introduction

1.1 Foreword

"At the core of this is the belief that the recording itself should serve and enhance the music at all times. A good recording should work with the performers and composer to excite and engage the listener and enable the sort of emotional involvement that is experienced in a live performance. The whole enterprise should have musical communication at its heart: we all love music; it is why we do what we do." (Haigh, Dunkerley and Rogers, 2020)

In this paper I would like to describe a concept that has been growing in my mind for many years. I have always been interested in how one could properly describe that moment when the record button is pressed and what happens in the next few seconds, minutes or even hours. I have always experienced a kind of sacred, perhaps even religious feeling while recording, no matter which side of the microphone I'm on. Even as a child, I wondered what was the key to a successful recording: was the quality of the performance the main criterion? Does the cost of the equipment used play a key role? Is it all about the room/space in which the recording takes place?

My views and my specialization as a musician have changed over the years. The first ten years of my musical practice were spent in the rather conservative world of classical music. I remember my first recording experience - a school concert in which my teacher had to record on an old video camera. All I could think about at that moment was not to make the slightest mistake: in the playing of the score, intonation, and so on. At that time, the whole concept of recording for me came down to how well the material was reproduced. In the early 2000s in the country where I was born, Ukraine, there was not much variety in the choice of equipment, so I did not think about what role it could play in the final result.

The big change was the moment when mobile phones with a recorder function became available. This was the first opportunity for me to experiment with recording myself. I

started borrowing a mobile phone from my parents and recording myself during practicing.
Over time, during my experiments with self-recording, I began to notice that my position in the room had a very strong influence on the tonal coloration of the sound on the recording. Moreover, I was deeply intrigued when I finally realised that the result depends not only on my position, but on the combination of my position and the location and direction of the recording device. But I was even more impressed when I realised how much the sound of the room itself matters, not just the position of me and the recording device.

Over time, as I was gaining experience as a session musician, I had the opportunity to use more professional recording equipment than handheld recorders. Eventually I could hear the difference in recording quality of my own sound, which led to an interest in exploring and comparing different equipment and its effect on sound at different stages of recording. But as well as realising that a good microphone and studio environment do play a part in the quality of the recorded material, I also realized how many other factors need to be taken into account to make a material sound satisfactory and interesting to the listener. It turns out that a sensitive microphone only makes the whole process even more difficult, capturing the smallest sound fragments that we sometimes can't perceive with our own ears. This awareness fits well with my more youthful opinions about the need for a perfect performance to achieve the desired result, but there was still something missing - no matter how well the material was performed and recorded, it didn't bring an element of liveliness and meaning to the resulting output.

Returning to the mobile phones with recording capabilities that became widely available in the mid-2000s, this also coincided with my first interests in "non classical" music and instruments other than violin and piano that I was studying. Like any other child at the time of my deepest passion for music, I really lacked the opportunity to play with someone else during classes. This became especially relevant when I started to explore new instruments and new music outside of my classical specialization. Already having some experience with recording myself playing, it occurred to me that by using two recording devices I could overlay one recording over another while playing new material. Of course, the quality of sound transmission with the tools at my disposal (two mobile phones), especially after re-recording the same material several times and playing it back

through the phone speakers, was incredibly distorted and I was not very happy with the results. However, it was during these teenage experiments that I realised that the recording process could be not only about capturing sound exactly as it is produced, but is also a medium for experimentation and a way to manipulate it creatively. It still took me quite a while to get my hands on computers and Digital Work Stations and dive into the world of composition and sound production, but it was in those years that my interest in sound recording was born, which led me to the ideas that I will explore in this thesis and continue to develop further.

1.2 Aims of the study

As follows from this foreword, I would like to give the moment of recording greater significance, both in the context of an individual event and in the context of one of the stages in the creation of a work of art or a composition. In some of the practices that I will discuss, the recording itself becomes a key component of the compositional process by highlighting the material with technical tools, making the ability to listen from both sides - performer and listener - more important than the post-production and processing of that material. The rawness of the material becomes a major defining characteristic, shifting the focus entirely to the moment in which the recording was made, forcing the listener in a sense to re-experience something that happened in the past and moreover construct a completely new, individual perception of that material.

"The process of listening can be a preliminary auditory investigation of the [recording] site, ready to inform choice of microphone type and microphone placement; it can be an impetus and inspiration for future compositions, a concurrent monitoring of the recording itself, there to calibrate the technical prostheses; it can be an important contributor to the labelling of recordings, to their classification and to their subsequent creative use, as they are processed or layered or mixed in the studio and then presented in public" (Lane and Carlyle, 2013, 10)

In other practices, such as Musique Concrete, recording material is only one of the initial parts of the compositional process, but it is also crucial for subsequent results and experiments. When planning in advance to apply processing to the recorded material, we

cannot always know exactly what the result will be. Therefore, the process of collecting material also becomes an equally important part, regardless what the circumstances are.

One more important aspect for me is the role of the person who makes the recording. This issue can be considered in many contexts, such as recording in order to recreate soundscapes and creating pre-recorded material for further manipulation which I have already mentioned. *"Is the recordist an audible presence? Are they a silent participant who nonetheless provides some experiential authenticity, or at least takes responsibility for pressing 'record' and then 'stop'? Or is the recordist understood to be of relative insignificance compared to the dynamic properties of the scene itself?"(Lane and Carlyle, 2013, 10)*. These questions are posed in the context of field recording, but I find them just as applicable to the recording process in general. How much influence does the recordist have on, for example, the recording of a classical music piece? Does he or she have any influence at all? Should he or she regard him or herself as part of the recording process and be emotionally involved? These questions are partly of a professional and ethical nature, but they also interest me in an artistic context, in an attempt to define the relationship between the technical and artistic aspects of the music creation process in general, and I will try, if not answer them, to explore them in more detail further on.

To summarize, in order to move on to more detailed consideration of various historical examples and case studies, I would like to conclude that sound recording, albeit in different contexts, has become a very important part of contemporary music making and, in my personal case, an essential part of artistic practice.

2. Brief history of sound recording

When talking about the use of pre-recorded sound as material for musical works, it is impossible not to turn to the technical component, without which this whole journey could not have begun. In this section I will concentrate only on a small part of the inventions that I think are important as drivers of the artistic process. The history of sound recording has reached a point in our time where a description of each stage in the development of audio technology would require an extensive technical research study of its own.

The development of sound recording has had a huge impact on the development of musical practice and has fundamentally changed the way we perceive music. Previously, the moment of making and sharing music required the audience and performers to be in the same place at the same time. Today, the average listener is much more likely to listen to recorded music than to a live performance, where the way it is recorded, processed and produced has a huge impact on how it is delivered to the listener. In addition, recorded music and sounds have become a huge and widely used resource for a whole generation of contemporary composers and musicians. *"This intervention of technology has created an interesting continuum between the quest for authenticity of reproduction and more manipulative applications designed for cultivating genuinely new means of musical expression*." (Manning, 2003, 5)

2.1 Acoustic Era

As mentioned above, Thomas Edison invented his phonograph in 1877, a device that marked the beginning of sound recording and its reproduction. It consisted of a cylindrical drum with tinfoil wrapped around it and a handle to rotate it. As the drum rotated and moved, a stylus attached to a diaphragm would create grooves in the tinfoil, capturing the sound waves. On the other side of a diaphragm, there was a small mouthpiece that the operator would use to speak into. For the playback, the stylus would be placed at the beginning of the groove to follow it, causing the diaphragm to vibrate which resulted in the movement of air in the mouthpiece and recreation of the sound.
Soon Edison's development was upgraded by Alexander Graham Bell and Charles Tainter. They replaced the soft tinfoil-covered cylinder with a hard-wax removable cylinder, improving it's sustainability and sound quality.

