



A B r i d g e B e t w e e n  
C o m p o s i t i o n  
&  
S o u n d  
D e s i g n

Reflections on the "Experimentalorgel" at St. Martin's Church

by  
Mauricio Silva Orendain

*Thanks to all my teachers during my master studies at the Jazz Campus and Musik Akademie Basel. Specially to my two main teachers: Guillermo Klein & Caspar Johannes Walter. Without their support, trust and teachings none of this would have taking place. Thanks to Malcolm Braff for always finding a way to expand my artistic vision. Thanks to Gregor Hilbe for guiding me through this special project. And last but not least, thanks to Bernhard Ley for believing in me since the beginning and let me be part of this beautiful community.*

*Deep thanks to my parents and family for their unconditional support and love throughout all my artistic career. Thanks to all my friends in Basel for their love, specially Daniel Somaroo for his continuous teachings and support in the recording and mixing part of this project.*

*Many thanks to Musik an St. Martin not only for allowing me to work with this incredible instrument but for all their attentions. Specially, deep thanks to Eckhard Manz for welcoming me and supporting my artistic yearnings.*

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# P r o l o g u e

The first time I heard about the organs at St. Martins Church in Kassel, Germany an idea began to emerge like a hand waving at me from faraway. My teacher from the Music Academy in Basel Caspar Johannes Walter began to talk of a new microtonal organ being built, and of course this spiked my curiosity. However, I did not realise at the time the magnitude of the opportunity that was coming my way.

Some months later, the building and transportation of the new Experimentalorgel was completed, the second organ at St. Martin's Church by the renowned Austrian organ-builders Rieger Orgelbau. It was not until then that the work of composing for the organ became a reality. It all began when Caspar Johannes Walter, to whom I am endlessly thankful for the opportunity, offered me to compose a piece for the presentation album of this new organ. We had been covering the topic of microtonality in our lessons and started to put it into practice with the Arciorgano in Basel. The relation to my ongoing study field and my eagerness for composition drew me to accept the challenge right away. Furthermore, the possibility of traveling to Kassel to work directly with the instrument appeared as a great advantage being a keyboard player. I did not immediately take this suggestion seriously as I was already involved with several other projects and because I was due to travel to Mexico. However, after returning from Mexico and the deadline approaching fast, I decided to immerse myself in the composition and a strong intuition rose up: why not just go to Kassel?

I immediately contacted the church and was surprised by the smoothness with which things developed. By the end of the day my train ticket to Kassel was booked.

Once in Kassel, I was picked up by car and brought directly to the St. Martin's Church. I will never forget the first time I walked into that church. Mario, who oversaw my introduction to the church, went directly to the main Große Orgel (big organ in German). However, my eyes were immediately drawn to the new smaller Experimentalorgel standing in a corner of the first floor. I just could not stop turning my head towards it, it looked so beautiful, so modern, so organic, so galactic. I had never had such an emotional and penetrating impression from an instrument before. Of course, this love at first sight developed into a true love once I started to play on it and realised all the diverse soundscapes it has to offer.

I stayed at a small modern building connected to the back of St. Martins's Church where I had an individual room with a bathroom and access to a kitchen. On my first day in Kassel I was introduced to the basics of how the organs are controlled and played. The Große Orgel has 65 registers, 5.700 pipes, 9 controlling pedals and 6 manuals with a total of 122 keys. It has several screens to follow the settings being used. It literally feels like sitting behind the controls of a spaceship. On the contrary, the Experimentalorgel did not require such extensive explanation. As it is brand new no one has yet developed

extensive knowledge on its operation. Moreover, its functions very intuitively as its mechanical format and ease of approach were driving factors in its construction.

I realised right-away that this was a one in life opportunity. I had my own keys for the church and for the organs and I could play and compose at any time specially after 5pm when the church was closed to the public. This, of course, was a great source of inspiration. I felt a strong energy from being in this immense building full of history. I spent night and day composing and playing the Experimentalorgel until I finished my first piece entitled "Settled Vagabond".

The success of this composition which is now published with the presentation album "Orgelpunkt" (caption 1). Due to its length only an extract of it is included in the album. This work opened the doors to the church so I could continue the work I had begun with the organ. By the end of this first visit in Kassel, which lasted a whole week, I decided I wanted to do my IDP about the organ and requested permission from the church. I am endlessly thankful to Eckhard Manz and everyone at St. Martin's Church for welcoming me and letting me work as much as I wanted in this incredible space and on this fantastic instrument.

This paper documents my four one-week long artistic residencies at St. Martin's Church in Kassel, Germany and explores the technical aspects of the new Experimentalorgel, the recording research, its relationship with composition and ends with a reflection on the personal artistic approach I developed with this incredible instrument. Nine compositions and improvisations portrait the results. Due to the large amount of documentation and information gathered during these four weeks not everything is included in this paper. However, for a more in-depth outlook, an annex at the end can be found with extra material.

All the photos, recordings, mixes, masterings, compositions and improvisations in this project were done by myself with the only exception of the composition "Two Fingers" which was a collaboration with Caspar Johannes Walter.

### 1. Presentation Album



First album with the organs at St. Martin's Church including my composition "Settled Vagabond".

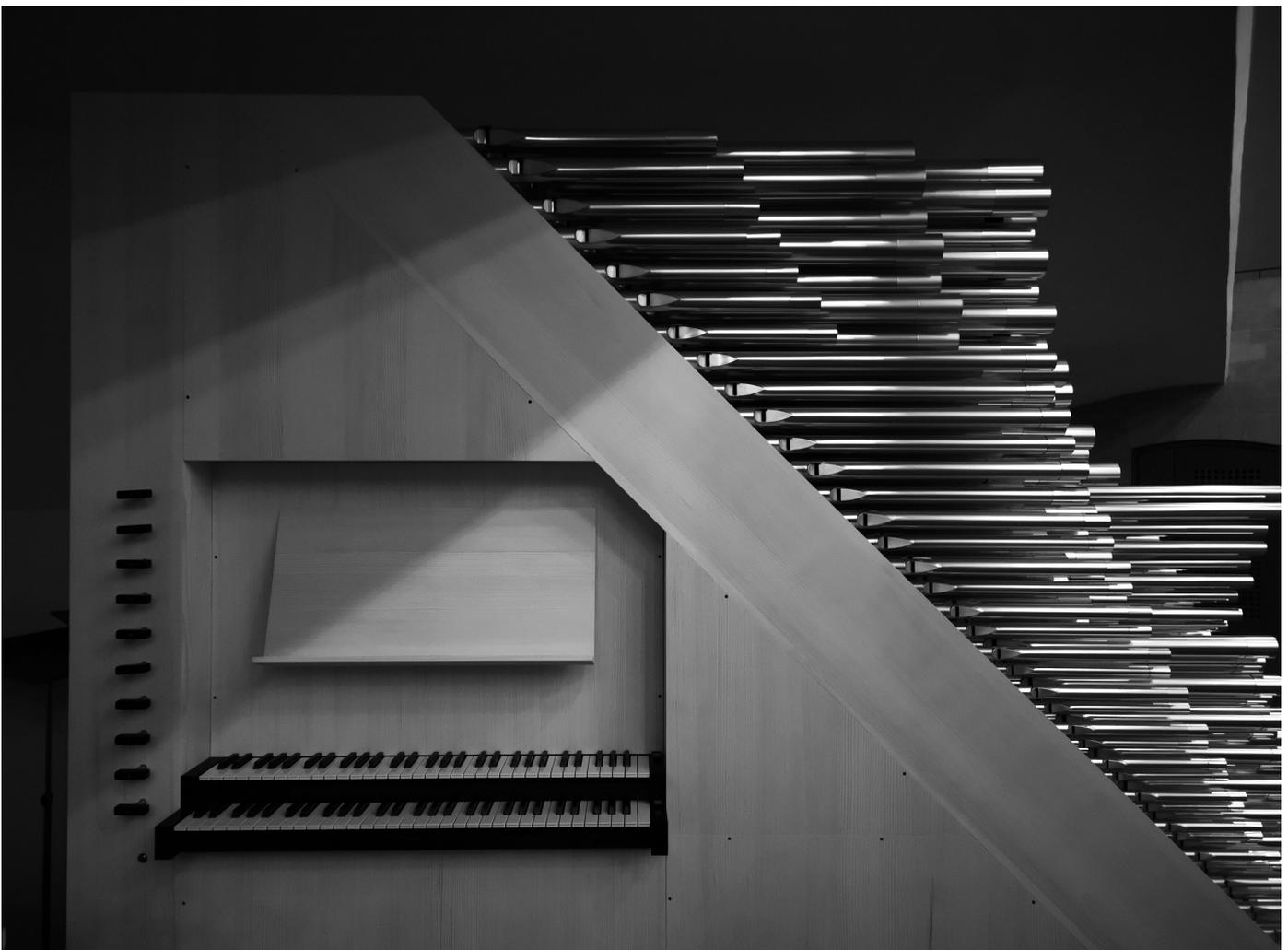
# V e r s a t i l i t y

**T**he Experimentalorgel offers a wide range of new technical possibilities some not found in any other organ in the world. This opens up a completely new colour palette for composers and improvisers making it possible to express new dynamics, textures, melodies and harmonies. This section delves into each of the technical aspects of the organ and explores them as parameters contributing to the wide diversity of soundscapes. In addition, some of my compositions and improvisations will be presented to illustrate the subject.

## Registers

The Experimentalorgel in Kassel has an approximate of 500 pipes dived in eight registers, four for each of the two available manuals. A Koppel II/I enables the player to connect the stops of Manual II to Manual I. Consequently, the performer can overlap the sounds of Manual II on top of Manual I but not the other way around. No pedalboard is available on this organ.

### 2. Experimentalorgel



*Stop-handles to the left of the manuals and pipes facing horizontal to the right.*

## Stop-handles

When we talk about organ stops we refer to the components of the mechanism inside the organ controlled with knobs or tabs by the organist to either let or stop the wind from flowing through a specific rank of pipes also known as a register. Each one of these registers offers a specific timbre and pitch range and the organist can use more than one at once to overlap timbres and pitches to achieve diverse textures, intervals, or harmonies.

