DOCTORAL THESIS

Never Heard Before

A Musical Exploration of Organ Voicing

João Segurado

This thesis is the result of a collaboration between Luleå University of Technology and the University of Gothenburg

UNIVERSITY OF
GOTHENBURG

Never Heard Before

A Musical Exploration of Organ Voicing

João Segurado

Abstract

Title: Never Heard Before: A Musical Exploration of Organ Voicing
Language: English
Keywords: voicing, voice, sound, listening, pipe, organ, tone, musical composition, musical performance, experimental, collaboration, artistic research, ethnography, musique concrète, transient, attack, steady-state, harmonic spectrum, languid, toe-hole, mouth, flue, reed, Studio Acusticum, Gerald Woehl, Piteå.
ISBN: 978-91-981712-6-6 (printed version); 978-91-981712-7-3 (PDF/GUPEA)

This dissertation examines the practice of voicing and its implications for musical performance. Organ sounds are shaped to suit the practice of musical performance, and they influence that practice in significant ways. This study seeks to describe precisely the role those sounds play in the context of musical performance and interpretation. More broadly, it examines the visions and artistic perspectives of those who create the sounds and those who use them in performance—voicers and musicians.

Pipe sounds are shaped by a practitioner called a voicer, in a process that is essentially one of gradual transformation of sound; that process is called voicing. The task of voicing demands excellent manual dexterity, solid theoretical knowledge, and a keen sense of hearing. The name *voicing* also suggests an approach to sounds that seems to transcend those aspects of the craft. Voicing means to give voice, and to give voice means to give life. The sounds of the organ are thus shaped with the intent to epitomize forms of human expression, and those forms of expression will be heard in the context of a musical practice. Thus: what exactly constitutes an organ voice? What type of concerns emerge during this process of voicing? In which ways do the voices that are created influence the music performed on the organ?

The answers to those questions were investigated in the context of a collaboration between a voicer and an organist (the author), over a period of roughly two years, while an organ was being built for the concert hall Studio Acusticum at Piteå, in northern Sweden. Since the researcher was a musician, the research questions are naturally approached from a musical stance.

This study comes under the umbrella of artistic research, and its results are not only articulated verbally, but also, and just as importantly, enacted through artistic content. The dissertation includes the creation of new artworks, and the exploration of artistic media. The ethnographic model is clearly felt within the text as well, as it deals mostly with examination of documents, dialogues, sounds, events, and the perspectives of different people.

The title of the dissertation—*Never Heard Before*—was originally the motto for the new Studio Acusticum organ, that served as a platform for the study. Here it serves to express the idea that the voicer-musician encounter has not previously been the subject of research, and that the materials presented in the text—both the dialogues and the sounds collected during the process of voicing—were things never heard before.

Dissertation for the degree of Doctor of Philosophy in Fine Arts in Musical Performance and Interpretation (Musikalisk gestaltning), at the Academy of Music and Drama, Faculty of Fine, Applied, and Performing Arts, University of Gothenburg, in collaboration with the Department of Arts, Communication and Education, Luleå University of Technology.

Art Monitor dissertation No. 51
Art Monitor is a publication series from the Faculty of Fine, Applied, and Performing Arts, University of Gothenburg

Art Monitor
University of Gothenburg
Faculty Office of Fine, Applied, and Performing Arts
Box 141
SE 405 30 Gothenburg, Sweden
www.konst.gu.se

This doctoral dissertation has been conducted within the framework of the Konstnärliga forskarskolan (the Swedish national research school in the arts).

Text layout: João Segurado, using Pages for Mac. Version 5.5.1 (2011)
Book print: Graphic Production, Luleå University of Technology
DVD cover: Swell shutters of the Woehl organ in Studio Acusticum
Photo and DVD Design: João Segurado
DVD print: Department of Media Technology, University of Gothenburg

ISBN: 978-91-981712-6-6 (printed version)
ISBN: 978-91-981712-7-3 (PDF/GUPEA)

Acknowledgements

First and foremost, I would like to express my sincere gratitude to my advisors, for all the guidance and support they gave me over these years, and for helping me in the completion of this dissertation. My most sincere gratitude to Prof. Hans-Ola Ericsson, my long-time and esteemed teacher, for inspiring the very beginning of this project, and for creating the right environment for its development; simply, this project would have not been possible at all without him. I am equally grateful to Prof. Sverker Jullander, for following this project very closely over these years, and for offering his vast knowledge and experience, and for guiding me in the best possible way. I am truly thankful for his patience and tenacity as well.

My sincere gratitude goes also to Dr. Lena Weman Ericsson, who has guided me in the very first moments of this project, already at the time of my research application.

This dissertation would have not been possible at all without Mr. Gerald Woehl's significant contribution, who opened the doors of the hall in Studio Acusticum, allowing me to observe, document and even take part in his voicing practice. Mr. Woehl is an inspiring person, and I am truly thankful to him: for sharing his knowledge and great artistry, for answering all my questions always in the most transparent and honest way, and above all, for offering such a wonderful perspective on many things. His perspectives have certainly enriched this dissertation in the most beautiful way.