The other important invention was made by Emil Berliner between 1887 and 1893. By trying to avoid Edison's patent he came up with metal disc covered in lampblack as a replacement of a cylinder. After the recording was completed, the disc would be put into an acid bath. The acid would create a groove in the metal surface where the recording stylus had cut into it. As the cylinder process required individual copies, making mass production difficult, advantage of Berliner's invention was that by electroplating the original disc, resulting in a negative version with ridges instead of grooves, it was then

easy to use the "metal negative" as a stamper for producing identical copies using a steam-heated press.(Beardsley and Leech-Wilkinson, n.d.)

However, these devices were the very beginning of sound-capturing history and are described as the "Acoustic Era" of recording. (“Acoustic Era”, Library of Congress) As the whole process was purely mechanical, these machines relied on springs and cranks, initially wound by hand, and later powered by electricity, to provide the necessary energy for the cylinder or disc to rotate throughout the recording, which resulted in a certain instability. In addition, the strength of the input signal had a huge impact, because the sound signal was directly converted into grooves on the disc. It made recording several musicians or bigger ensembles very difficult because of the variety of amplitude levels of the different instruments. Anyways, at that time the primary aim was to capture a version of the sound that could be heard and recognized rather than achieving a perfect replication of the original. In any case, these early recording methods were very far from giving flexibility to the engineering process, and even less to the possibility of manipulating the recorded material for artistic purposes. (Adam, n.d.)

2.2 Electrical Era

The following inventions, which will be described, are a turning point in sound recording and relevant to this research. They brought into a new, so-called "Electrical Era". These inventions are the microphone and the magnetic tape.

In the "Acoustic Era” the quality of the recording was very much dependent on the ability of the performer to work around the limitation of the recording device and on the stability of the recording device itself. The invention of microphones changed the situation significantly. The process of converting sound waves in the air into corresponding oscillations of electric current made it possible to record a much greater variety in sound amplitude, and also made the recording process more flexible. From then on, the performers no longer had to suffer the difficulties of singing directly into the recording cone and there was no longer any need to place the ensembles in a completely unusual position in order to normalize the volume level between the instruments. It became possible to simply find a cable of considerable length and run it from the microphone for

as long a distance as needed. It also made it possible, yet still in a limited way, to record different sound sources separately.

However, the microphones themselves had some limitations. The recording level had to be set before starting the recording itself. That is, to make a quiet recording the level had to be raised, but if something loud happened - it led to an overload of the signal. The problem was solved with the help of invention of Lee de Forester, the triode. The triode is an active electronic component that can actively amplify signals. This is in contrast to the passive components used previously, such as transformers, which could only change the voltage and current levels, but could not actively amplify the signal. Unlike the fixed characteristics of passive components, the triode's gain could be dynamically adjusted during recording. This is crucial for adapting to different recording scenarios, such as capturing quiet sounds without noise or handling loud sounds without distortion. The triode's amplification capabilities could cover a wider range of signal amplitudes than passive components. It could handle both weak and strong signals more effectively, providing a better balance between capturing subtle nuances and preventing distortion of high amplitude signals.

But perhaps the most important breakthrough of this time was the invention of magnetic tape by Fritz Pfleumer in 1932, a further development of the wire recording technique. The microphone and amplifier greatly improved the process on the recording side, but not much had changed on the storage medium side. Although the magnetic tape recorder was used for military purposes until the end of World War II and only became commercial afterward, the magnetic tape entailed the revolutionary step that allowed for experimentation with the transformation of recorded material in novel ways. (Hutchinson, 2023). The working principle of magnetic tape was also completely different than the one of the record: instead of scratching physical grooves on a disk now soundwaves could be encoded as polarizations of magnetic particles on a celluloid tape, so the process became electrified from both sides now - sound became recorded and stored electrically. Moreover, it provided better amplitude and frequency range than it was in the case with previously used methods.

It is important to mention Bing Crosby, the famous American radio artist of the first half of the 20th century. He quickly noticed the potential of tape recording, namely that the

information was recorded linearly rather than spirally as on a disc, which made it possible to cut it into small pieces and use it in the same manner as film tape, shifting these pieces between each other. (Adam, n.d.) As a whole piece, Walter Ruttmann's "Wochenende" is called the first attempt of sound-on-film montage. Being already present in the avant-garde silent film scene, he had the idea to create a "movie" without any visual material. (James, 1986, 78) "Wochenende" displays a soundscape of a weekend in Berlin in a collage of sounds, words and musical fragments recorded on a soundtrack of optical sound film. It was commissioned by Berlin Radio Hour and presented on 13 June 1930 (The San Francisco Tape Music Collective).

In general, the advent of tape opened up a huge range of possibilities for working with sound recording. Eventually also becoming available for individual, "home" use in the 60's - 70's, one can only imagine how big an impetus it was to create and capture more music. In addition to this, the rapid development of technology also influenced the portability of equipment, as now all equipment could fit into a suitcase and be used by one person.

2.3 Digital Era

"Computer-based technology is far more complex today than ever before, and music- and its worldwide presence in our society- has never been richer; thus, our fascination with technology and its role in teaching and learning continues to grow."(Webster, 2002) - These words are an excellent preface to this section, especially in the context of the accessibility and freedom of the information circulation that the time period in question represents.

This era in the history of sound recording, the last one I would like to talk about, but perhaps the most important one in the context of the methods known and widely used today, must be given its due. It was during this period that all the already quite great possibilities offered by tape recording in the 50s and 60s became truly accessible not only to the people working in radio studios, record companies, research centers and a few lucky enthusiasts. With the advent and implementation of inventions such as transistor and audio signal converters, which are by no means the only ones, but perhaps the most

important to mention first, it became possible to convert the electrical signal received from microphones into a digital signal.

Transistors themselves had already made a huge contribution to the downsizing and compactness of devices such as radios, film recorders, and electric keyboards, but it was the analog-to-digital converter (ADC) that finally made it possible to store recordings as digital information. Although over the time, this not only expanded the amount of information that could be stored, but also greatly increased its quality. (Adam, n.d.) In contrast to analogue audio recording, in which the sound waves were captured on a medium and read out by an additional physical device to convert the waves back into sound, in digital recording, for example on compact discs, the voltage levels of the source audio waves are divided into a large number of discrete measured segments, which is called sampling. The hearing range of the human in the best case is in the range of 20Hz and 20kHz. The Nyquist theorem suggests that for accurate digital representation, the sampling rate should be at least twice the highest frequency, so 44.1kHz is commonly used. This will accurately capture up to half the sample rate (22.05kHz), maintaining fidelity within the limits of human hearing. ("Compact Disc/ Sampling ", Britannica) This means that it is finally possible, by increasing the sampling rate, to capture not only the entire frequency spectrum audible to the human ear, but also information beyond it.