Unlike other organs, the Experimentalorgel offers *stop-handles* instead. These are placed to the left of the two keyboards starting with Manual I from top to bottom (caption 2). As seen on the picture, there are ten handles in total including the eight mentioned before. The two extra handles are the tremulant (penultimate), the function of which will be explained in a later chapter, and the last one is the Koppel II/I previously mentioned.

These handles open like a faucet meaning that when you turn them to the left you open them and when you turn them to right you close them. In caption 3 we see *stop-handles* 1, 2, 7 and 9 (from top to bottom) open and the rest closed. Therefore, when the handles are in a vertical position they are open and when they are in a horizontal position they are closed. It is important to mention that the common stop-knobs or tabs in organs work by pulling instead of turning like a faucet. This makes a big difference because it gives the performer more flexibility and accuracy in opening making it possible perform the movement slowly to experiment with the different textures a register has to offer while not being complete open.

### Manual I

#### Gedeckt 8'

This stop is labelled with the number 8' on the *stop-handle* and is the first one on the row of handles from top to bottom. The number eight refers to the pitch of the register and it is known as the "native pitch" since the approximate length of the longest pipe in a set of open pipes is eight feet. For this reason, this register is

3. Stop-handle System



Vertical stop-handles are open and horizontal ones are closed.

also known as "eight-foot" or Achtfuß in German. The name Gedeckt comes from the form of the pipe since it is covered or muted (gedeckt in German) at the end and thus creating a unique mellow and non-aggressive sound.

### **Flöte 4'**

This stop is labelled with the number 4' on the stop-handle and is the second handle on the row from top to bottom. This register sounds an octave higher than the Gedeckt 8' reason for which it is labelled with the number four. This refers to its pitch since a pipe half the size sounds an octave higher. It is therefore also known as a "four-foot" or "Vierfuß" in German. The name Flöte (flute in German) refers to the specific timbre produced by this pipe which is similar to a flute.

### **Quarte**

This stop is labelled as  $2 \frac{10}{11}'$  on the *stop-handle* which again relates to the relationship between the pitch and the size of the pipes. This register sounds a fourth above Flöte 4'. Therefore, it is a mutation stop meaning that its pitch is at an interval other than an octave above or below the unison sound.

### **Mollterz**

This stop is labelled as  $1 \frac{13}{19}'$  on the *stop-handle* and is as well a mutation stop. It is called Mollterz (minor third in German) since the sounding pitch is a minor third above the actual pressed key. Specifically one octave plus a minor third from the sounding pitch of Flöte 4'. This makes it the highest register on Manual I.

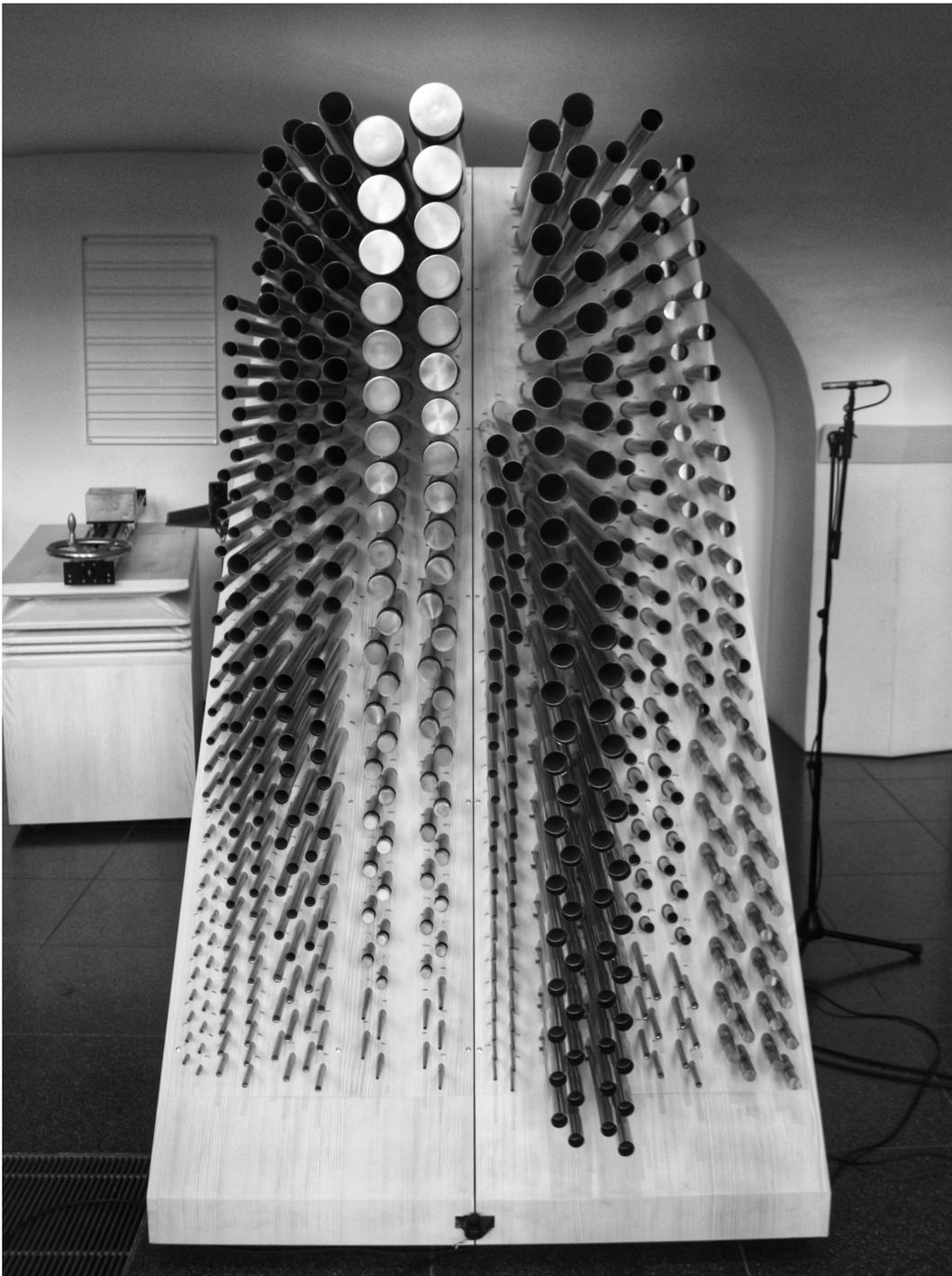
## **Manual II**

### **Flatterzunge 16'**

This stop is labelled 16' on the *stop-handle* and called Flatterzunge or "sixteen-foot" . The number 16 refers once more to the sounding interval since pitch is an octave below the eight-foot register. Flatterzunge refers to the type of pipe which has a kind of tongue (Zunge in German) that creates a very harsh aggressive sound in comparison to the Gedeckt 8 from Manual I. Its timbre might evoke similarities to the human voice.

### **Akkordeon 8'**

Labelled as 8' on the *stop-handle* this register sounds in unison with Gedeckt 8'. It is the eight-foot of Manual II. However, its sound is much more aggressive and full than the one from Manual I. Since it is literary an accordion, sounds can also be produced by lifting the Wind Wheel in the opposite direction (upwards in stead of pushing). A technique I discovered myself which no one had thought about before and which I use in the piece "Sound-quakes". A detail explanation can be found on video no. 5 from the video series "Orgelfastination" (annex).



*Pipes from left to right; Mollterz, Quarte, Flöte, Gedeckt, Windharfe, Microtonal Stop, Akkordeon and Flatterzunge. Wind Wheel on the left side of the organ.*

### **31-Ton**

This stop is labeled 4' on the *stop-handle* because of the pitch range it covers. This is the most special register of the organ in terms of pitch. It offers the possibility to play 31 steps within an octave instead of the common 12-tone equal tempered system. Making it thus a microtonal register. The timbre is mellow and soft allowing its narrow grid of pitches to smoothly blend together. More about the music theory behind this register can be found in its own section (Microtonality).

## Windharfe

Labelled as 8' on the *stop-handle*, due to its pitch, this register is probably the most interesting ones in terms of timbre. It emulates electronic distortion creating thus an altered, constantly moving, unstable sound. Specially when laying chords with soft air pressure one can notice its random shape transformation. A good example for this is the beginning of "The Obscene Bird Of The Night". Lastly, this register does not offer the lowest octave of the manual having thus just four octaves of pitch range.

## Pipes

One thing one can already appreciate on **caption 2** is the special direction of the pipes. We are used to vertical pipes in organs but in this case they are placed horizontally. This is not merely for aesthetic or design purposes. One of the main goals of this new organ is to bring closeness and intimacy to the audience. We are used to witness the organ from faraway and from below as they are most commonly placed high inside churches where even the organist is hidden. However, in this case, the Module I "Experimentalorgel" which can be seen as an extension of the big organ at St. Martin's Church, aims to connect to the audience in a more intimate manner by being placed downstairs where the audience is seated and by having the pipes placed horizontally.

It is important to keep the physical position of the pipes in mind while composing and playing as this affects not only the panning of the instrument but also how sounds interact with each other in terms of physical space. This creates a completely new atmosphere between the instrument, the player and the audience and also brings new opportunities for the performance and recording techniques. On **caption 4** we can observe the outline of the pipes from the side of the organ and notice a division right in the middle which divides Manual I (left) and II (right). This means that the player is closer to the pipes of Manual I. This was an important aspect to keep in mind while composing as the final sound of what I was playing or composing was not exactly what I was hearing from the keyboard perspective. For instance, while using the stop Gedeckt 8' on Manual I in a low register and the microtonal stop in a mid-high register I was not able to actually hear the subtleties and presence of Manual II because of the bold cloud of sound I was creating right in-between me and the soft mellow melodies of Manual II. I realised this when listened to my recordings in which both were clearly audible.

The order of the pipes from the side of the keyboards to the back of the organ is as follows: from Manual I we have Mollterz, Quarte, Flöte 4' and Gedeckt 8' and from Manual II, after the division, we have Windharfe, 31-Ton, Akkordeon and Flatterzunge. The pipes go from the high to the low registers in both manuals. The relation between the order of the *stop-handles* and the position of the pipes on the organ is the following: from top to bottom which means back to front from the player's perspective.