I am also thankful to Claudius May-Woehl, for his help over these years, for his explanations, demonstrations, discussions, translations, for keeping the organ in good shape during the recordings in Studio Acusticum, and also for his patience. My appreciation goes also to other people at Woehl Orgelbauwerkstatt, namely: Simon Buser, Monika May, Monika Sommer, and Sven Clausen.

Some people shared their viewpoints during the time of my research, and they offered their criticism. Among those, I would like to emphasize Dr. Joel Speerstra and Dr. Maria Bania, who added their comments and valuable suggestions. A special word of gratitude to Dr. Robin Blanton, who shared her thoughts and gave insightful criticism, and who also did the English editing of my text during the final stages. Dr. Blanton's contribution was significant in the way that really improved the overall quality of the main text—its clarity and readability—but also in the way that kept me confident and motivated during the final stages of my project. I am truly grateful to her.

I am also thankful to teachers and colleagues at the Department of Arts, Communication and Education in Piteå; they shared their thoughts and created always a friendly atmosphere. Thanks to Dr. Åsa Unander-Scharin and Dr. Sture Brändström, thanks to my fellow colleagues Fredrik Hedelin and David Myhr.

A word of appreciation to Roger Norén, Anna-Carin Johansson, and Lars Johansson, all at Studio Acusticum, Piteå, for helping with the booking of the hall and with other logistical things.

I am also thankful to Munetaka Yokota and Ibo Ortgies at GoArt, Gothenburg, for taking the time to talk with me, for being so generously available.

A special word of gratitude to Johannes Oscarsson, who did the sound production and editing of the recordings in Studio Acusticum. I am truly grateful to him, for his generous availability and great professionalism, as well as for his patience, and above all, for being such a friendly person,

and for bringing such a pleasant working atmosphere to the recording sessions. Johannes helped me keeping the ground steady at some points in this project, when some things became less certain.

I wish to thank my family as well, for their inexhaustible support. To my mother, for the countless hours of conversations—despite the geographical distance—for listening, for caring, for suggesting, and for keeping me aware of so many other important things in life as well.

Finally, I wish to express my most sincere gratitude to Katharina Schröder, my partner in life, who helped me with basically everything; for being **always** there for me, for helping me with the interpretation and translation of countless texts and conversations and sound recordings, for reading my texts and giving feedback, for doing the production of the recordings in Studio Acusticum, for traveling with me, for planning with me, for listening, for being patient, for keeping so many things in perspective, and much more. This dissertation would have not been possible without her, and I am truly thankful for her love and support.

My most heartfelt gratitude to all.

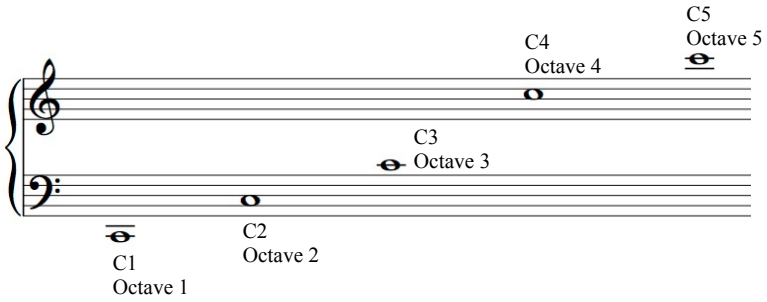
Berlin, January 2015

João Segurado

Contents

Note on pitch and compass

The following system of notation will be used to refer to pitch and octaves:



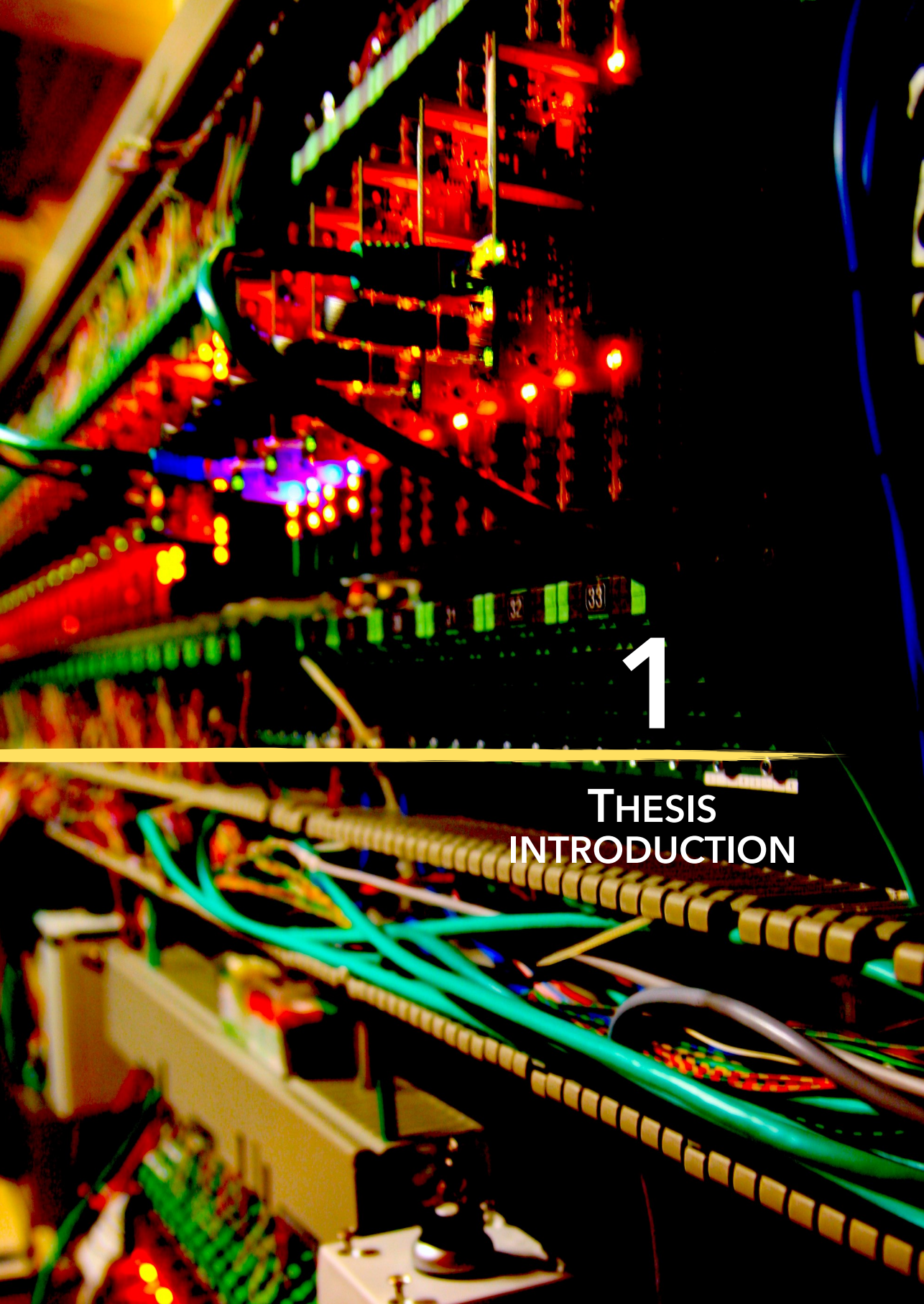
In the text, as a general rule, pitch will be referred irrespective of the type of stop played, unless stated otherwise.

Never heard before

"If only there were a dogma to believe in. Everything is contradictory, everything tangential; there are no certainties anywhere. Everything can be interpreted one way and then again interpreted in the opposite sense. The whole of world history can be explained as development and progress and can also be seen as nothing but decadence and meaninglessness. Isn't there any truth? Is there no real and valid doctrine?"

The Master had never heard him speak so fervently. He walked on in silence for a little, then said: "There is truth, my boy. But the doctrine you desire, absolute, perfect dogma that alone provides wisdom, does not exist. Nor should you long for a perfect doctrine, my friend. Rather, you should long for the perfection of yourself. The deity is within you, not in ideas and books. Truth is lived, not taught."

Hermann Hesse, excerpt from *The Glass Bead Game* (1943).



1

THESIS INTRODUCTION

Chapter 1

INTRODUCTION

Encounter

The present study explores the encounter between two distinct practices. From a distance, that encounter takes place between the realm of musical performance and the world of instrument building. Closer up, it becomes the collaboration between an organist and an organ builder. Of these two, the realm of musical performance is perhaps better known to more people, and I believe it is not necessary to give much introductory explanation about the practice of musicians. On the other hand, organ building may be seen as a somewhat obscure practice, and perhaps not much is known about the practice of builders. To get started, it is enough to know that organ building is the professional activity that has as its main goal the building, designing, and maintenance of pipe organs. Given the complexity of pipe organs—considered as machines, artefacts, musical instruments—builders themselves often have many different areas of expertise, ranging from carpentry, engineering and metallurgy, to music, drawing and painting, and perhaps others too. This study looks at one particular area of expertise: *voicing*.

Voicing is the practice that has as its main goal the adjustment of the sounds produced by the pipes in the organ. The one who does the voicing is the voicer; a voicer adjusts the color, attack and loudness of the tones produced by the pipes, and gives them character. The standard technical procedures applied in voicing—such as the adjustments made to the physical components of the pipes, as well as measurements and the handling of tools—are described in few theoretical writings, but not much is known about the artistic motivations of voicers, and we do not know why some organs sound better than others, even though the techniques applied and the materials used are generally the same. Voicers tend to voice their instruments behind closed doors, and their knowledge usually stays within those boundaries. There are no schools of voicing, and there are no theories available to a voicer to explain the processes or personal mechanisms involved in the act of voicing. Even today, masters still transmit knowledge to their pupils in a process that mainly relies on imitation and the gradual

embodiment of tacit experiences. We may say that voicing remains a somewhat obscure practice.

But I myself am not a voicer, or an organ builder. I am a concert organist and a composer, and I am interested in voicing as it relates to my own artistic practice. As an organist, I know for a fact that the tonal characteristics of the sounds produced by organ pipes cannot be changed from the keyboard. Differently from other musical instruments, pipe organs offer the player a relatively small degree of control over the tones, if any. The loudness and timbre of each tone are set and defined by voicing, after which they are fixed and cannot be changed in musical performance. This means that the performance of organ music relies very much on the quality of the voicing done to the pipes; it is the voicer who sets the tones and the voices in the organ, the performer who plays music on them. It is not quite clear in which way the decisions made by a voicer will influence the music performed by the musician.