This digital breakthrough led to many new inventions, such as Minidisc recorders and DAT (Digital Audio Tape), but all these technologies have now been outcompeted by cheaper digital options. Most digital audio recorders these days store information on memory cards, flash cards and hard drives. These card-based digital recorders are becoming available at lower and lower prices and are shrinking in size (Clukey, 2006). Memory cards also played a big role in the part of technology development I am interested in. They exponentially increased the amount of information that can be stored, as well as its protection in general. They are small, easily removable, and very portable devices, and unlike hard drives have no moving mechanical elements inside. The information on them can also be overwritten practically an infinite number of times, so with their sustainability, low price, and large storage capacity they have practically superseded the older carriers such as floppy discs, cassettes, and CDs (Foote, 2017). The reduction in size of professional recorders to the size of a mobile phone (which in fact can also be used as a recorder), has sped up the preparation for recording to a few seconds, as all one has to do

now is take it out of the pocket and press the REC button. It also increased the number of potential recordings that could be made in places where, when planning a trip or expedition, it was difficult to imagine taking a whole cassette recorder with cables and microphones. Of course, the quality of the built-in microphones in most of these portable devices is not very good, and external microphones are often needed for more professional recordings. Nevertheless, it is now a matter of just a few hundred extra grams in a rucksack and almost no extra space, which has encouraged a large number of amateurs and enthusiasts to record and document more and more new sounds.

3. Historical examples of sound recording in artistic practice

3.1 Musique Concrete

“That concrete music presents itself as a "new way of making," is concerned with "a new type of object”. That concrete music presents itself as a "new way of making," is concerned with "a new type of object," is all too clear. At least it is to our credit that we do not claim to produce a work of art straightaway, that our works are constructed in the name of techno- aesthetic experimentation only and not as a true "project." If these procedures have often appeared to us ourselves as both desperate and often inauthentic, then it's because, filled with a taste for the old music, we felt very uncomfortable with this endless groping in the dark.”(Schaeffer, 1952)

This chapter on the history of music, and perhaps also of recording as it is artistically interpreted, is interesting to address in the context of my thesis. Later on, Musique Concrete gave a boost to the development of different approaches to composing and perceiving music. But what is important to me is that the Musique Concrete was one of the first to see recording not just as a way of capturing sound, but as part of the music-making toolkit. Still relatively limited in the technical possibilities of the late '40s and early '50s, the composers of musique concrete were already beginning to take an interest in the manipulation of recorded sound.

I would start with Pierre Schaeffer as one of the notable representatives of the Musique Concrete. Working at the Radiodiffusion Télévision Française (RTF) in Paris and having

access to its equipment, he became the founder of the Musique Concrete. His education as an electrical engineer encouraged him as early as the mid-40s to attempt to define the subjective characteristics of natural sounds, for example, the attack and decay characteristics of individual sounds and the nature of their evolving timbres. In January 1948 Schaeffer began experimenting not only with the morphological description of individual sounds, but also with the invention of techniques for manipulating these sounds in a way that would allow them to be used for the musical composition. The evolution of musique concrète was significantly shaped by the functional limitations of recording technology. Pierre Schaeffer's techniques in musique concrète included playing recordings backwards, juxtaposing sounds from different time contexts, adjusting playback speeds, and creating repeating sound loops. Practical constraints required manual volume control, spacing grooves for multiple recordings on a single disk, and intricate studio procedures for constructing montages and playing recordings in reverse. (Manning, 2003, 5)

3.2 WDR – Stockhausen

The next example I would like to review is the use of microphones and tape recorders in several compositions by the German composer Karlheinz Stockhausen created in the 1960s. His work, both musical and theoretical, has had a strong influence on the development of avant-garde music since the 1950s. He was also the director of the WDR (Studio for Electronic Music of the West German Radio (German: Studio für Elektronische Musik des Westdeutschen Rundfunks)) from 1963 to 1977, which was one of the most advanced at the time. At various times the studio has hosted such well-known representatives of the Electroacoustic scene as Herbert Eimert (one of the founders), Karel Goeyvaerts, Gottfried Michael Koenig, György Ligeti, and many others.

Speaking of Stockhausen's music, which is versatile and in many ways pioneering in its genre, I am particularly interested in compositions such as Mikrophonie I (for tamtam, 2 microphones, 2 filters and potentiometers), composed in the 1964-65s, and Solo (for a melody instrument with feedback (1 instrumentalist and 4 assistants)), composed in 1965-66.

The idea for the composition "Mikrophonie I" came from experiments conducted by Stockhausen and Jaap Spek in August 1964. As Stockhausen writes in the preface to the

composition: "After completing the score of MIXTUR for orchestra and ring-modulators, I began to search for possibilities of also composing in a flexible way the process of picking up sound by microphone. The microphone has, up to now, been treated as a lifeless passive recording instrument for the purpose of obtaining a sound playback that is as faithful as possible: now it also had to become a musical instrument and to be used in turn to affect every aspect of sound" (Stockhausen, 1973, 9). Stockhausen had a tamtam installed in his garden, which he had purchased for his previous composition. The experiment consisted of interacting with the gong with various objects that he had collected around the house and a microphone that he held in his other hand and moved around. The microphone was connected to an electrical filter whose output led to a volume control and then to the speakers. At the same time, Spek, who was inside the house, improvised by manipulating the filter potentiometer and the dynamic level, recording the result on tape simultaneously. The experiment became the basis for the score of Mikrophonie I. The composition is played by 6 performers. Two interact with the tamtam using a variety of objects. Two others "scan" the tamtam with microphones, changing the distance between them, resulting in changes in dynamic level and timbre. The last two operate filter potentiometers, also changing timbre, pitch, dynamic level, and spatialisation through a combination of filter settings and loudness control. "In this way three mutually dependent, mutually interacting and simultaneously autonomous processes of sound-structuring are connected with each other" (Stockhausen, 1973, 9) I find this composition important in the context of my thesis as it is one of the first to establish the significance of the microphone in a new musical context.

In the second composition I would like to review – Solo -, Stockhausen uses the live sound recording itself as an compositional element. It was composed in April and March 1966, commissioned by the Japanese Radio Broadcasting Services (Sluchin, 2000, 39). Solo is a composition for melodic instrument and feedback (1 instrumentalist and 4 assistants). Any melodic instrument can be used and during the performance parts of what the instrumentalist plays are recorded on a 2-channel tape recorder. The recorded parts are passed through a feedback circuit, which allows them to be overlaid with different time delays, and are played through two groups of speakers, mixed with the instrumentalist soloist's live playing (Stockhausen, 1969, 13). As the notation system of this composition is very complex, I will not go into a deep explanation of it and will give

an overview of the technical component and its importance in the context of this composition.

The feedback circuit consists of two tape machines, one of which records and the other winds the tape. Between the tape machines, there is a table with moveable guide rolls and 6 playback heads installed on it. Guide rolls should be positioned in such a way that the time delay corresponds with the periods described in the scores. Four assistants must control the technical equipment. The first - recording levels, the second - feedback levels, the third - playback levels. The fourth assistant is responsible for switching between playback heads, thus determining the duration of the delay, and giving signals to the soloist and other assistants to navigate them through the composition. (Stockhausen, 1969, 15)

In this composition, Stockhausen explores the meaning of feedback rather as a general concept: "I mean, for example, any kind of feedback between musicians who play in a group, where one musician inserts something, bringing something into context and then listening to what the next musician's doing with it when he's following certain instructions, transforming what he hears"(Cott, 1972, 193). With a technical set-up, he gives this interconnection a new meaning, in a sense personalizing it, making the soloist play with himself. "Everything that the instrumentalist, "thinks" during the preparation and the execution of his solo should be perceptible in sound: the feedback between the soloist-what he already has played, and what he is going to play- between him, his second self, his third self, and his multiple selves, which have already played and which are going to play"(Sluchin, 2000, 39) In the context of my thesis, the technical part of this composition is very important. He addresses the questions he is interested in through the live recording and playback of sound, making it an essential compositional element and giving it the significance of an instrument not only in a technical but also in a musical sense, as with the microphone in the previous composition I have reviewed