When observing the organ from the front, the pipes of the Windharfe stand out the most. They have the most uneven forms and do not go all the way to the top as they miss the lowest octave (**caption 4**). The design of the organ itself inspired me profoundly from

the beginning. Like suggested in the introduction of this paper, I will never forget the first time I stepped into St. Martin's Church. The visual aspect of the organ spoke to me right away. The position of the pipes and their unevenness, combined with the diagonal that cuts across them (caption 5), evokes not only movement but flying and, I may even say, space galaxy flying. It appears as drawn from outside our conventional earth. This organ is on the one hand intimate and close due to its size and position and, on the other hand, modern and other-worldly due to its shape evoking flying. The blend between these two opposing concepts creates a very interesting dilemma and is a source of inspiration. I attempting to portray this opposition in my work, for instance my composition "Settled Vagabond" where the name already implies this contradiction.

## Wind Wheel

The wind wheel is one of the most important features of the organ making it unique and bringing a lot of flexibility not only in terms of expression but also in terms of harmony and melody. This is due to the change of air pressure this device offers which affects not only the dynamics and texture of the instruments but also its pitch.

On the left side of the organ, we can appreciate an extra element connected to the back of the instrument (caption 4 & 6). This part consists of a 50kg plumb cube attached to a wheel which when turned moves the cube to the back or to the front of the wind body changing the pressure of the air that is going through the pipes. The mechanics of the wheel have the same principle as the *stop-handles* meaning that it works as a faucet; turning left opens and turning right closes. In this case "closing" means to slide the cube away to reduce the air pressure and "opening" means bringing the cube forward to increase the air pressure. Numbers are placed under the wheel to measure the air pressure. The number 80 indicates a "regular" air pressure, meaning that the organ should sound in its intended tuning. However, it is important to mention that the organ is sensitive to temperature which may occasionally vary the tuning.

An important possibility offered by this organ is the possibility to regulate the air pressure. With this system the regular air pressure (No. 80) is not the maximum air

5. Experimentalorgel's side perspective



*Experimentalorgel from the side: showing its unique futuristic design.*

pressure that can be achieved. It can rise to No. 155 meaning that the flexibility of the air pressure goes in both directions: under pressure and over pressure. The lowest air pressure is almost 0. In order to achieve complete silence the cube has to be moved to the farthest position and the accordion must be lifted with the least strength possible.

Having this mechanical element close to the manuals makes it possible and even easy for the performer to manipulate wind pressure while playing. However, it is also possible to have a second or even a third person as an assistant to control it. This simplicity in the manipulation of air pressure is revolutionary. Throughout history one of the main struggles of organ builders was to achieve a steady air pressure through all the pipes, reason for which water was initially used. Now, almost two thousand years later, we have an organ that allows to modify the air pressure evenly while playing.

#### 6. Wind Wheel



*Wind wheel on left side of the organ which enables the performer to control the wind pressure going to the pipes.*

## Touch Sensitivity Keyboard

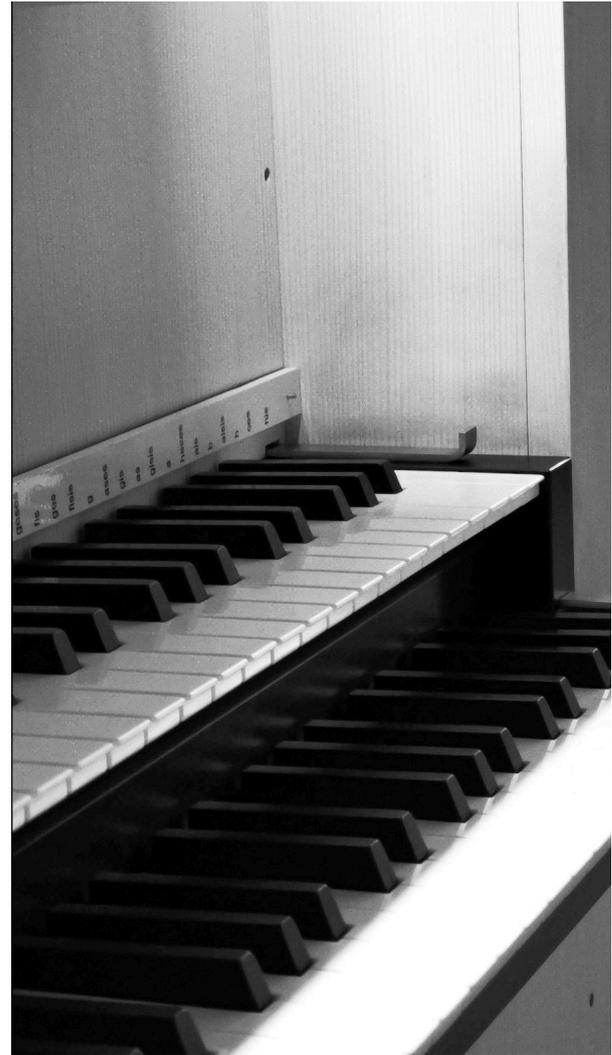
The wind flexibility of the organ does not end with the wind wheel. Each key of the organ is touch sensitive, meaning that the sound produced depends on how far the key is pressed. Thanks to an individual valve system in each pipe it is possible to open each single one as slowly as desired. This enables to create multi-phonics and other sounds commonly found in extended techniques of wind instruments such as the flute, the saxophone and the clarinet. Playing with this feature feels like controlling many flutes simultaneously.

The composition "Two Fingers" portrays very well some of the possible sounds and blends one can achieve with this feature. This composition originated during a meeting between Mauricio Silva Orendain and Caspar Johannes Walter. After researching possible blends of specific notes and combining specific registers, Johannes gave Mauricio five notes to improvise with the constraint of playing single notes and blending them together using touch sensitivity, that is to prefer having only two notes sounding at the same time, hence the name "Two Fingers". The spontaneous improvisation with these guidelines gave birth to the collaborative composition.

## Sliders

On the right side of both manuals where the key-bed ends, two metal objects with a claw pointing upwards are available. I call these sliders. They enable a unique mechanical feature for the organ not found anywhere else in the world. Pulling the sliders against you creates a resistance under each key stopping you from pressing each key to the bottom. On **caption 6** we can observe the slider from Manual II completely pulled meaning it gives full resistance to the keys. In this case the player is not able to press the keys at all and thus no sound would come out. The interesting sounds occur once one begins to slowly push the slider back into its original position to reduce the resistance.

As a composer and performer of the Experimentalorgel I found two interesting ways of using these sliders. The first one is to use it to trigger the flexibility of the touch sensitive keys (not opening the pipes completely) and still be able to play freely and percussively rather than having to slowly press each key to achieve the desired openness as the slider enables to fix a threshold on how much each pipe will open. This enables to combine different parameters of the organ and create a unique sound and timber which is similar to how synthesisers are approached. The second way of using the sliders is to apply weights on the keys in order to blend in and out of chords or single notes while also controlling other parameters of the organ like the wind wheel or the *stop-handles*.



*Metal object after the end of the keyboard serves to control the resistance of the key-bed (fully pulled).*

## Tremulant

This device is not new to the organ world. It has been used since the sixteenth century. The word comes from the latin "tremulus" which means trembling, and like the word itself explains it, it enables to fluctuate the amplitude and pitch of the sound coming from the pipes thus producing a kind of tremolo or vibrato sound. This creates a new texture in opposition to the regular linear sound of the constant and even air flowing through the pipes. It is sometimes only connected to a certain register of the organ but in the case of

the Experimentalorgel it affects all registers simultaneously. This means that once turned on nothing can be played without the influence of the tremulant.

Like mentioned before this is not something new. However, this mechanical device in combination with all the other sound parameters of the organ; the wind wheel, the sliders, the touch sensible keys and the microtonal register, magnifies the potential of the whole instrument. It is important to mention that tremulants differ from organ to organ in terms of how fast and deep they push the wind. For the Experimentalorgel, Eckhard Manz, the organist at St. martin's Church, requested specifically that the organ builders of Rieger Orgelbau construct a strong tremulant in order to have a big impact on the sound of the pipes. The second part of my composition "Settled Vagabond" is a good example of what the tremulant can offer in terms of textures and timbers.

## Mobility & Connectivity

The Experimentalorgel has wheels underneath making it possible to move around the church. Furthermore, it is also possible to split the organ into two parts and thus completely detach both manuals. As mentioned before the pipes from Manual I are in the first

### 9. Internal Mechanism

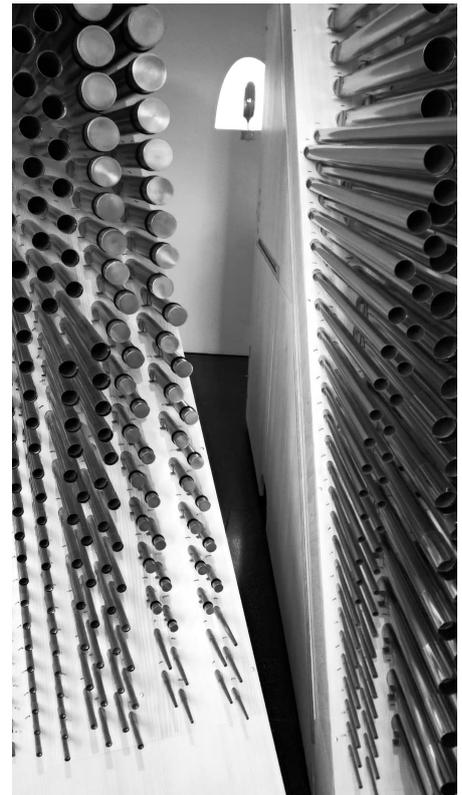


*Internal gear that connects the two manuals in order to be able to control them at them with the handle-stops.*

half of the organ close to the keyboard and the pipes from Manual II are on the second half (caption 4). And the line we see in the middle of both is where the organ can be separated.