Over the past four years I have been investigating voicing, following the work of one particular voicer and trying to understand how he shapes the tones and the voices of an organ, and how he himself relates to that practice. I was directly involved in the process of building and voicing a new organ, as an active musician. I explored the interaction and collaboration that developed between myself and the voicer of the organ, while voicing the organ in the room. That interaction made me think differently about my own experience of organ sounds, it inspired the composition of a new musical work, and it instilled in me a deeper understanding of the implications of voicing for the practice of musical performance.

1. Project description

"Never heard before…": this was the motto used to describe the vision for a new pipe-organ built in a concert hall in northern Sweden, which was the platform for this research project. In 2008, a group of renowned international organists and organ experts, along with organ builder Gerald Woehl (Orgelbauwerkstatt Woehl, Marburg, Germany), set out to develop an instrument that would allow the performance of music from the past, the present, and the future. The idea was to combine tradition with innovation and to inspire new research that would explore new artistic and technological developments in the fields of organ building and musical performance. The instrument—also envisioned as "a symphonic instrument for the 21st century"[1]—was inaugurated in October 2012.

The present study was initially planned to be included in a larger research project that had voicing as its main subject. Professor Hans-Ola Ericsson, leader of the above-mentioned organ project, with Dr. Lena Weman Ericsson and Professor Sverker Jullander, all at the Department of Arts, Communication and Education in Piteå (then the School of Music in Piteå) had designed a research project that would coincide with the building of the instrument for Studio Acusticum. The aim was to investigate the practice of organ voicing, with specific focus on the work of Gerald Woehl. The research was designed to include different perspectives on that topic. I was invited to contribute to this scenario with my own musical perspective, which ultimately sought to understand the implications of organ voicing for musical performance. This initial impulse developed further, and before long into my PhD project. After applying to what was then the Department of Music and Media in Piteå (at the Luleå University of Technology) for a vacant PhD position starting in September 2009, I was awarded financial support and a place in the doctoral program at the Faculty of Fine, Applied and Performing Arts in Gothenburg.

Research application

From the start, my vision for this research was to bring both musical and voicing practices together during the period of building and voicing the organ, and specifically within a later stage of voicing—*tonal finishing*—when the sounds produced by the pipes are adjusted to suit the acoustic configuration of the room. I wanted to be engaged in that process, and to gradually introduce musical performance during that phase. I wanted to explore the extent to which music influenced the practice and decisions of the voicer, and conversely, to see how a knowledge of voicing would influence my ideas about musical performance and musical composition. I knew beforehand that it was often the practice of the voicer Gerald Woehl to ask for musical performance on site, in order to listen to the behavior of the newly voiced sounds. Knowing that, I thought that I could make myself available to be a kind of resident musician while the organ was being voiced in the hall. That type of participation would grant me access to sounds never heard before, and would also give me the opportunity to take part in a process that had not been throughly documented before.

It should also be noted that this research project always had an artistic turn. The approach to research was an *artistic* one, not a musicological, scientific one. The research and the knowledge gathered were intended to contribute to the artistic community, with the creation of new artworks as the ultimate goal. Thus the project was always

aimed at developing knowledge that would influence and develop further my own artistic practice, and possibly contribute to the artistic practice of others faced with similar concerns. From the beginning, I decided that the results of this dissertation would include the recordings of musical performances, and possibly the composition of new musical works. In addition, I also planned to provide a monograph that would describe, in the most extensive possible way, the practices of both of the core participants—myself and the voicer Gerald Woehl.

Significance

This research work has no precedent. The topic of voicing has been approached within other fields of research[2], which essentially have focused on the technicalities of the practice itself, considered in isolation. No study, however, has ever examined the encounter between musical performance with voicing. Both the building and the musical practices influence the sounds of the same instrument, but they do so from different angles, and possibly with different goals. Often we find the builder's workshop on one side and the performer's stage on the other. There is no documentation of shared visions and shared concerns; there is no coherent articulation of the encounter between them. To contribute to this scenario, and in hope to shed light on this subject, here I bring these practices in close contact with each other, and here I examine this encounter; in this dissertation I bring forth my concerns as performer, and I bring forth the concerns and visions of the voicer too. What is attained is a new perspective and knowledge of voicing, articulated not only as theory, but also in artistic content.

Since this topic has never been researched before, and since not much is known from the start, I see here the opening up of a new subject of inquiry. In this study I intend foremost to articulate any of the findings in a coherent fashion, and to share the knowledge gathered, the observations made, and the sounds heard (never heard before) in an organized, clear format. My hope is that this project will also be a good starting point for further research.

2. The dissertation

Content

The work laid out here is my own musical investigation of organ voicing. It is a mirror of my own research into that practice. For this reason, the reader will find in this text not only reflections on my own musical practice, but also my descriptions and observations on the practice of the voicer Gerald Woehl—which may or may not be generalizable. In

addition, the reader will find a brief history of the organ project for Studio Acusticum, with a few comments made to the events that took place during the period of designing and building that instrument. The DVD attached to this monograph contains the artistic results of this research; they are indispensable for a good understanding of the issues discussed in the text.