3.3 Field Recording

Field recording is an important part not only of the history of sound recording but also of sound art in general. Taking its origins in the interest in the documentation of various sounds by researchers, historians, ethnomusicologists, ornithologists, and so on, in the

middle of the 20th century it found its application in the field of experimental music. Composers such as John Cage and the aforementioned Pierre Schaeffer contributed to popularising the idea of using everyday sounds and environmental recordings as musical material. In our times, however, "Field recordings are composed with, performed in concert venues, installed in galleries, released as CDs, worked into audio-visual matrix with film and other media, and made available in sound maps and other online forms of distribution"(Lane and Carlyle, 2013, 11)

The first recording of a non-human subject is credited to Ludwig Koch. He recorded Common Sharma, a bird of the thrush family, in 1889 at the age of eight, using an Edison phonograph bought by his father at the Leipzig Trade Fair. Later, in the 1930s and 40s he created several sound books consisting of recordings of British birds. (Guida, 2018, 295) Through his books and work for BBC Radio he had a big influence on many recordists of the time, yet the approach to environmental sound as an independent unit in the context of composition and sound art came a little later. (Lane and Carlyle, 2013, 9) In 1969, Canadian composer R. Murray Schafer founded The World Soundscape Project at Simon Fraser University (SFU). The project was based new field of research of acoustic ecology or soundscape studies, which aims to draw public attention to environmental sound, documenting its changes, establishing the concept of soundscape design as an alternative to sound pollution. The main goal of the project was to find an "ecologically balanced soundscape" where human society and its sound environment are in harmony. Schafer's partners at the beginning of the project included Howard Broomfield, Bruce Davis, Peter Huse, Barry Truax, Hildegard Westerkamp and Adam Woog. The project has resulted in a massive collection of field recordings, mostly recorded in Canada and Europe, publication of its documentation, as well as archival and educational work. Although the project did not continue as group work, it was a trigger for rethinking the notion of soundscape in the context of both science and composition. Many composers have continued to develop the theme of soundscape in their works, discovering new forms and approaches not only on the compositional side, but also on the listening side. (Truax, 2006)

In this chapter, I will look at two works that I think demonstrate well the variety of how field recordings and soundscape themes are used in composition. The first is "A Sound Map of the Hudson River" written by New Zealand composer Annea Lockwood in 1982 and released on the label Lovely Music in 1989. Annea Lockwood was interested in the

sounds of rivers from an early period of her artistic career, already in the mid 60's she began to collect a "River Archive" consisting of recordings made by herself and others provided by her friends, including Pauline Oliveros and Carolee Schneemann. (Lane and Carlyle, 2013, 30-31) A Sound Map of the Hudson River is a listening journey from the river's source in the highlands of the Adirondacks downstream to Lower Bay and the Atlantic. The 77-minute long album consists of 15 segments recorded along the course of the river, with a given location, date, and time for each one. Each segment has its own sonic characteristics depending on the weather, season, geographical particularities, and the presence of the human environment, the sounds of which are intertwined with the sounds of the river. In the album notes of "Hudson River," she writes "...I have recorded rivers in many countries, not to document them, but rather for the special state of mind and body which the sounds of moving water create when one listens intently to the complex mesh of rhythms and pitches."(Lockwood, 1989). In one of her interviews, when asked what she thought and felt about her river recordings, she talks about rivers as something completely independent, with complex internal structures. She describes the perception of the sound of a river as "...a combination of the brain being engaged by constantly changing details in the texture of moving water, combined with the apparent overall repetition". (Lane and Carlyle, 2013, 31)

In her interviews, she says that she does not use any post-processing in her sound map works, except for the necessary equalization. This example is interesting to me because of its approach to material collection and representation. The project, which took about one year long to be completed, consisted mainly of selecting locations and the recording process itself. The 350-mile journey along the river will certainly include interesting situations, incidents, and encounters - all during the recording - giving it new meaning as a process. Annea uses her ears and her perception to select a particular location/situation, then uses microphones as a kind of second pair of ears, without the intention to change the material further, but in an attempt to represent the compositional features of the soundscape in its original form and to convey this feeling to the listener later on.

The second piece I will review is the album "Magneto Mori: Vienna" by Mark Vernon. Mark Vernon is a Glasgow based artist who works with tape music and explores themes of magnetic memory, audio archaeology and nostalgia in his work. "Magneto Mori: Vienna" is a fragmented sonic portrait of the city created from found sounds, buried tapes,

and field recordings. "In this de-composition sounds from Vienna's past and present are conjoined in a stew of semi-degraded audiotape" (Vernon, 2021) The album was recorded around the city on a reel-to-reel tape recorder over a two-day period, after which the tape was cut into fragments and buried in the dirt in one of Vienna's gardens along with local souvenir fridge magnets to erase the part of the tape they came into contact with. In the album description Vernon writes "The deliberate distressing and erosion of these present-day recordings results in artificially degraded sounds that fast-forward the effects of time, disrupting the perceived chronology of this audio matter" (Vernon, 2021).A few days later the tape fragments were exhumed, washed, dried, and put back together in random order. While the tapes were underground, Vernon found some old tapes at local flea markets and made additional field recordings. These found sounds were later mixed together with what was on the buried tapes, stretching the several day time period over which the recordings were made by himself "to perhaps as far back as fifty years ago" (Vernon, 2021).

I find Vernon's approach to this work and the way he handles the recorded material interesting. He intentionally distorts the carrier (tape) by hiding it underground, slicing it up, and reassembling it in a random order. Listening to the album, I find it particularly interesting to analyze how this random order is successfully folded into a composition, supported by more static material that he recorded in parallel and assembled from old tapes. The element of time also plays an important role. The recordings from the old tapes are not always distinguishable, being mixed with obviously damaged recordings and normal field recordings, but knowing the history of the making of this album encourages you to listen to the material, to compare it, and to think about it in a much deeper way.

3.4 Contemporary Examples

In this section, I would like to look at a few contemporary examples. Unlike the examples described above, which mostly belong to a particular aesthetic, here I present a mix of different practices of using sound recording as an element of the compositional process.

One example is a wonderful record called "Domesticated Wind" created by Kaspar König in 2015 and 2016. Microphones always have difficulties in very windy situations, the diaphragm overloads and results in chaotic clipping and distortion of the sound. The idea of the author was to create a controlled windy environment and use different recording

strategies and approaches to explore the outcome on the edge of the distortions, which are usually unwelcome, in a musical context. As the author writes in the album description:

"One can monitor and adapt the wind speed in a controlled environment, as well as make the wind molecules hover by adjusting the wind speed just before clipping is expected to occur. The method and strategy we have designed is to listen to a variety of microphones placed at a series of different angles to the wind. The initial results inspired us to continue our experiments, eventually losing the microphones in the process. A breakthrough moment in the research came in the summer of 2015 whilst working on the wind tunnel at our artistic research facility. Thinking about aerodynamic properties and their measurement tools, I focused my attention on how, exactly, to control the behaviour of microphones in the wind"(König, 2016)

I find this recording incredibly important in the context of my research. The author's instrumental toolkit for creating the final recording is in fact limited to just microphones and a controlled wind flow, which in a sense emphasises the recording process itself. Also, this approach differs significantly from examples of field recordings, of which it can also be said that the only tools used to create them are a few microphones. The author emphasises the intention to eliminate the background sounds present at the recording location, and to concentrate on the desired material in a controlled way:

"Since the wind tunnel is placed on top of the University of the Arts in Zürich in a semi-open space, we were also exposed to the sound of airplanes, trains and urban wildlife. Precisely those things that are normally tested in the wind tunnel surrounded us, and we managed to focus the sound as much as possible into the tunnel and away from the objects or models. This required us to place microphones directly in the wind. After testing several microphones intensively, we detected that some sensitive microphones resisted distortion to a considerable degree. We could effectively use them in any situation and at any angle towards the wind. In this way, we pushed all the microphones to the limit, only just preventing clipping and stochastic noise in the recordings." (König, 2016)

The author gives the microphone a new meaning, equating it with a musical instrument, as Stockhausen did in his composition "Mikrophonie I". Apart from the wind, the most

important material in the recording is the internal mechanical processes of the microphone exposed to unusual workloads. In this way, unlike sampling successful moments or collecting material to further work on it, the process of recording and experimentation becomes the predominant part of the whole project.