However, once separated the player can no longer control Manual II and its registers as the mechanism must be connected in parallel to work. If the physical connections of the *stop-handles* are not inserted they cannot pilot the necessary mechanism in order to open and close the registers. Therefore, once the Experimentalorgel is split, the player has to play from the Große Orgel. The Experimentalorgel can be thus connected via a LAN cable to the bigger organ upstairs to be able to control and play it from above.

### 8. Detachment



*The two manuals of the Experimentalorgel can be completely detached.*

# P e r f o r m a n c e

One of the first things I realised in my first days of working with the organ was that even as a keyboards player I was actually learning to play a new instrument. All the different parameters mentioned in the previous section have to be practiced to be fully controlled. It takes time to get to know the instrument on a physical and intuitive level. To see how it reacts to the smallest and subtlest actions impressed on the sensitive keys, on the wind wheel or by turning handles of the registers. After spending a whole month in the church I can say with confidence that I acquired a good physical and intuitive connection with the physics of the instrument.

## Logistic & Tools

Keeping in mind that the Experimentalorgel has so many possibilities and parameters that can be manipulated, it is unsurprising that several people can be involved in playing this instrument simultaneously. Nonetheless, a single person can also control many parameters. In the last months, I chose to work with the instrument individually mainly for reasons of practicality and because, as a composer, I mainly interacted with the organ alone. However, as we can see on caption 10 of the performance of my composition "Settled Vagabond" at the inauguration, two people are performing. Eckhard Manz and his Registrant. Eckhardt Manz is mainly involved in playing the keys and moving the weights on the keys, which is a technique I will further develop. The Registrant, on the other side, is taking care of the wind wheel as well as the registers. This of course makes the performance easier and brings more flexibility to the interpretation of the piece as some extra wind manipulations can be achieved which is not possible when performing the piece alone. This adds musicality and helps blend sections and frames of the music together as the

changes of the wind and register can be accomplished faster and simultaneously. Keeping this in mind, it is also possible to perform with three people on the instrument: one concentrating entirely on playing the keys, a second one controlling the registers and a third one controlling the wind wheel.

10. Livestream Screenshot from Inauguration



*Eckhard Manz and his Registrant performing Settled Vagabond during the inauguration of the Experimentalorgel on May 23rd, 2021 at St. Martin's Church in Kassel, Germany.*

## Weights

Another very important feature to keep in mind is the use of weights on the keys (caption 11). This has been one of the most important tools for my work so far as I was alone when composing and recording the organ. I believe that this forced me to go into a specific direction in my music, limiting some angles but harnessing others.

### 11. Weights



*Special metal weights used to lay out chords on the keyboard and have free hands to interact with other sound parameters of the organ.*

The possibility of using weights to lay out chords or single notes to be able to manipulate other parameters like wind pressure and registration opened a whole new world for me in terms of composing and improvising. It reminded me a lot to the digital audio workstation Ableton Live when you loop a sound, chord or melody and then start to shape it and transform it with plug-ins. These shapes become the piece in itself or a pre-setup for improvising live.

## Practice

Having to practice all these performing techniques rather than just playing on the keys was new to me till my visits in Kassel. I had never spent time working and playing with organs with which you usually have to constantly change between registers while playing. With this specific organ four additional features aside from the registers also have to be familiarised with for the performance: the Wind Wheel, the Sliders, the Weights and the Touch Sensibility. Each of them is a universe in itself and requires time to feel their physical sensitivity and fragility.

I am not of the opinion that the performer should follow a specific routine or order to approach the instrument. However, I do encourage to isolate each of the features and give the necessary time to explore the ways in which they can shape the sound of the organ. My approach was to build different set ups and then change the variables of only one feature listening to how the others reacted to it. For instance, to get familiar specifically with the *Windharfe stop-handle*, I would lay down a chord with the Weights on a certain pitch range, chose a position for the Wind Wheel and finally spend some time moving the *stop-handle* as slowly as possible to explore all the different possible soundscapes. Then I would change the pitch range, use the weights with a chord varying the intervals or maybe even play a single tone to have try a different setting and, again, explore all the diverse possibilities it can offer.

It is about developing physical control over the movements on each of the technical features of the organ and maintaining a deep listening at the same time. This enables to create a connection between the ears and the body. Through this process I developed my own ways of creating a strong connection to the organ and its various features. For example, I noticed that to connect with the Touch Sensitivity feature of the keyboard while playing a single key, it was useful to keep a round posture of the hand and gently touch the surrounding keys with my other fingers. I rely on this to be able to go down on the key as slowly or as fast as I want. I would even sometimes use both my hands, one over the other, and employ more than one finger to press a single key. This gave me a lot of control over my movements allowing to play glissandi and melodies with a single key.

A good example for to observe this movement is in the video of “Two Fingers” in which I use this technique throughout the composition to blend and fade in and out all single notes. This technique is especially helpful with the *Flatterzunge* register to play melodies with a single note. I used it very often, for example at the beginning of “Summons” and throughout “Exosphere”.



# W r i t i n g   S y s t e m

**D**uring my first stay in Kassel I had to develop a way to notate what I was playing and composing for the organ. My main task during my first visit was to compose a piece for the presentation Album of the Experimentalorgel. It was not going to be the one recording the piece but the organist and Kantor of St. Martin's Church Eckhard Manz. This forced me to find a way to portray all the little details I was developing with the different parameters of the organ to make it possible for someone else to recreate the sounds I was composing as closely as possible. This notation had of course to be the simplest possible.

## Sheet Layout

After some trial and error, I noticed I needed to create a clear layout of how I wanted to distribute the different parameters of sound onto the music sheet. These parameters included the Wind Wheel and its movement and direction as well as the exact position where it stops, the amount of pressure on each key, the use of the Sliders and the use of registers and its percentage of openness and the change of this percentage throughout the composition. All these subtle movement were creating not only specific sounds and textures but even melodies.

### 12. Sheet Layout

The image shows a blank music sheet layout for the Experimentalorgel. It consists of two grand staves. The top grand staff is labeled 'Manual II' and has a 'Register' line above it. The bottom grand staff is labeled 'Manual I' and also has a 'Register' line above it. Below the Manual I staff is a dashed rectangular box labeled 'Wind' for wind manipulations.

*Empty music sheet for the Experimentalorgel with two grand staves, two system lines for registration and a system section for wind manipulations.*

The only parameter affecting both manuals at the same time is the Wind Wheel. Knowing this, I decided to first develop an independent system section at the bottom of the music sheet to specify everything happening with the Wind Wheel. The reason is that, on the one hand, it is always affecting both manuals no matter what and, on the other hand, it is greatly important for the overall sound of the music. I believe that this “external” device should be treated nearly as an independent instrument. When two people are performing the Experimentalorgel one person usually takes care specifically of the Wind Wheel. This extra system section at the bottom makes it easier for him or her to follow the music and give it the necessary importance.

The other valuable parameter that is constantly changing throughout my music is the art of “registration”. This occurs particularly when using weights as it becomes the only parameter shaping the sound. Consequently, the sheet layout I developed for notating for the Experimentalorgel (caption 12) has a wind system at the very bottom like mentioned before and then two grand staves for each of the two manuals. Each one has an extra registration system line on top to indicate the *stop-handles* in use and their subtle modifications throughout the composition.

## Symbols

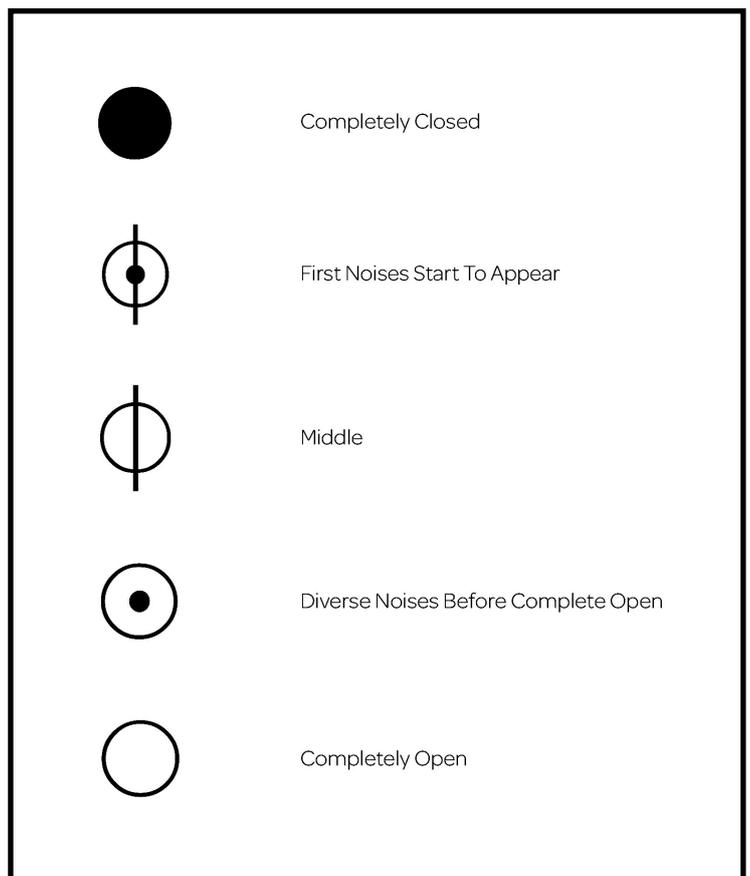
To make everything more eye-friendly and easier to follow it became necessary to create symbols that expressed what I was performing with the registers and the wind wheel.

### Registration Symbols

In the case of the registers, I wanted complete clarity on how far each register must be opened or closed and be able to portray the precise movement necessary to create specific sounds, textures and sometimes even melodies. Therefore, I came up with five different circles that would express the openness of the registers (caption 13).

Five symbols may seem a large number but they were necessary to guide the performer on the desired sound as minimal movements of the *stop-handle* immediately impact the **pitch**, **texture** and **dynamics** of sound. The way the registration influences these variables differ from

### 13. Registration Symbols



register to register. For instance, slightly opening the Windharfe register will produce whispers and soundscapes, whereas in the Flatterzunge 16' register same openness may not produce any sound. For this reason, I believe that in most cases an audio reference improves the accuracy of the performance. Moreover, it is important to mention that in order to perform a piece on this instrument one must get familiarised with it very well in advance due to its fragility and sensitivity.