Structure

The monograph is organized in three major parts. Part 1, in five chapters, introduces and contextualizes some of the topics I will be addressing in the later parts; namely: fundamental principles of organ voicing; personal approaches to musical composition; a discussion on the topics of artistic research and methodology; relevant aesthetic trends in the history of the pipe-organ. Part 2, in three chapters, presents a history of the organ project for Studio Acusticum, and a descriptive account of the methods employed by the voicer Gerald Woehl while voicing that organ. It concludes with a retrospective of my own musical research practice. Part 3, in four chapters, offers a discussion (in two parts, *Discussion I* and *Discussion II*) on the topics I found especially relevant to this research; namely, *Listening* and *Voice*. Each discussion is followed by one of the two artistic results of the dissertation: *The wind in the word—memorized sounds of voicing* (attached DVD: tracks 18-24), and *Franck, Reger, Kagel, and J. S. Bach* (DVD: tracks 25-32), with related comments in the text. The *Conclusion* closes the dissertation with some final remarks.

It remains for me to add that I have organized the content of this dissertation in such a way as to demonstrate the path my research took throughout the years of my project, thus starting with more general considerations (as in Part 1), gradually narrowing down to more specific ones (as in Part 3).

3. Core participants

Concert-organist João Segurado (b. 1984)

My first experience with the pipe organ came perhaps around the age of ten. Back then I was a piano student at the Conservatory of Music and Dance in my hometown, in Beja, in the south of Portugal. There, at the cathedral, there was a three-manual organ, built by the German organ-building firm Pfaff, with some 30 stops or so. I don't remember who or what drove me there, but I remember that, given the opportunity to try the instrument, I enjoyed the fact that I could make the notes last as long as I wanted, which was different from what I had experienced on the piano. I was also struck by the

way in which the sounds developed in that spacious room. The effect was indeed magical. Soon after this experience, I decided to sign up for the organ class at the conservatory. I studied there for some years, also exploring complementary subjects such as piano, harpsichord, chamber music, and other theoretical disciplines. Parallel to these studies, I also completed my high school degree in the field of arts. In 2003 I moved to Lisbon to pursue an advanced degree in organ performance, having been admitted to the class of António Esteireiro at the Escola Superior de Música de Lisboa. I finished my university degree in 2007. The same year I was awarded first prize and an audience prize at a national organ competition in Lisbon. Immediately after the completion of those studies, I was granted a Rotary Ambassadorial Scholarship to continue my music studies in a foreign country. I moved to the north of Sweden that year, intending to do a Masters in music performance, for which I joined the international organ class of Hans-Ola Ericsson at the Department of Arts, Communication and Education in Piteå. After completing my Masters degree in 2010, I was invited to collaborate in a larger research project focusing on the voicing of the Woehl organ for Studio Acusticum, which was starting in the summer of 2010. That contribution became my individual PhD project, financed and supervised by the Department of Arts in Piteå and the Faculty of Fine, Applied and Performing Arts in Gothenburg. The result of that project is the dissertation now presented here.

As a performer, I have concertized in Europe and Canada and been invited to perform in numerous international organ festivals and other venues. I have also had the opportunity to participate in several international organ competitions; for example, I reached the finals of the Herford Internationaler Orgelwettbewerb in 2008, in Germany, and the semi-finals of the prestigious Canadian International Organ Competition (CIOC) in Montreal in 2011.

Organ builder Gerald Woehl (b. 1940)

Organ builder Gerald Woehl was born in Villach, Austria. He belongs to the third generation of a family of musicians. He is the founding leader of the renowned organ building firm Orgelbauwerkstatt Woehl in Marburg, Germany. He trained with the organ builders Walter Haerpfer (knowledge of the French organ scene and French organ building), Georges Lhöte (construction and planning of symphonic organs, construction and building of reed stops), and Günter Späth (drawing, painting, and sculpture). In 1981, Gerald Woehl was officially recognized as a restorer of musical instruments and became a member of the German Union of Restorers. In the same year, he founded, together

with his wife, the harpsichord and fortepiano builder Monika May, a separate restoration workshop for historical keyboard instruments. In 2003, Woehl also started an organ workshop in Potsdam.

Woehl's encounter with the French organ scene in the 1960s has been an important influence on his work, as have current encounters with organists, musicians, composers and artists, which have all produced new creative impulses. The completed instruments have had a great impact on contemporary organ building. The building of the great Bach Organ at the Thomaskirche of Leipzig (2000) has opened up new perspectives on the creative work of Bach and the organ building of Central Germany. Other recent major projects include the Herz-Jesu-Kirche, München (2003); the Friedenskirche, Potsdam-Sanssouci (2004); the Eastman School of Music, Rochester, USA (in classical Italian style, 2005); and, most recently, the Coronation Cathedral, Bratislava (2010). Woehl's interests span a wide arc from the music of J. S. Bach to the new music, in particular the organ works of Olivier Messiaen and instruments congenial with this music. He has also published on topics in organ building and done studies on the restoration of musical instruments, and there are many interesting recordings by internationally noted organists on organs built by the Woehl firm.[3]

Chapter 2

FUNDAMENTALS OF ORGAN VOICING

Regarding voicing specifically, from a starting point, we may agree that pipe voicing, organ voicing, intonation, the German term *Intonation*, and the French *harmonization* all refer to the same basic practice. The aim of this practice is to shape the tonal characteristics of the sound produced by each individual pipe in the organ, and ultimately by each stop, with the intent to arrive at voice. Changes in tone occur along with the physical (manual) manipulation of each of the components of an organ pipe, and this is what allows the skillful voicer to (re)adjust the sound the pipes produce. The task demands excellent manual dexterity, solid theoretical knowledge, and a keen sense of hearing.