The last composition I would like to discuss in this section is "Past to Present", created by Anton Tkachuk in 2023. It is a good example of the use of modern digital technologies and the Internet as a significant part of the compositional process. I find this composition particularly interesting because of the way it uses the possibilities of the smartphone and voice messages in chat rooms as a recording tool.

The basis for its creation is a bot written for the Telegram messenger, which sends reminders in a random order. At the beginning of the communication with the bot, the performer sets the date and time of the performance. The performer can choose how long before the performance to start interacting with the bot, as the number of reminders remains the same and is distributed over the remaining time before the performance. After receiving a reminder, the performer should record a voice message using his/her phone, regardless of the situation he/she is in. The performer can choose what to record at the moment of receiving the reminder; it can be the sound of the environment, his/her own voice, or any sound element that stands out at the moment of recording. As the day of the performance approaches, the reminders come more and more frequently. Before the performance, the bot puts all the recordings in chronological order and creates one single audio file, forming a timeline from the past to the present. During the performance, the performer plays generated audio file while looking into the camera to establish a more direct and intimate connection with the audience. The image from the camera is transmitted to a screen behind his back. As the recording comes to an end, "the timeline of the past converges with the present moment". The piece culminates in the present moment when the performer and the audience share a "common experience of the now". The past aims for the present like a musical composition aims for its climax. The climax is a period of silence of about one minute, designed to reflect and realize the present moment (Tkachuk, 2023).

In the context of my thesis, I am particularly interested in how Anton Tkachuk uses the mobile phone and its voice messaging function as a toolkit for recording sound. In the

description of the piece, he defines the smartphone as a portal into the performer's life, allowing the documentation and recording of the environment that surrounds the performer at any given moment. He also refers to the smartphone as a tool for the study of sound ecology, which reflects different social realities, as the performer's environment differs according to the social group he or she represents (Tkachuk, 2023). The composer rethinks the technologies that are so present in our contemporary lives and gives them a new meaning in the context of the creation of art. I also find it interesting that the sounds are recorded using the microphone built into the smartphone, which definitely influences the sound of the material. Whatever is recorded retains the aesthetic of a voice message, something most people hear on a daily basis. This further emphasizes the idea of exploring and representing the sonic environment through "our ubiquitous interaction with technology" (Tkachuk, 2023).

4. Own experience

In this, the last part of this thesis, I would like to give examples of my personal experience as a sound recordist. As I said in the preface, sound recording is an integral part of my artistic practice, both in the context of sound engineering for large projects with other artists, and as a compositional tool in my solo works.

4.1 “Example №.1”

Coincidentally, my first serious composition, “Example №.1”, was created during my first fascination with recording and collecting surrounding sounds. At the beginning of 2018, I bought my first more or less professional recorder, a Zoom H6. I already had some plans for Example N.1, I wanted to include a lot of instrumental sounds. Studying instrumental performance at the time, I spent most of my time in the rehearsal block at the university, surrounded by a 'cacophony' of sounds from various instruments and voices. In the breaks between rehearsals, I began to leave my room with the recorder and record individual instrumental sounds throughout the building. I was interested in finding different combinations of instruments and exploring how their sound would change when recorded from unusual angles and locations. Often the sounds would come from closed or partially

open doors, windows, or from the other end of the corridor, creating strange reflections. There was also a lot of luck involved in catching a good moment with an interesting combination of sounds as I never knew which pieces each of the musicians would practice and how it would overlap with the sounds of the others, but just recorded them, remaining completely unnoticed in most cases. Recording a choir was also an interesting experiment. I started attending rehearsals of the university choir and recording from inside, joining in with different sections. As with the recording of instrumental sounds, I did not use the standard methods of pointing microphones at sound sources. Eager to remain unnoticed, I often put the recorder in the pocket of my rucksack, hid it behind the backs of the choristers before the start of a rehearsal, or put it in my pocket while moving between different groups of people. All this material became the basis for my composition "Example N.1". Without thinking too much about aesthetics at the time, I used it in very different ways. Some instrumental sounds underwent a lot of processing: pitch shifting, time stretching or various effects. Others I left practically untouched, except for a slight manipulation of the dynamics of the recorded segments.

It is also important to note that because of the strategy I used, the quality of some of the recordings was not up to standard, as many of them were made from positions that did not seem suitable for this purpose. This affected the nuances of the sound: in the first part of the composition, for example, you can hear a lot of extended sounds of string instruments. Some of these, as mentioned, were recorded from behind slightly open doors. By mixing these recordings with the more conventional ones, which were made by pointing the microphone directly at the sound source, I was able to achieve interesting transformations in the shades of sound. The frequency spectrum changes from more muted to fuller. The sense of space is also constantly changing, as the acoustic properties and reflections were very different depending on where and how I chose to record. This is also the case with the choir: by recording it from inside, I got unusual shades of sound and balances between the voices. In the piece, I used a recording of the warm-up at the beginning of the rehearsal, in which the choir also clapped and stomped along with the singing. As I held the recorder at about waist height, the clapping and stomping predominated over the voices, and the overall sound seemed to come from afar. This combined well with the 'dry' electronic sounds I added on top of it, and also created an interesting sense of space in the final version of the piece.

The experience of working on this composition became very important to me and played a big role in the subsequent development of my compositional practice and technique. From that time until now, for most of my compositions, I try to use sounds from my ever-growing collection of surrounding sounds.

Link to the piece: https://on.soundcloud.com/1iwyS

4.2 “Doors and more”

Another interesting example is my composition "Doors and More" written at the beginning of 2019. Given the task of writing a composition in the Musique Concrete style, that is, a composition consisting of recorded sounds without the use of processing techniques that were not available in the 1950s, I thought about what kind of material would be suitable for me. At that point, I was no longer interested in using instrumental sounds. I also didn't want to go in the direction of field recordings, because I felt that this kind of material was too static, and I could not get a satisfactory result by cutting up such recordings. I wanted dynamic sounds that I could change and influence during the recording process, to find a balance between my ideas and the limitations of the processing methods. The solution was the sound of a creaking door. I discovered that door creaks sound very different depending on the door, the room, and other factors, and have a very wide timbral and dynamic spectrum. I was also able to manipulate the doors in the way I wanted, finding and extracting the micro-sounds that interested me the most. Over the course of several months, I recorded many doors in different cities, which became the core material for this first composition, created during my studies at the Institute for Electronic Music and Acoustics in Graz. All of them were recorded either with my recorder or with a shotgun microphone, a highly directional microphone that is particularly good at picking up the sound source and cutting out extraneous noise. Unfortunately, I wasn't familiar with contact microphones at the time and had not thought about the resonance of the doors themselves, which could have added much more variety and interesting sounds to the composition. Nevertheless, I was very inspired by this work with doors, and after some time I made several recordings of creaking doors, using much more varied technical equipment, and created quite a large package of samples that have been used in my other works.