I used the common notation for crescendo and decrescendo to notate the movements between the different openings of the registers. To specify which register was being performed I simply used a boxed text with the abbreviation of the name of the register. As a first simple example of these registration symbols, here are the first two pages from a research music sheet I wrote for myself entitled "Soundscapes" (caption 13). The aim of this music sheet was to document the sounds and textures I found interesting and to be able to recall them for my compositions and improvisations.

### 13. Registration Notation

# Soundscapes

for the "Experimentalorgel" at St. Martin's Church in Kassel, Germany

Mauricio Silva Orendain

No. 1 Dark Curtain	No. 2 Crystals
<p><b>Register</b></p>	<p><b>Register</b></p>
<p>Manual II</p>	<p>Manual II</p>
<p><b>Register</b></p>	<p><b>Register</b></p>
<p>Manual I</p>	<p>Manual I</p>
<p><b>Wind</b></p> <div style="border: 1px dashed black; padding: 5px; display: inline-block;">#75</div>	<p><b>Wind</b></p> <div style="border: 1px dashed black; padding: 5px; display: inline-block;">#75</div>

"Soundscapes" music sheet as an example of how to notate the parameters of registration. Notice as well the use of square empty note-heads to indicate the use of weights.

14. Wind-Wheel Symbols

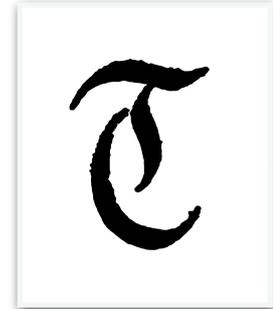
**Wind Symbols**

As previously mentioned, I felt the need to have an individual system for movements I was doing with the wind wheel. Two main parameters were important here: movement direction and resting position. Therefore, I came up with the symbols shown on caption 14.

The first two symbols show the performer in which direction the wheel should be turned. The third one shows where the wind wheel stops and is only needed in the lowest air pressure position as, at some point, numbers under the wheel serve as a guide. However, at

the very beginning of the register no numbers shown yet and the slightest movement of the wheel changes the sound and pitch of the pipes. The clock system is needed for this reason. Besides this, I also decided to indicate the turning on and off of the tremulant in this system line. I achieved this by taking a picture of the symbol on the *stop-handle* and editing it in order to be able to use it on the computer (caption 15).

15. Tremulant Symbol



A good example portraying the use of all these wind symbols are the first pages of my composition "Settled Vagabond" where the wind wheel plays an essential role (caption 16). The piece begins with the number 0 in the wind wheel. The very first noises should start to appear once the wind wheel starts to turn anticlockwise. To connect the movements, I simply used arrows and wrote the approximate time of the movement in seconds.

16. Settled Vagabond Music Sheet

# Settled Vagabond

*for the "Experimentalorgel" at St. Martin's Church in Kassel, Germany*

Mauricio Silva Orendain

**Register** \_\_\_\_\_

Manual II

Register

○ ○ ○ ●

8' Fl. 4' Quarte Quarte

*...open slowly in order..*

Manual I

**Wind**

#0

○ — 15' —> ⊙ wait 5' ○ — 15' —> ⊙

*...turn from 11 O'Clock to 9 O' Clock slowly and delicate...      ...turn back and stop at 7 O' Clock..*

Reg.

M. II

Reg.

M. I

Wind

ca. 35 BPM

Quarte

10'

2'

turn back to 10 O'Clock  
a little bit faster

turn back fast and stop at 7 O'Clock

Reg.

M. II

Reg.

M. I

Wind

♩ = 90

accel. . . . .

3

10' → #55

Fast energetic turn till # 55

First pages of "Settled Vagabond" as an example for the use of Wind Symbols.

To indicate the use of the Touch Sensitivity Keyboard to the performer, I simply correlated it to the common dynamic notation. Forte requires pushing the key completely down and pianississimo means playing the first appearing noises while the pipe is opening. In some compositions I also notated the multi-phonics or overtones that I wanted. A clear simple example can be found on page four of "Settled Vagabond" (caption 17, minute 1:50).

### 17. Touch Sensitivity Notation Example from "Settled Vagabond"

The image shows a musical score for "Settled Vagabond" with four staves: Reg., M. II, M. I, and Wind. The Reg. staff has a horizontal line with a trapezoidal shape indicating a dynamic change from a black dot to a circle with a vertical line through it, labeled with '20'' and '7'. Below this is a box containing the number '16'' and a curved arrow pointing right. The M. II staff is empty. The M. I staff has a treble clef and a bass clef. The treble clef part starts with a flat sign and a gliss. marking, followed by notes with dynamic markings ppp, f, f, ppp. The bass clef part has a long horizontal line with a wavy texture and a circled '8' at the end. The Wind staff is a dashed line with the marking (#55) in the center.

From minute 1:50. On the treble clef of Manual I the key pressed is a D natural. However, due to the very slow opening of the pipe indicated with the common dynamic notation, a glissando from Eb to D is heard and part of the main melody.

A more complex example is the beginning of "The Obscene Bird Of The Night" in which the first staff indicates sounding pitch and the second one the key that must be pressed (caption 18).

# The Obscene Bird Of The Night

3

for the "Experimentalorgel" at St. Martin's Church in Kassel, Germany

*gentle & very slow*

Register

Windharfe 8'

M. II

Register

Largo ca. ♩ = 50

rall. . . . .

sounding pitch

M. I

playing pitch

Wind

#85

...imagine an owl whispering at night...

gliss. gliss. 8<sup>va</sup> gliss.

ppp < mf > ppp ppp mp

G. 8' G. 8' Fl. 4'

4

Register

M. II

M. I

Wind

Fl. 4' G. 8'

gliss. gliss. gliss. gliss.

< p > pp < p > ppp p ppp

Upper staff on Manual I is used to notate the sounding pitch and lower staff to notate the pressed key.

# M i c r o t o n a l i t y

In my experience, many musicians immediately relate the term microtonal music to quarter-tones. However, this is only a very small area in this world. Microtonality is the use of intervals smaller than a half-tone and goes much further than simple quarter-tone intervals. A complete in-depth account on this vast topic would require its own research paper. Nonetheless, in this section I seek to point out its basic aspects, how it is implemented in the Experimentalorgel and how it influenced my music.

## Tuning System

The Experimentalorgel has one microtonal register available in Manual II. The physical keyboard-bed stays the same, but the sounding pitches differ depending on the keys pressed. This expands the division of 12 tones per octave to a division of 31 equal steps. Accordingly, the real range of the keyboard while using this register is little less than two octaves as seen on caption 19.

19. Microtonal Keyboard Layout

The image displays musical notation for a microtonal keyboard layout. It consists of four staves. The top two staves are labeled 'Sounding Pitch' and 'Pressed Key'. The 'Sounding Pitch' staff shows a sequence of 31 notes with various accidentals (sharps, flats, naturals, and double naturals) and some notes with a double sharp symbol. The 'Pressed Key' staff shows a sequence of 31 notes with various accidentals. Below these are two more staves, the second starting with a '2' above the first note. The bottom staff has an '8va' marking above it, indicating an octave shift.

20. Microtonal Step Distance

To measure the distances between the notes of this 31-Tone microtonal register the unit used is the cent. In the tempered 12-Tone System a half-tone interval (two adjacent piano keys) has a

$$1 \text{ half-tone} = 100 \text{ cents}$$

$$1 \text{ octave} = 1200 \text{ cents}$$

$$1200 \text{ cents} \div 31 \text{ steps} = 38.7 \text{ cents}$$

distance of 100 cents and consequently a quarter-tone one of 50 cents. Therefore, the calculation on **caption 20** can be done to find the equal division between then notes in the 31-Tone System. Accordingly, when dividing the octave in 31 equal steps, the resulting distance between each note is 38.7 cents, slightly under the quarter-tone but enough for the ear to recognise. It depends on the person's ears capacity, the tonal context, and the register of the pitches, but usually the human starts to recognise a difference in pitch at about 5 to 10 cents.

## Harmonic and Melodic Possibilities

Once these equal steps are laid out throughout the octave, new interval options arise together with the possibility to play pure intervals from the natural harmonic series. This is connected to what is called Just Intonation where all intervals are tuned using whole ratio numbers. The following table shows the distances in cents of the intervals within an octave in the 31- Tone System and its comparison to the Equal Tempered 12-tone System and to the Just Intonation System.

### 31-Tone System Intervals

Note	Interval	12-Tone System	Natural Harmonic	31-ToneSystem
C	Unison			0
Dbb				39
C#				77
Db	Minor Second	100	112	116
C##				155
D	Major Second	200	204	194
Ebb				232
D#				271
Eb	Minor Third	300	316	310
D##				348
E	Major Third	400	386	387
Fb				426
E#				464
F	Perfect Fourth	500	498	503
Gbb			551	542
F#	Tritone	600		581
Gb				619

Note	Interval	12-Tone System	Natural Harmonic	31-Tone System
F##				658
G	Perfect Fifth	700	702	697
Abb				735
G#				774
Ab	Minor Sixth	800		813
G##			840	852
A	Major Sixth	900	884	890
Bbb				929
A#			969	968
Bb	Minor Seventh	1000		1006
A##				1045
B	Major Seventh	1100	1088	1084
Cb				1123
B#				1161
C	Octave	12000	1200	1200

*Numbers show distance in cents to the fundamental.*

As we notice on the table, some intervals differ more than others between the equal temperament and the natural harmonic series. Unisons and octaves are exactly as in the natural harmonic series and only the minor and major second and the perfect fourth and fifth differ by less than 5 cents which is difficult for most people to perceive. However, the rest of the intervals do differ by an amount between 10 and 20 cents. One of the most important compromises within the Equal Temperament is the major third which is 14 cents higher than the pure one. With the Experimentalorgel it is possible to play a pure major third which is only off by 0.8 cents. Consequently, it is possible to play a nearly pure major triad where the fifth suffers a little bit more than in the equal temperament (5 cents instead of 2 cents), something that most people would not be able to differentiate.