The process of voicing an entire organ is a rather complex one, and it usually takes quite a long time—it took around one year and half in Studio Acusticum, for example. Two major phases are generally recognized in that process: *pre-voicing* and *tonal finishing*. Pre-voicing is often done at the workshop, and it is a preparatory phase to prepare the pipe to articulate a tone and to make sure that it behaves properly when producing that tone. Tonal finishing, in contrast, consists of adjusting the tones produced by the pipes to the acoustic configuration of the room. Tonal finishing is the final phase of voicing, and it is the one in focus in this study

1. VOICE

In none of the writings[4] I have become acquainted with on the subject of organ-building and voicing have I yet found a satisfactory or an in-depth reflection upon the concept of *voice*: that is, the voice of the organ. A dissertation which has organ voicing as platform will have a hard time shedding any light on the subject if it does not question the most essential aspect of that practice—what it is essentially about.

We can look at this concept from several perspectives, perhaps most notably from the perspective of those who have written about organ-building, who are almost exclusively organ builders themselves. When looking into Dom Bédos, for example, I came to

realize that no close definition of voice was given; Dom Bédos does not specify to which sound parameter voice may refer, or how (or where) it can be felt or understood by the voicer in the process of voicing an organ. He simply states that "since organs are made only to be heard, they must be given a suitable, pleasing tone."[5] No clear definition of voice can be found in Goebel[6] (1967) or Monette (1992); their approach to voicing is equally technical. The same type of approach is found in Audsley (1905). More recent research on the topic of voicing does not offer any reflection on the concept either. I have for instance looked into Rioux (2001), Castellengo (1999), Pelto (1995), and Yokota (2003), and found no definition there. Encyclopedic entries do not offer any further explanation. In a recently published organ encyclopedia, for example, voicing is simply described as "the set of operations needed to make a pipe sound match stop specifications."[7] Another similar reference says that "when the pipes are put into the organ, they are voiced: the exact tone and speech of each must be adjusted and balanced with the rest of the organ."[8]

The collection of such perspectives made me aware of the consensus: voicing is a practical activity fundamentally related to the intrinsic aspects of sound and tone. From that perspective, voicing seems to be understood as the act of shaping sound, or shaping tones. Although true, this understanding is, in my view, incomplete, because it seems to imply that voice is roughly the same as the tone, and ultimately that it is the quality of tone that creates the quality of voice. As I have learned over the years, voice is not synonymous with tone; although relatable, these are two distinguishable concepts, and their meaning and practical application must be clarified.

The distinction between tone and voice is analogous to the distinction between an inanimate object—a concrete material, devoid of life—and a human emotion. An inanimate object has no voice, because it has no emotions or opinions to express. Voice, in contrast, is **human expression in sound**;[9] it is being *as* sound. In the organ, that expression emerges not only out of the individual tone, but from the complex relationship established between the different tones and the different sound regions of the organ stop. That relationship is indeed rather dynamic, and it includes a diversity of colors, pitches, noises and amplitude levels. This means that the voicer creates the voice not only by shaping the individual tones, but by exploring the relationship between those tones. That relationship may not always be shaped under the conventional standards of balance and pleasure—"suitable and pleasing"[10]—but by considering other aesthetic parameters as well, as for instance: beautiful-ugly, pleasant-unpleasant, balanced-unbalanced, regular-irregular, and so on. An expressive voice might very well be the result

of the exploration of such contrasts and extremes, considered all over the range of the stop. Note Woehl's perspective on this matter:

> An organ has to have strong voices, weak voices, poetic voices, and even ugly voices… A good voicer can fill out the whole artistic spectrum. Whether it's beautiful or not. There are beautiful organs but they are often boring. Beautiful is not necessarily artistic. I would say. I think that may be the most important thing that defines a voicer…When the voicer brings a harmony to the whole instrument. It doesn't have to be beautiful, but everything has to be in it… The more extreme the organ is, the better, I would say. That is what makes a voicer good. If he brings the most extreme things into one thing.[11]

Such exploration of extremes serves the ultimate purpose to create voices with distinctive features; voices filled with character and artistic intention. The intention is precisely to create voices that can epitomize a range of human emotions, being able to express those emotions in musical performance. Woehl exemplifies:

> For example it is very extreme with the Flûte harmonique. In the bass it is quite transparent and nearly bright, it gets [grows] darker and more sad, and in the treble it is a bit melancholic. Yes, that's what a romantic piece needs. Melancholy is a very important element; it plays a role in Romantic [music].[12]

Thus, the voices of the organ are not only thought of in terms of balance—"…the exact tone and speech of each must be adjusted and balanced with the rest of the organ"[13]; or in terms of the individual tones—"suitable and pleasing". Rather, they are conceived as contrasting, expressive, even perhaps *lively* entities. A voicer explores the contrasts and extremes throughout the range of the stop; he also explores modes of expression. Here is another interesting remark by Woehl:

> Someone told me once: 'Gerald, each organ needs to have voices where one can cry out. That is the most important.' But how does one do that? 'Where one can cry out…' How is one dealing with a chorale by Bach, [for example,] which is about comfort, or something like that? How is one expressing this with sounds, with tones?[14]

Real object and ideal object

The distinction between tone and voice may be also seen in light of Husserl's notions of the *real object* and *ideal object*. Tones are the actual physical object, the physical phenomenon, observable, felt by humans. Voice is an idealized concept, an entity emerging from the real object; it is not physical but essentially imaginary. Benson explains:

> Key to Husserl's conception of ideal objects is that they are essentially spiritual entities that have an ideal rather than a real existence… whereas real objects have an existence in space and time, ideal objects do not. Instead they have a timeless existence (i.e., once they are created) that can be characterized as "omnitemporal," for they are "everywhere and nowhere"…Thus, although "Goethe's Faust is found in any number of real books," these are simply "exemplars of Faust," not Faust itself.[15]

The vocal perspective

To a more practical extent, the term voice is also used to refer to the different regions of an organ stop, and more specifically to the actual singing voices in those regions—bass, tenor, soprano. The term is applied here in a more technical way, easily understood from a musical perspective.

A concise definition of voicing

To sum up, organ voicing is the practice which consists of the manipulation of the physical components of organ pipes, as a means for gradually adjusting their sound, with the intent to achieve a desirable voice. A voice encompasses individual tones, organized by pitch, which are adjusted to suit the acoustic configuration of the room in which they are to be placed, a consideration which takes into account the characteristics of both the initial transient phase and the steady state of the tone, where the latter includes parameters such as harmonic spectrum and loudness. A voice emerges out of the relationship established between the tones and the different regions that constitute an organ stop. Ultimately, a voice is an idealized concept; a form of expression.

2. Types and nomenclature of organ pipes[16]

There are two main types of organ pipes to be considered: flue pipes, also called labial, and reed pipes, also called lingual. Figure 2.1 gives an overview of the anatomy of both

flue (left) and reed pipes (right), along with the nomenclature I will be using throughout in this dissertation.

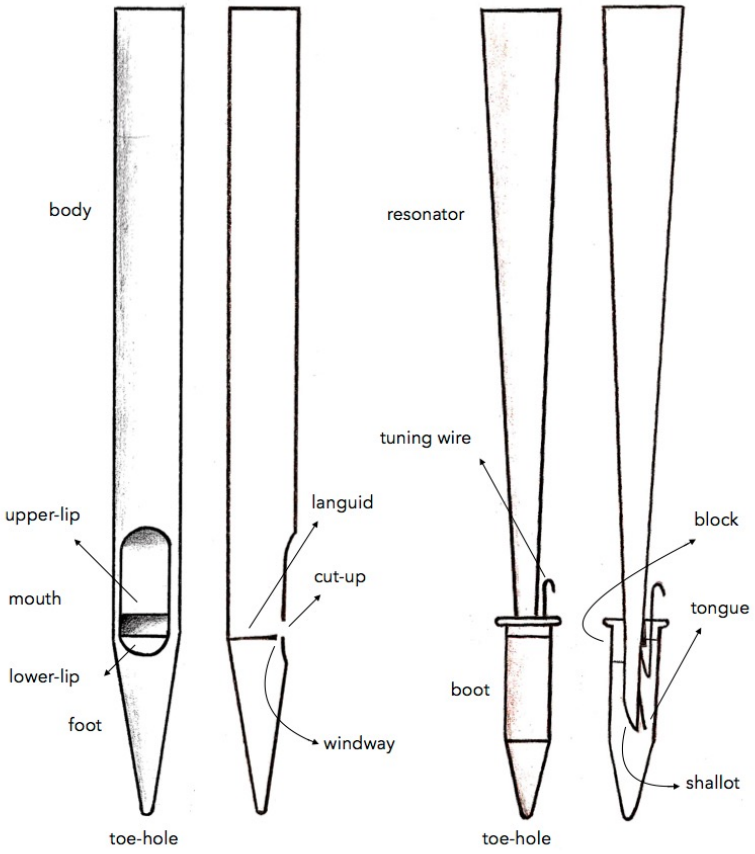


Figure 2.1[17]

Flue pipes

Flue pipes may be made of metal or wood. They are called labial because of their particular anatomy, which includes a mouth, comprised of a lower and an upper lip; flue because an air stream passes through them. In flue pipes, the air stream arising at the bottom of the pipe (toe-hole) flows directly to the mouth, and it is precisely the friction between the air stream and the components around the mouth that produces a tone, very much in the same manner a whistle does.

Reed pipes

Reed pipes—which are more often made of metal, although parts of their body may be made of wood as well—work differently. Their sound results from friction between two metal plaques inside the boot—one vibrating reed (tongue) and one stationary piece called a shallot. This vibration is also triggered by the passage of air arising at the bottom (toe-hole) of the pipe.

The stop

Similar pipes, producing similar tones, are grouped together inside the organ-case, and organized in pitch, chromatically—such a group is called a rank. A stop often consists of one rank of pipes—but sometimes more—and is always unified in sound concept and different from other stops, which may include pipes with different shapes, and made of different materials. Thus a stop consists of a group of pipes of similar tone, producing similar timbres, and arranged in pitch chromatically, most often playable across the whole range of the keyboard. The variations of stops that may be available in any organ are indeed many.