The example of using sound recording as part of the compositional process in this composition is interesting not because of the technical features of the recording, but because of the interaction with the sound source and how it affects the recorded material. Unlike the previous example, where I acted as an observer, looking for interesting sounds and experimenting with recording positions without any influence on the sound sources, this time I had full control over them. The recording equipment was in the usual positions, aimed at the source of the sound, in this case, the doors or door hinges. However, the recording process itself became very interactive as I explored the different nature of the squeaks of each of the recorded doors. The door squeak, which at first sight might be characterized as an uncontrollable sound, turned out to be very playable and manipulable. Factors such as the speed of the door and, for example, the pressure I could apply to the hinges with my body weight, added unexpected variety to the already richly colored sound of the door squeaking. This was an important experience for me and the discovery of a different recording strategy in which the performer is an active participant in the creation of the sound material and has a significant influence on the output. This is a good contrast to the strategy of observing and waiting, which is more about capturing sounds as they are meant to be heard.

Link to the piece: https://on.soundcloud.com/r5FdA

4.3 “Happy new semester”

This small but interesting example is my composition "Happy New Semester", also created in 2019. It was based on an ironic voice message left by a colleague in our student chat room, congratulating us on a failed start of the semester, as the COVID-19 pandemic outbreak caused the university to close just a few days after the beginning of the semester. During this time I was exploring various sound synthesis techniques such as Granular synthesis and FM synthesis, and was quite interested in the glitch aesthetic. While experimenting with various granular synthesis possibilities in the audio programming environment Supercollider, I jokingly re-recorded this voice message, which had already gone viral among my colleagues, and started using it as a sound source for my granular experiments. After a while, I created a large amount of different material with this few seconds long vocal message and decided that it would be the basis for my next composition. The material ranges from the sound of the original recording, slightly

equalized and saturated, to time-stretched drones and percussive glitch sounds. This composition in a sense advocates a recording made on a mobile phone, suggesting that such material should be seen as something of equal value to recordings that are made with the appropriate equipment and with the intention of being used later. Even though this little recording was not made by me, I consider it important to mention this example in the context of using recorded sound in a composition. Finding it and deciding to use it later and re-recording it represents another kind of work with recorded material, which I would label as a search for sounds in the digital space that is so inherent in our contemporary reality. This parallels the above examples of finding and capturing natural and human sounds, suggesting a broader range of spaces in which interesting sounds can be found. Also, practically the entire composition consists of different variations of the resynthesis of this single recording of a few seconds in length. This also serves as an example of how diverse recorded material can become by applying various manipulations and resynthesis techniques to it.

Link to the piece: https://on.soundcloud.com/vfNCd

4.4 “Triptych: Statements”

The composition "Triptych: Statements", written in 2023, is an example of my work during a period of concentration on the moment of the sound recording and the sound collection as the main compositional tool. The material that was used in this composition was recorded during 2022 and 2023 as part of the Claypot project, for which I and a few colleagues of mine conducted a large number of experimental improvisation sessions with various instrumentalists and vocalists in different European cities. Two sessions impressed me in particular, and in the process of listening and mixing I felt that they would be good material for new work. The first session was held in the autumn of 2022 in Brighton, England, and was curated and recorded by one of my colleagues. It featured Galician writer, performer, and vocal improviser Xelís de Toro. I was very impressed by the timbral coloration of his voice and the manner of his improvisation. Also, the subject matter of his improvisation appeared to be in line with my taste in this field. The second session was curated and recorded by me and my colleagues in Graz, Austria in the winter of 2023 and features improvisation by jazz drummer and percussionist Sebastian Baumgartner. He stood out among other drummers and percussionists with his remarkable

control over the sound dynamics, flexibility, and unconventional methods of sound extraction from his instruments. I especially liked his ability to play quietly, and even during solo improvisation to give the feeling that he was still playing with someone, which suited perfectly for the piece I planned. My compositional strategy was not to apply any effects or processing to these recordings, apart from a little equalisation and adjustments of the volume balance between the recordings. This was radically different from my previous experience with recorded material, as I've always been interested in total control over the sound, which often resulted in the correction of micro parts in samples and recordings. This time I wanted to emphasise the value and sound of the original material that impressed me so much. I decided to take parts of both sessions that I found interesting and that fitted together, and put them together in a kind of puzzle, recreating a collaborative improvisation in an artificial way.

The most challenging and time-consuming part was listening through and deciding which parts worked best together, as both sessions were about three hours long. I took three of my favourite vocal improvisations, each based on a repeated and slightly changing phrase that states something. The phrases were: "Until the cows come home", "There is nothing like being silent" and "It’s important to know how to hold a hand". From this came the title: "Triptych: Statements. Working with these vocal improvisations was quite easy and efficient because they were recorded with long pauses between phrases. This allowed me to cut the approximately ten minute improvisations into shorter phrases without compromising the sense of authenticity of the recording. Also, the semantic context of these phrases turned out to be structured in such a way that it didn't change much depending on the order in which I arranged them. The next step was to select the percussion improvisations. Based on the mood of each vocal improvisation, I chose the most appropriate segments. It was also very easy to work with the percussion material. For the recording of this session, as the person responsible for its technical component, I used an extensive combination of different microphones in stereo pairs, trying to capture the sound of the percussion and drum kit in different parts of the room, aiming to capture the material in a wide variety of sonic colours. In my experience, given the equipment available, this is always a good strategy, as it gives more freedom to work with the material later on. However, in the end, for "Triptych", I decided to use a combination of overheads (a set of microphones that are used to capture the sound field above the source and are usually used to record a drum kit in order to capture the sound of the cymbals

along with the stereo image of the whole kit) and a large condenser microphone that I placed facing the drum kit, at about eighty centimetres high and about a meter and a half away, to capture the lower frequencies produced by the kick drum and toms. I chose this set of microphones because it was the most appropriate in relation to the sound of a vocal session, that had been recorded earlier by my colleagues, for which the standard studio technique of voice recording with a large condenser microphone was used. The session was supervised by me and my colleagues in such a way that we gave instructions and ideas for the moods, in a sense conducting the musician, and he improvised for a few minutes on the theme we gave him. The instructions and ideas ranged from more or less ordinary primitive terms such as "louder-silent", or "faster-slower" to quite interesting formulations and suggestions. For example, a request to imagine different emotions and moods, or to imagine yourself in a certain situation and try to express the expected reaction with your instrument. I was also interested in capturing the diversity of genres. I tried to formulate my requests not by naming the genre directly, but by trying to describe it in different ways so as not to push it into the stereotypical image that names like "funk" or "swing" might evoke. In this way, I intended to achieve the results that I had in mind, while still getting them completely through the interpretation of the musician.

In this case, slicing the material was not the most efficient solution because the musician used a lot of cymbals with very long sustain and release times. But fortunately, the material from both sessions fit together so well that by arranging the vocal phrases within a percussion recording I was able to achieve a satisfactory result that recreated a sense of collaborative improvisation. As I mentioned earlier, one of the factors that I found intriguing about the percussion session is the feeling that even when playing solo, the musician seems to be playing with an imaginary companion. The vocal phrases lay perfectly on the longer percussion improvisations, together creating a sense of dialogue between the musicians.