My composition "Vessel" begins by approaching a pure D major triad which slowly dissolves when each voice starts to move within this 31-step system. I found not only the sensation given by the pure triad very interesting but also the one given by the small movements made within each of the single voices.

## Beatings

Beatings are the oscillation created by the clash of two pitches with different frequencies played at the same time. Depending on the difference in distance and the horizontal coincidence between the frequency of two tones the beatings will have a faster or slower oscillation. As an example, the beatings of two notes with a difference of only 1 cent will be much slower than the ones of two notes with a difference of 24 cents because they are farther away from the unison. This phenomenon also occurs when tuning an instrument. If one pitch is in tune and the other one is modified to reach the same tuning, beatings will occur till the second pitch coincides perfectly with the first. The speed or absence of these beatings can be used by the musician to determine when the desired pitch is achieved.

One of the most fascinating aspects of this microtonal register is its combination with the different performing techniques that have been mentioned throughout this paper: Touch Sensitivity Keyboard, Wind Wheel, Register Combinations. Gathering all these tools and putting them in practice we end up with a very narrow grid of frequencies available. This brings the opportunity to create interesting beatings between them which result not only in subtle, beautiful and abstract melodies and harmonies but also in fascinating textures and timbres. When listening to the recorded music, one can hear moments when the organ sounds akin to an electronic instrument or an analogue synthesizer. This effect appears in almost every tune if not in all of them. But a specific tune in which this can be clearly heard is "Exosphere" in which we perceive a clear sound curtain from the organ and on top of which we hear high beatings that sound like electronic signals. "Phone Call" is another clear example of this type of texture. In this specific case we can even hear a bell ringing in minute 2:00 from which the name of the improvisation was derived.

A more accessible piece that reflects this approach is "Two Fingers" in which the combination of registers together with the use of microtonality and Touch Sensitivity give birth to very interesting soundscapes. On the "Two Fingers" Dynamic-Score Video we can follow the notation and notice that the same register combinations are open throughout the piece: the microtonal register, Akkordeon 8' and Windharfe 8' for Manual II and Gedeckt 8' for Manual I. This composition originated from an improvisation I did during a Zoom Meeting with my teacher Caspar Johannes Walter while recording an example from his research "Standard Testfile Experimentalmodul" (annex). The blending point of the microtonal register with the tempered running in the back are the focus of this last part of the research. After finishing recording the prepared examples Caspar motivated me to improvise with the following selection of notes (the ones on the music score from the video): Ab/G# for Manual I (tempered system) and C#, Ab/G#, A and E on Manual II (microtonal system). These notes create a kind of aeolian sound but the interesting part is that they all match both the physical keyboard and the sounding pitch of the microtonal register with the exception of the A natural which creates a consonant perfect fifth. This theory behind makes it exciting to play with beatings and blending them with a more stable sound.

# C o m p o s i t i o n a l   S o u n d   I m a g e

**B**ringing my experience and the opportunity in Kassel together in this final interdisciplinary project for my master studies forced me to go deeper into the recording and mixing world thereby opening my ears and eyes to new fields and concepts.

Recording the Experimentalorgel was a big revelation to me not only as a producer but also as a composer and performer. It was the first time I recorded my own music at a professional level. Getting acquainted with this new field required a lot of time and effort and I am endlessly grateful to my dear friends Daniel Somaroo and Sam Barnett for all their support and teachings and for always being there when I needed guidance.

After spending some time recording and mixing my music for the Experimentalorgel I started to become more aware of the term "space" in acoustics and its importance in the overall sound of the composition. By this I do not mean the horizontal space found through the time-line of sound, but the physical dimensional space that frequencies and their amplitudes occupy at a specific moment in the music. We can compare it to a painting where colours and shapes occupy specific spots on a canvas. Similar colours and shapes might occupy the same place to create a desired effect or texture. But the space might be expanded for other colours and shapes. Perspective, vanishing point and depth play a crucial role here. This creative balance and architectural game is what I understand under the term Compositional Sound Image.

Due to the wide sound spectrum the Experimentalorgel has to offer, I found myself at times occupying too much space in a specific place of the sound image which heavily influenced the overall sound and impact of the composition. Hence, I came to the conclusion that through the conscious building of the sound image one can manipulate the dimension of the instrument and the room. This tool has the potential to give place to very strong artistic decisions giving character and concept to the music.

In consequence, the following questions started to rise up: where do I want to have the low, mid and high frequencies placed in the recording and what role do I want them to play in the composition? Does the music need them and when? What is the size and shape I want to give to the organ in the mix? And what is the size and shape I want to give to the room? Where do I want to feel that I am listening from: from far away, from right in-front or from "inside"? I realised that through the choice of microphones and their positions in the church together with the type of mixing approach I was drawing the shape of the instrument, its size, and its characteristics. I noticed that I was not only composing the music through the music sheet but was also the architect of the instrument and the room through my recording and mixing techniques. And thus, the following question arose: do I even want to recreate the real sound of the organ or do I want to go farther away and manipulate the sound image in order to create an artificial sound and make it part of the composition? At some point the answer became clear to me. I wanted

to take advantage of the recording techniques to boost the potential of the soundscapes the organ has to offer.

I felt that my musical concept and taste were asking for a shift in the sound image depending on the composition. Some of the subtle textures and colours I was composing were demanding to be as present as possible in the recording. At specific moments I wanted the listener to feel right inside the pipes, hearing even the air coming out of them. Other instants required a more roomy image to feel the size of instrument and room. However, I never went too far away with this approach as I felt that the more I was recording the room, the less I was recording from the direct sound of the instrument and thus it was making it smaller and pushing it away in the sound image. At many points I sought to find the right balance between these two main images whilst trying to create an inverse sound experience that was not necessarily a real one but rather an artificial one. In the next section I explain with more detail how I went through this recording process.

## Recording Equipment

### 1st Visit

My first visit at St. Martin's Church in Kassel, Germany originated from an offer by my teacher from the Musik Akademie Caspar Johannes Walter who kindly invited me to compose a piece for the presentations Album of this new Experimentalorgel. After accepting the offer my teacher also mentioned the possibility of visiting and working directly with the instrument in order to get to know it better. Therefore my only recording equipment this first time was a Zoom Recorder H1 (caption No. ) with which I recorded the first full version of "Settled Vagabond" (the piece I composed for the presentation Album).

17. Zoom Recorder



*Only recording device during first visit.*

18. Rode NT5



### 2nd Visit

After realising the magnitude and uniqueness of the instrument and the wide spectrum of soundscapes possible, I decided to come back a second time with better equipment to start my recording research. I had the opportunity to borrow 8 microphones and an audio interface from my teacher Johannes Caspar Walter with whom I am endlessly thankful.

**Equipment:**

- 6 Rode NT5 (small diaphragm condenser /cardioid)
- Schoeps MK4 Stereo-Set (small diaphragm condenser /cardioid)
- Focusrite Scarlett 18i20

**3rd Visit**

Not being convinced completely by the sound of the preamps, especially because of a soft distortion in some of the recordings from the 2nd visit, fearing that the audio interface had developed some instability after several years of use, and being eager to start building my own recording set, I bought an audio interface myself.

During this visit the recording experience was more intense. I recorded the audio for 8 short videos the organist Eckhard Manz made to explain the basics of the new Experimentalorgel ("Orgelfastination" in annex). I had to mix background audios for an interview I had with the German Radio HR a few days before the inauguration. In addition, I also did the live stream audio for the inauguration concert during Pentecost's service which brought many new challenges but a lot of new learnings and experience.

19. Schoeps MK4 Stereo-Set



20. Sontronics STC-2

**Equipment:**

- 6 Rode NT5 (small diaphragm condenser /cardioid)
- Schoeps MK4 Stereo-Set (small diaphragm condenser/ cardioid)
- 2 Sontronics STC-2 Silver (large diaphragm condenser/ cardioid) This were only used for the inauguration live stream recording (annex)
- Uphoria UM1820 (audio interface with Midas design preamps).

**4th Visit**

After achieving good results and experiencing improvements in my recordings my motivation kept me moving forward and made me realise that this activity was becoming

part of my artistic career. I therefore decided to start investing in my own equipment. After hours of online research and comparing microphones I came across the hand-made Swedish brand Line Audio. These microphones were inside my budget possibilities and promised good quality and positive specs for what I was looking for in my sound: transparency, flatness, no colouring.

I spend days sending e-mails to different distributors as these microphones cannot be found in most of the big music stores due to the small amount available. They are solely produced by Robert Johnson in Sweden. The company only offers 4 products; microphones CM4 and OM1 and Preamps 4MP and 8MP. The names of the microphones could not be simpler and clearer: CM for Condenser Microphone and 4 because it is the 4th version and OM for Omnidirectional Microphone. MP stands for Microphone Preamplifier and the preceding number for the number channels/preamps. This explains the basic concept of this company: simple, flat, and correct.

Finally, a few days before my trip to Kassel I found a seller in Lithuania. My equipment improvements went further. After many advice and feedback from different people I realised the importance of preamps for recording. I therefore invested in the 8MP also from the Swedish brand Line Audio in order to connect it to my Uphoria UM1820 Interface.



From top to bottom: Uphoria UM1820, Line Audio 8MP, Uphoria AM4020, Focusrite Scarlett 2i4.

## 22. Line Audio Microphones



Left to right: OM1, CM4 & a lighter as size comparison.

## 23. Neumann TLM 103 Stereo-Set



### Equipment:

- 6 Rode NT5 (small diaphragm condenser/cardioid)
- Schoeps MK4 Stereo-Set (small diaphragm condenser/cardioid)
- Neumann TLM 103 Stereo-Set (large diaphragm condenser/cardioid)
- 2 Line Audio CM4 (small diaphragm condenser/cardioid)
- 2 Line Audio OM1 (small diaphragm condenser/omnidirectional)
- Uphoria UM1820 (audio interface with Midas design preamps)
- Uphoria AM4020 (UM1820 extension)
- Line Audio 8MP (8-Channel Preamp)

## Microphoning

As mentioned before, recording the organ became a primary issue in this project. Of course I did my research on which microphones to use and how to place them. However, I was dealing with a completely new instrument. Therefore, a large amount of my time working in St. Martin's Church was spent moving microphones around the Experimentalorgel. I spent many hours moving myself around the room and the instrument trying to catch all the different angles available and trying to figure out which ones I needed for my music. This made me more conscious of what I wanted to express as an artist and gave me a completely new perspective for composing and improvising.

I compared all the microphones I had available placing all of them together in a same spot and recording the same music to evaluate the different sound image they were offering (caption 25). This process was repeated at different distances and positions from the organ. The microphones all differ depending on their polarisation and their brand each offering individual physical aspects and colouring. I repeated the same process with the three pre-amps I had available during my four visits. The one that gave me the cleanest and flattest sound was the Line Audio 8MP. Down below the results of all these comparisons.

### Placement

The first main comparison I was carrying out was regarding the distance between the organ and the microphones. The farthest I went was approximately 15 meters away from the organ using something in between AB stereo and NOS techniques with Shoeps MK4 Stereo-Set (caption 24). This gave me a nice natural reverb which I used with very little volume in my mix in order to give colour to the image. Having too much of this in the mix was making the whole picture too disperse and roomy for what I was looking for. During the first recordings, I was afraid to bring the microphones too close to the organ. I thought it would be too much for the microphones creating noise and distortion and that the sound would not be clear. I was wrong. Regulating the gain of the preamps already helped to avoid signal excess. During the soundcheck I played both the loudest and softest sounds I was going to record and then adjusted and found a balance to even the gain input from each different microphone. After my first recording I noticed that I appreciated the sound produced when the microphones were placed close to the organ; subtle details like the air coming

24. Stereo Hall Room



out of the pipes, and a very present sound image for the mix. In my next recording I therefore got even closer to capture all the details and presence. The closest I placed the microphones was approximately 5 to 10cm from the organ on the sides like on **caption 25** where I am actually comparing all of my microphones from my 4th visit to see how they react in this close position. The other close position I used was around 15 to 25cm in front of the pipes (**caption 26**).



26. Close Pipes Position

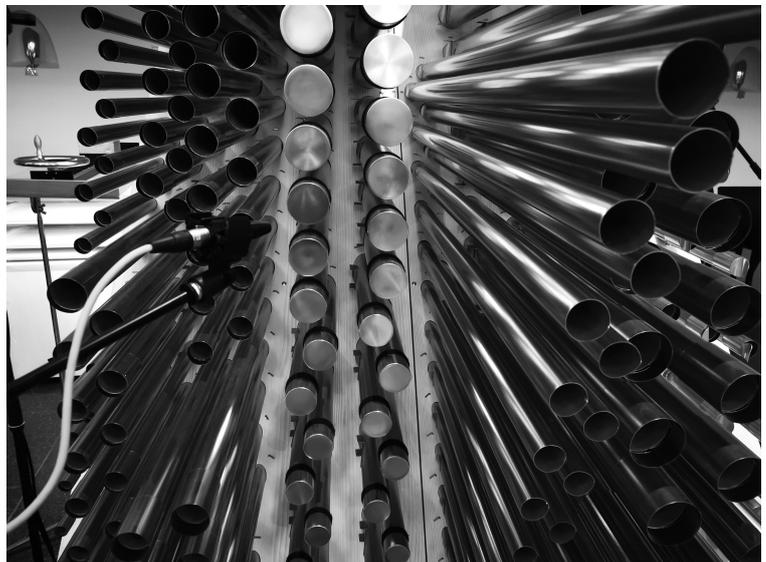


The mics on the sides were giving me a strong bass and beatings particularly when playing clusters in the lower register. I noticed that the presence of this sound receded as soon as I stepped back around 1 meter from the organ. Therefore, I needed these microphones there to capture what the organ was making me feel when playing. In the end I was mainly composing from this perspective and my music was full of this low register clusters. A good example of this is "The Obscene Bird Of The Night" minute 5:46.

I also noticed a beautiful clear sound coming from in-between the pipes while playing with soft dynamics. To capture this, I placed an omnidirectional

26. Omnidirectional in-between pipes

microphone right in-between the pipes that were producing this sound (Caption No. 24). In this specific moment of the music, I wanted the listener to feel the abstract and constant randomly moving soundscape. The moment I am talking about is the very beginning of "The Obscene Bird Of The Night".



## Polarisation

To record the Experimentalorgel I used two different polarisations: cardioid and omnidirectional. Each of them gave a different form and size to the sound image. The omnidirectional ones added a rounder roomy image and were better able to capture the basses of the organ. They were also helpful for giving the sensation of being "inside" the music, especially when placed very close to the organ, almost in-between the pipes as in the example mentioned in the previous section. At a distance of around 2 to 3 meters they also gave an interesting colour to the recording. However, once placed farther away the image would get too roomy for the aesthetic I was striving for in my music due to the big reverb of the room.

The cardioid also helped capture subtle direct sounds which brought the instrument literary to my face. Moreover, when placed farther away in stereo at around 5 meters from the organ, they recorded the big room of the church nicely whilst at the same time staying focused on the direct sound of the organ. It is worth mentioning that the Neumann TLM 103 also being cardioid like the Schoeps MK 4 gave a wider image probably because they are a large-diaphragm microphone instead of a small-diaphragm microphone.

## Setup

For my recordings I tried different microphone setups. One of my preferred setups using only the 8 microphones I had available was the following (captions 27 & 28 ):

- **1 cardioid microphone (Line Audio CM4)** on the front side of the organ at a distance of around 5 cm in order to capture the bass beatings of the organ.
- **2 omnidirectional (Line Audio OM1)** microphones very close (almost in-between) to the front of the organ pipes in order to get subtle details at soft dynamics, a surround image and a full bass.
- **3 cardioid (2 Schoeps MK and 1 Line Audio CM4)** right in front of the pipes at a distance of around little less than a meter in order to bring the sound image to the front.
- **2 cardioid (Neumann TLM 103)** at around 3.5 meter from the organ and a distance of around 3 meters between each other and at a height of around 3 meters.

As the pipes of the organ are not evenly distributed, the placement of the microphones are also not equally distributed and the heights of the microphones also play an important role in order to capture the wide spectrum of frequencies coming out of the organ.

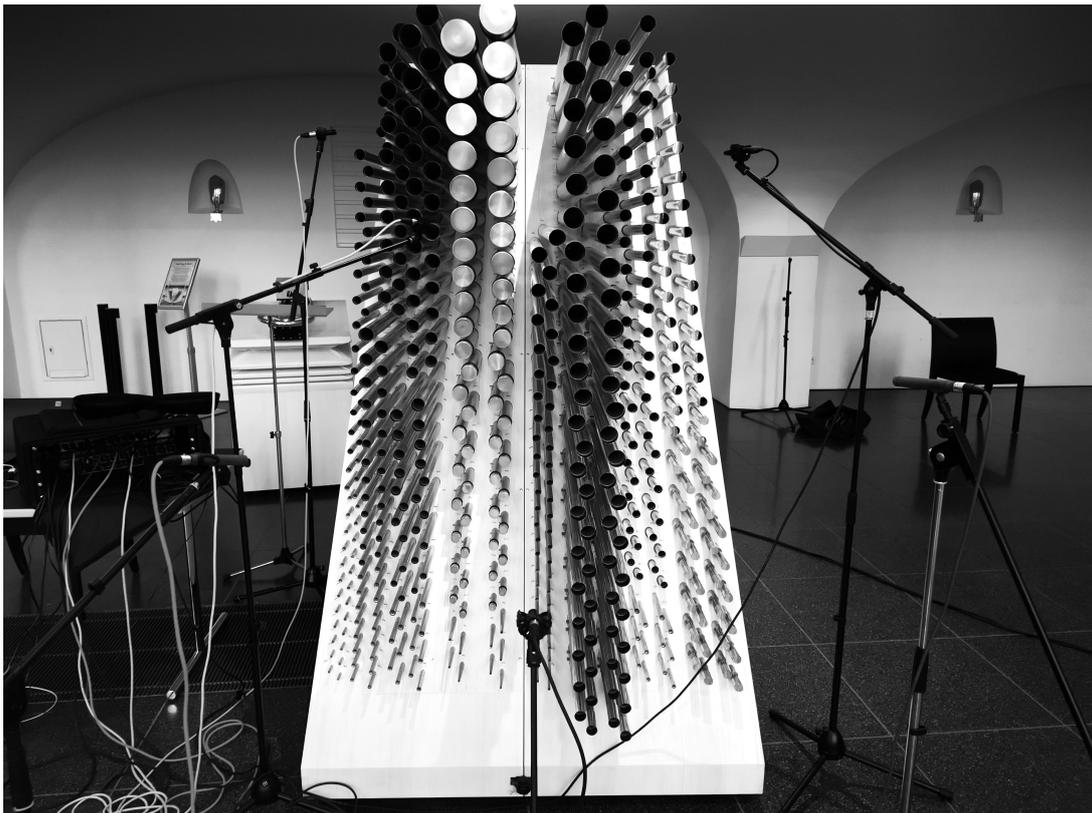
After all these trials, I came to the conclusion that an ideal set-up for recording the Experimentalorgel should have at least 12 microphones in order to cover the necessary

images I want for my music. I am slowly upgrading my own recording gear and hope that I will soon get the chance to move forward with new set-ups for my next recordings at St.

## 27. Set-Up Examples



Martins Church.



# R e f l e c t i o n s

If there is one thing I will never forget about this journey is the value of experience, the value of know-how, having to start doing things in order to learn how to do them. Although it may sound simple, a perspective on a topic changes the second it is put into practice. I really believe that the experience gained by taking part in projects that step into the unknown, bring about uncomfortable situations, and impose to engagement in the craft is priceless and essential for growing as a professional. The closer they are to a real life situation, the bigger the learning outcome.

Composing, researching, and recording the experimental organ was like meeting a new being. I cannot put into words how fascinating the experience of encountering a completely new instrument was. I chose the word being because of its subtle and unique instability, particularly in some soundscapes where the only possibility is to listen to how it is reacting and creating random beatings and rhythms. I find the idea of not being able to control everything and letting not the performer but the instrument itself be the interpreter of the music very exciting. The mechanisms and physical characteristics of the Experimentalorgel react in different ways to the physics around it including the room, the position in the room, the temperature, and the position of the listener in the room.