I think this composition is a good example where the recording and the way it was done are key elements of the composition. The improvisational character of 'Triptych' is directly related to the improvisational nature of the sessions that served as the material for its creation. It is also important to note that in the case of these two sessions, the guidance from myself and my colleagues, who acted as a kind of curator throughout the recording, had a strong influence on the form of the output material. In a sense, this

establishes a compositional element at the moment of recording itself, creating an inseparable link between the recording itself and the moment when I began the direct work of combining the material and creating the piece out of it. The sound recording as part of the compositional process in this piece also reveals the interactive approach to recording that I mentioned in the example of the "Doors and More" piece. This approach presents a recording strategy in which the recordist directly influences the sound source, and by interacting in this case with a live person, it takes this approach to a new dimension, introducing a moment of mutual interaction and communication. I also find it interesting how two completely different sessions, with different musicians, recorded at different times, in different countries, by different people, turned out to be so consonant. It gave me, as a composer, the opportunity to put this musical puzzle together and artificially recreate a sense of collaborative improvisation without using any tools other than separating the vocal phrases and orienting them in time in relation to the percussion recording.

Link to the piece:
https://drive.google.com/file/d/1MZ2yOSQ0fHRCiSIWEhEiWvnN0sitfTaB/view?usp=share_link

4.5 “Verkehr”

The composition " Verkehr " (transport in German) is a work I created in the summer of 2023. It is based on recordings of public transport I made in the cities of Kyiv, Antwerp, and Vienna between 2018 and 2023. In 2018-2019, at the beginning of my interest in recording environmental sounds, I spent a lot of time in Kyiv - at that time a metropolis of 5 million people - and focused on finding, documenting, and recording the sounds of the city. Large cities are often overflowed by the sounds of the modern world, it is almost impossible to hide from the constant hum of cars, trains, construction sites, planes flying in the sky, and, of course, people. I was interested in the characteristic sounds that make up the soundscape of this particular city, regardless of the neighborhood. In my free time, I began to walk around the city and listen to the environment, trying to identify the sounds that were most characteristic, no matter where I was: on a busy street, in a park, or in an apartment.

After a while, I realized that for me the most recurrent and characteristic sounds of a particular city are the sounds of public transport, which are very present in the city and only become silent for short periods at night. The sounds of public transport also vary from city to city. Trams, buses, subways, announcements, passengers, and other elements have their own dynamics, intensity, and presence in each city. I focused on transport and spent several recording sessions trying to capture exactly those sounds that I think are most characteristic of Kyiv transport. The strategy was to start recording as I approached a vehicle stop so that I could record a tram, metro, or bus approaching. Then I tried to move around the vehicle, looking for interesting combinations of its internal sounds and the conversations of the people around it. I discovered that transport sounds very different in various parts of it, especially in the case of the Kyiv trams created in the middle of the 20th century, which at that time had not yet been replaced by newer ones and sounded particularly "loud". For example, being in the rear part of the vehicle and facing the front as it moves, the whole sound reaches your ears in one massive wave. In the middle parts of the carriages, there is much more spatiality, especially turning towards the windows and having the rear and front of the transport on both sides of the ears. The front part is the opposite of the rear, being the least dense. At the same time, the occasional sounds from the cabin can be an interesting addition if they are audible and present. Elements such as doors and the listener's distance from them are also important and necessarily present elements in the soundscape of every vehicle I have explored. At the same time, stop announcements, which are also a constant part of every vehicle soundscape, were not the most interesting to me in terms of internal spatialization. They almost always come from all sides, as speakers are usually placed along the entire length of the vehicle. I also found the presence of the passengers and their conversations to be a very interesting part of every journey. They are an integral part of the internal sound of the transport vehicles unless the journey takes place late at night and no one is inside. Their number and contingent vary depending on the time of day, part of the city, and events in the city in general. Getting on a bus in a busy city centre in the late evening, the soundscape is likely to include groups of young people talking loudly, joking, and perhaps singing something. Being in industrial parts of the city in the early evening and getting on a tram at a stop near a factory exit, one can often hear the tired but peaceful dialogues of workers returning home after a long working day. After a few stops, I would get out of the vehicle and move slightly away from the roadway, imitating the daily listening experience of a

passenger. A few years later, in the summer of 2021, while participating in the art residency ChampdAction.LAbO, I attended a workshop called "The Politics of Listening", organized by Aurélie Nyirabikali Lierman. The participants of the workshop had to go for a walk with recording devices in search of sounds that interested them. Walking around Antwerp, I remembered a similar experience in Kyiv. I immediately latched on to the sounds of the surrounding traffic and tried the same strategy, trying to identify the characteristic repetitive sounds of the vehicles that define the sonic environment for me. Like the recordings made in Kyiv, I did not use the Antwerp recordings for any projects or compositions at the time and simply added them to my collection of field recordings.

The idea for this composition came to me in the summer of 2023, when I was listening to and sorting through old recordings. I found the recordings from Kiev and Antwerp very interesting. They had a lot in common, as I had a similar strategy when making both records. At the same time, when I listened more deeply, I found a large number of microelements that were very different from each other. Comparing these recordings, I had the idea to record the Vienna Transport in the same way and to create a composition from all three rounds fused together.

In July 2023 I made a series of recordings in the Vienna underground and trams. This time I used a binaural microphone to simulate the experience of being on public transport even more closely. Once I had finished the recordings, I started to work on the composition. As I mentioned before, the interesting part for me was to find similarities and differences between the recordings from three different cities. I decided to create a soundscape from the fusion of all the recordings, choosing pieces that transitioned well from one to the other. Using the sounds of the streets of the different cities, recorded from the windows of vehicles, I created a soundscape that is used as a background. The composition begins with the sound of the opening doors of the Kyiv high-speed tram. I thought this would be an appropriate starting point, as it is also one of the first recordings I made in the context of vehicle recording sessions. Then, from one stop to the next, I combine parts of the recordings from inside the trams and underground trains of three different cities, trying to recreate the feeling of a complete recording. The vehicles merge from one to the other, revealing their micro-characteristics, while having differences that only become apparent when you focus on them. I also tried to pick out sections where the passengers'

conversations could be heard. I combined these conversations with the sounds of transport from other countries, which also created a completely new feeling for me. For example, if you know the sound of the Kyiv tram very well, it is unusual to hear a recording of children speaking Dutch at the same time. The same can be said of the Vienna underground, for example, which is filled with the conversation of Ukrainian ladies discussing their Sunday visit to church. Sometimes the conversations are mixed together, forming strange semblances of dialogues in English, Ukrainian, German, Dutch, and other languages. The composition ("ride") ends with the sound of the closing doors of the same high-speed tram in Kyiv from which it all begins, followed by a recording of the slow movement away from one of the tram stops in Vienna. In this way, I wanted to complete the ever-changing soundscape by marking the end with the opening sound, but at the same time with the still slightly present Viennese recording, leaving a slight feeling of mixture. This composition, in the form of an ever-changing soundscape, aims in a sense to convey to the listener my interest in the sounds of transport vehicles. The exaggeration of the material through the blending and layering of many different recordings invites the listener to take a fresh look, and to listen more deeply to the surrounding sounds while traveling in transport, which is a daily experience for many. Some listeners, being unfamiliar with the sounds of the specific cities where I made the recordings, can draw their own parallels, and experience this composition in a "live" interpretation by getting on a tram, metro, or train in other cities. Other listeners might catch little parts of unusual connections, recognizing sounds they have already encountered. For me, however, it is an attempt to convey personal experience and interest in the form of sonic memories captured over the course of several years.