At a certain point I began asking myself: Where does the instrument start and where does it end? Does it start or end on the key? On the pipe? In the air? In the room? The room is also part of the instrument and so is the listener, for, depending on how they move around the room, a different connection to the sound is created thereby influencing the music happening at that precise moment.

Each visit to St. Martin's Church in Kassel was meaningful for my artistic development as it always felt like an artistic retreat. Being almost all the time by myself in this huge incredible building full of energy and with this incredible instrument allowed me to go deeper inside my thoughts and feelings while composing. During these insightful moments I also realised the strength of the physical aspect of sound in relation to what we call music. As I was directly experiencing how the individuality of the organ and the room were influencing my compositions, thoughts emerged to my mind about the action of taking a decision and shaping something not only as an artist but as a human being as well. Why do we decide to create something instead of just observing?

Something that stuck in my mind after my stays in Kassel was that after days of listening to the organ for long periods time, to all its abstract sounds and beatings, my ears began reacting to all the sounds around me in a very different way as I was going out in the street to take a walk or get some food. I heard the softest rustle and the simplest creak from the tram as music. Not only was I much more aware of all the sounds and noises around me but I was somehow accepting them as an art-form.

This led to the question: Why do we to shape sound and not only observe and accept it? At what moment do we begin to act, to take decisions and where does this yearning

come from? And what are our intentions with them? These are questions that may be difficult or even impossible to answer with words, at least for me. However, these questions pushed my analytical and intuitive mind and my reflections on life and music to new limits. I believe extremes expand our vision and create bridges to new perspectives. I strive to connect all these introspective thoughts and feelings with the music I am creating and hope that they are somehow reflected in the compositions and improvisations presented in this project.

The inspiration for my first composition "Settled Vagabond" came from a vagabond who used to visit the church every day and would sit for hours looking in the same direction without doing anything. This gesture impacted me because of the strong decision I saw in him: The decision of not doing anything, the decision of just observing. This reminded me of a paragraph I read a few weeks before in the book "Rayuela" by Argentinian writer Julio Cortázar which is referred to in the cover pages of the composition together with personal thought:

*Inspired by a vagabond who visits St. Martin's Church almost every day, sits on a corner and stays there with his eyes closed or looking in the same direction for hours without doing anything.*

*Maybe homeless but at the same time settled in his own world faraway within himself.*

...Hacer. Hacer algo, hacer el bien, hacer pis, hacer tiempo, la acción en todas sus barajas. Pero detrás de toda acción había una protesta, porque todo hacer significaba salir de para llegar a , o mover algo para estuviera aquí y no allí, o entrar en esa casa en vez de no entrar o entrar en la de a lado, es decir que en todo acto había la admisión de una carencia, de algo no hecho todavía y que era posible hacer, la protesta tácita frente a la continua evidencia de la falta, de la merma, de la parvedad del presente. Creer que la acción podía colmar, o que la suma de las acciones podía realmente equivaler a una vida digna de este nombre, era una ilusión de moralista. Valía más renunciar, porque la renuncia a la acción era la protesta misma y no su máscara...



...To do. To do something, to do good, to pee, to make time, the action in all its forms. But behind all action there was a protest, because all doing meant leaving to get to, or moving something to be here and not there, or entering that house instead of not entering, or entering the one next door, meaning that, in every act there was the admission of a lack, of something not done yet and that it was possible to do, the tacit protest in the face of the continuous evidence of the lack, the decline, the paucity of the present. To believe that an action could fulfil, or that the sum of actions could really be equivalent to a life worthy of its name, was a moralist's illusion. It was better to resign, because the resignation to action was the protest itself and not its mask...

Further questions: Does the instrument influence the way I compose music? The way I express myself? Do I feel more freedom in the way I portray my ideas and my feelings? Do I feel more connected? : To these questions I can unequivocally answer: "yes".

With the Experimentalorgel I now really feel that I have a space where I can connect with myself in a more personal way channelling all the things that have shaped me so far as a person, as musician and as an artist. All the different cultures I have experienced since I started to travel and live in different places. I grew up in Mexico City, an almost 28 million city. At 16 I moved to Austria for two years to do the Matura in a music Gymnasium. Then I came back to Mexico for three years where I studied at Lafaro jazz Institute. I then moved to the USA for two years where I did the first half of my bachelor and then finally three years in Barcelona where I concluded it.

All these experiences and mixes of cultures, society and ways of living have been my reality and live within me in many different ways. With this new instrument I feel the freedom to just be myself and do not think about any style or tradition in particular. I let myself go into the sound and into what I am hearing and feeling inside, especially in this moments of my life after being in contact with so many different cultures. I try to connect to what resonates with me the most. This organ has definitely opened new doors inside me to experience new ways of communicating with myself, with the instrument, and with everyone around me. I feel I must embrace this different shape of art that is coming out of me and at the same time believe in it.

Composing for a new unknown instrument at a time when I was also working for other types of ensembles such as choir, big band and chamber music, unconsciously forced me to be able to find the sound of my music regardless of the instrumentation and concept behind. Consequently, I had to find a deeper level and character in the music. It has been an incredible experience as I was able to connect for the first time the three points of composing, playing, and recording all by myself. This helped me to dive deeper into each point due to the nourishing they all brought to each other. I also finally saw the key bond between all of these points and realised the importance of knowing about all of them regardless of having more knowledge in one specific field. Knowledge of each enables to develop ways to collaborate and communicate with people, as it provides clearer focus and direction.

I am definitely not the same artist I was before going through this journey. Coming in contact with the Experimentalorgel felt like shaking hands with someone new. But in the end it may not have been about meeting someone else but, rather, simply myself.

# P r o l e p s i s

The Experimentalorgel is currently one of my main projects as an artist. Therefore, the research and work in Kassel will not cease with this Inter Disciplinary Project. I found a deep connection to this instrument because I can blend my compositional and performance skills in a creative and unique way. I also feel that I am uncovering an individual artistic voice. I know that these first four residencies are the first step of an important path in my artistic career and that much more research, exploration and creation can still be done. Until now my main focus has been on the "small" Experimentalorgel. However, let us not forget about the main Große Orgel which with 5.700 pipes, 65 registers and 122 keys offers an immense sound spectrum. The exploration of this massive instrument by itself and together with the Experimentalorgel is in my plans for the near future.

My residencies at St. Martin's Church will continue to take place, hopefully again on a monthly basis as in the last months. On October 16th 2021 I will perform a concert in duo format with the organist Eckhard Manz. The concert bears the title "Neuenanfang" (new beginning in German) and is the closing event of a concert series at St. Martin's Church. It will have an improvisation approach with me playing the Experimentalorgel and Eckhard Manz the Große Orgel.

Furthermore, my current goal is to publish an Album by the end of this year exclusively with music composed and performed by me on the Experimentalorgel. After this the exploration with different instruments and ensembles will begin as well as the integration of electronics.

The musical concepts emerging from this instrument are pushing me towards a new exploration: Ambisonics. The music I am composing has the potential to be performed not only directly from the instrument itself but also from a sound installation. A multichannel format could open new doors for the music and its performance arriving to the practice of "Sound Diffusion" where the performer uses speakers as an instrument to spread sound in an acoustic space.

The reason why this instrument represents a bridge from composition to Sound Art is because of all the possibilities of expression and performance it offers. It can infiltrate through the microphones to the digital world and come back to life through electroacoustic inducers in a new shape.

# A p p e n d i x

1. P h o n e C a l l	6 : 3 6
2. S e t t l e d V a g a b o n d	9 : 4 0
3. P r i s m a	1 : 2 4
4. E x o s p h e r e	4 : 0 9
5. S u m m o n s	3 : 1 2
6. I n d u c t i o n	2 : 4 2
7. V e s s e l	4 : 4 0
8. T h e O b s c e n e B i r d O f T h e N i g h t	1 1 : 5 6
9. T w o F i n g e r s ( D y n a m i c - S c o r e V i d e o )	5 : 1 6

## P r e s s - M e d i a :

- H R R a d i o I n t e r v i e w 3 : 3 4

Appendix link:

<https://drive.google.com/drive/folders/14MEeeyQLv88dSIGShWA0KgWpc7kttLXT?usp=sharing>

# A n n e x

Due to the large amount of documentation gathered in my four weeks in Kassel, not all of it is included in the main production of this project. And in case of interest here is a list of some of the extra work done which can be accessed with the following link.

<https://drive.google.com/drive/folders/1CScznIMRx9jYTsQiECduYUBd4R1XH5hV?usp=sharing>

- **Introductory Videos with Eckhard Manz “ Orgelfasination”**

During my third visit I recorded the audio and participated in a series of videos done by St. Martin’s Church Organist Eckhard Manz.

- **Experimentalorgel Premier Live-Stream**

I was invited to the inauguration of the organ on May 23rd 2021. My composition “Settled Vagabond” was the first and only piece performed and I was invited to do an improvisation with Eckhard Manz playing the Große Orgel and me playing the Experimentalorgel. I also took care of the audio of the live-stream.

- **Standard Testfile Experimentalmodul (video)**

I performed and recorded audio and video of a research file written by my teacher Caspar Johannes Walter. All pipe-ranks are played in different registers first normal and then using the *slider* in order to capture the different sounds happening while slowly opening and closing the organ pipes. Dynamic music sheets accompany the video.

- **Register Combination & Wind Manipulation (video)**

Trials done during a Zoom encounter between my teacher Caspar Johannes Walter and me.

Furthermore, I am continuously sharing new pieces for this project on my webpage:

[www.mauriciosilvaorendain.com](http://www.mauriciosilvaorendain.com)



*Left to right: Pastor Dr. Willi Temme, Bishop Beate Hofman, Kantor MD Eckhard Manz, Composer Mauricio Silva Orendain & Organ Builder from Rieger Orgel Wendelin Eberle. Photo taken during the inauguration of Experimentalorgel on May 24th 2021 at St. Martin's Church in Kassel, Germany.*