The process of working on this composition was particularly interesting for me, not only from the point of view of studying the material recorded over five years, analyzing my approaches to recording, listening, and selection. A very important part was the third round of recordings in Vienna because this time I recorded having the references created beforehand.

This had a great impact on my approach to the recording process because unlike the previous two rounds, having an idea of building a composition, I was not only searching for the specifics of a particular transport in a particular city but also for its similarity with the existing recordings. Another important moment for me was that, in the process of

recording, I rediscovered my interest in exploration and studying the mechanical and industrial sounds around me, which are also full of human presence, as last year I focused mainly on nature and instrumental material.

Link to the piece:
https://drive.google.com/file/d/1YyuPkJHu_-YhxmZk9lOMZpEUK5ATC-il/view?usp=share_link

5. Conclusions

As it follows from this thesis, sound recording is an integral and important part of the compositional process, both in my practice and in the practice of many other composers. The development of sound recording technology has fundamentally changed the interaction with the musical world for both listeners and music makers, bringing into history new concepts of perception and creation of sound material. This has allowed a rethinking of recorded material through the possibilities of its manipulation and control, offering a wide range of new possibilities for experimentation and the search for new sounds, which in turn leads to a rethinking of the process of recording and searching for sounds, giving it a new, deeper meaning. In my thesis I show different approaches to sound recording, asserting its importance as part of the compositional process. Depending on the intentions and goals, these range from exploring the surrounding sonic environment, documenting ambient sounds, to intentional recording and experimentation during realization. Ultimately, they all lead to the creation of works whose form and aesthetics are largely determined not only by the material itself but also by the way it was recorded. This reaffirms my belief that the moment of searching for and capturing sounds plays a crucial role in my work, which often, together with the ideas that emerge in the process, further finalizes the form in which a particular composition appears. In my own work, and that of other composers, I also touch on the role of the recordist and his/her influence on the recording. This ranges from the quiet observer who does not interfere in any way with the environment, to the explorer who moves through the soundscape in search of sound particles that interest him/her, to the "conductor" who directly influences the source of the material in the recording or performance process. In this way, I show that sound recording, which can be called a technical component at first consideration, is interconnected with the artistic component, together defining it as an important tool and part of my compositional process.

6. References

Books:

Cott, Jonathan, 1973. *Stockhausen, Conversation with the Composer*. New York: Simon and Schuster, p. 193

Haigh, Caroline, John Dunkerley, and Mark Rogers. 2021. *Classical Recording - A Practical Guide in the Decca Tradition*. Introduction

Lane, Cathy and Angus Carlyle. 2013. *In the Field: The Art of Field recording*, Axminster: Uniformbooks

Schaeffer, Pierre, *In Search of a Concrete Music*, 1952, chapter 14 “concrete approach”, page 114

Articles:

Clukey, Tim, "Capturing Your Sound: A Guide to Live Recording", Music Educators Journal, Vol. 92, No. 3 (Jan. 2006), p 28.
https://www.jstor.org/stable/3401137

Edwards, Jim, “Choosing the Right Microphone”, The Choral Journal, Vol. 21, No. 3 (NOVEMBER 1980), pp. 5, Accessed on 19.07.2023.
https://www.jstor.org/stable/23545594

Guida, Michael. “Ludwig Koch’s Birdsong on Wartime BBC Radio: Knowledge, Citizenship and Solace.” In Being Modern: The Cultural Impact of Science in the Early Twentieth Century, edited by Robert Bud, Paul Greenhalgh, Frank James, and Morag Shiach, 293–310. UCL Press, 2018.
https://doi.org/10.2307/j.ctv550d3p.19.

James, Richard S., “Avant-Garde Sound-on-Film Techniques and Their Relationship to Electro-Acoustic Music”, The Musical Quarterly, Vol. 72, No. 1 (1986), pp. 78

https://www.jstor.org/stable/948107

Manning, Peter, “The Influence of Recording Technologies on the Early Development of Electroacoustic Music”, Leonardo Music Journal, Vol. 13, Groove, Pit and Wave: Recording, Transmission and Music (2003), pp. 5, Accessed on 11.06.2023. https://www.jstor.org/stable/1513442

Sluchin, Benny. “A Computer-Assisted Version of Stockhausen’s ‘Solo for a Melody Instrument with Feedback.’” *Computer Music Journal* 24, no. 2 (2000): 39–46. http://www.jstor.org/stable/3681926

Truax, Barry, and Hildegard Westerkamp, and Adam P. Woog, and Helmut Kallmann. "World Soundscape Project", The Canadian Encyclopedia, Historica Canada. Article published February 07, 2006; Last Edited July 16, 2014.
https://www.thecanadianencyclopedia.ca/en/article/world-soundscape-project

Webster, Peter. Music Educators Journal, Vol. 89, No. 1, “Special Focus: Changing Perspectives in Music Education” (Sep. 2002), pp. 38, Accessed on 15.07.2023.
https://www.jstor.org/stable/3399883

Internet Pages:

Adam, Alex, "The Historical-Mechanical Origins of Audio Fidelity", n.d, accessed on 06.07.2023
https://kimon.hosting.nyu.edu/physical-electrical-digital/exhibits/show/audio-fidelity/electrical-sound

Beardsley, Roger and Daniel Leech-Wilkinson, "A Brief History of Recording to ca. 1950", The AHRC Research Centre for the History and Analysis of Recorded Music (CHARM), accessed on 06.07.2023 https://www.charm.rhul.ac.uk/history/p20_4_1.html

Encyclopedia Britannica, “Compact Disc/ Sampling”, revised by John P. Rafferty, accessed on 15.07.2023 https://www.britannica.com/technology/compact-disc/Analog-versus-digital-sound

Foote, Keith D., "A Brief History of Data Storage" November 1, 2017, accessed on 23.07.2023.
https://www.dataversity.net/brief-history-data-storage/

Hutchinson, Leslie, "The Development of the Tape Recorder." Science and Its Times: Understanding the Social Significance of Scientific Discovery. Encyclopedia.com., accessed on July 25, 2023 https://www.encyclopedia.com/science/encyclopedias-almanacs-transcripts-and-maps/development-tape-recorder

Library of Congress, "Acoustical Recording", accessed on 10.08.2023 https://www.loc.gov/collections/national-jukebox/articles-and-essays/acoustical-recording/#:~:text=In%20sound%20recording%2C%20the%20acoustical,of%20microphones%20or%20electrical%20amplification.

Lockwood, Annea, "A Sound Map of the Hudson River", Lovely Music, Ltd. 1989
http://www.lovely.com/albumnotes/notes2081.html

The San Francisco Tape Music Collective, "The Transparent Tape Music Festival", 2001-2002, accessed on 20.07.2023 http://sfsound.org/tape/ruttmann.html

Scores:

Stockhausen, Karlheinz, Mikrophonie I, General introduction, 1973, pp. 9

Stockhausen, Karlheinz, Solo, Introduction, 1971, p.13

Stockhausen, Karlheinz, Solo, Technical set-up, 1971, p.15

Tkachuk, Anton, Past to Present, 2023

CD Booklets:

König, Kaspar, "Domesticaed Wind", Tochnit Aleph – TA152, CD Album, 2017