3. Main characteristics of the sounds produced by organ pipes

In this study, the focus is less on the techniques of organ voicing than on the resulting characteristics of the sounds. Although these two things are intrinsically related, it is sound alone that takes part in the musical dialogue, and it is precisely in sound that voicing and musical performance meet. Various fields of research have in fact shown interest in some of the particularities of the sounds produced by organ pipes. Research has been done on the physical (acoustical) features of organ pipes, but also on such things as their phonetic qualities and the perception of their sound. Among the most relevant studies, I would emphasize Disley's *An Exploration of Timbral Semantics Related to the Pipe Organ* (2004, PhD dissertation) and Rioux's *Sound Quality of Flue Organ Pipes—An Interdisciplinary Study on the Art of Organ Voicing*, the latter being an interdisciplinary project in the fields of physics and psychology. During the course of my own research, I also found some studies relevant for the way they helped me delineate essential notions of sound as a physical phenomenon: namely Helmholtz (1885), Grey (1975), and Smalley (1997).

The terms I will be using in this dissertation that have to do with organ pipe sound are informed by these readings, and I have adopted them with the aim of articulating my own perspectives. To that end, I will refer to the following specific features of sound:

temporal parts (including attack, steady state, and release); consonant type and vowel type; color; loudness and strength; noise. It should be underlined that all these aspects can be adjusted during voicing, and they are subject to the personal taste of the voicer.

Temporal parts

The temporal parts of a sound include the attack, the steady state, and the release. The attack—or initial transient (in physics)—refers to the initial impulse, the first fractions of seconds when the tone begins, immediately before it stabilizes into the steady state. Commonly, among builders—even among organists—this particular temporal part is also referred to as the *speech*. For the moment however, I will keep on using the term *attack*. The steady state is the most clearly audible and stable part of the tone, that which can be heard continuously, and which, in the case of most sounds produced by organ pipes, can be kept sounding for as long is desired. The release is the closing of the tone, the tail end of the steady state phase, which may also be referred as the decay transient (in physics).

Consonant type and vowel type

Consonant type and vowel type refer to the phonetic characteristics of the attack and the steady state of the tone, respectively. The attack usually resembles the sound of a consonant, or a group of consonants, with characteristics similar to phonemes such as 'pff,' 'tss,' 'sch,' and many other variations. The steady state of all types of pipes is mainly vocal, and its vowel type may vary in openness; the vowel can be open, as in 'aa'; midway open, as in 'ee'; or closed, as in 'ii', 'yy,' or 'uu.' These examples serve to explain the concept, but in reality the variations are many, and may even be hard to identify for the untrained ear.

Color

Color—which is different from timbre[18]—refers to the sensation that is perceived by the listener in response to the characteristics of the harmonic spectrum of the steady state. The steady state of a single tone is composed of partials, a series of harmonic frequencies (or overtones) that arise over the fundamental frequency. The sensation of color—dark, brilliant, and so on—varies depending upon the arrangement of that series in relation to the fundamental. Here I may sometimes use the term *Klangfarbe* to refer to this aspect as well, since this was the term employed by the German organ builders working in Studio Acusticum.

Loudness and strength

Loudness refers to amplitude. Strength (Stärke), differently, may be used to refer to the intensity of the tone, not necessarily to its loudness. Another parameter may be referred in connection to these two: *presence* (Präsenz).

Noise

Noise is an element of the sound produced by organ pipes, and it plays a role in defining the character of the sound that is heard. Noises may be heard in both the initial transient of the tone and the steady-state. The noises heard in the attack are often easily identified by listeners, heard as spitting, or as a 'chiff', or other similar variations. Goebel, for example, explains that the noises of the initial transient are important parts of the pipe sound, as long as they are not too strong.[19]

The greater or lesser amount of noise accompanying the steady-state may produce a range of different sensations; for example: the tone may be perceived as more or less airy (white noise), more or less metallic, more or less textural, clean or dirty, smoky, silky, and so on.

4. Technical considerations of voicing

Although the technical aspects of voicing are not central to this study, I think it is useful to briefly describe some of the most basic principles of pipe voicing. It should be noted that such techniques are employed when and as they are needed, in response to specific situations arising throughout the process of voicing. This means that the techniques are not applied in any standardized orderly fashion; their use depends on the sounds resulting from the pipes, and ultimately, the sound attained depends greatly on the taste and experience of the voicer.

4.1 Flue pipes

Cut-up

The character of the tone produced by flue pipes is greatly dependent on the height of the cut-up, especially the relationship between the cut-up height to the scaling[20] (specifically the width) of the pipe. In general, a low cut-up produces a sharper, narrower tone, and a high cut-up results in a softer, rounder tone. These parameters are also influenced by the wind pressure levels at the chest, the amount of air that enters through the foot (toe-hole) of the pipe, and the width of the windway.

Windway

The windway may be adjusted to a wider or narrower width. This adjustment influences amplitude of tone, as it controls the amount of air that hits the upper lip. A narrower windway will most likely produce a quieter tone, and a wider windway will produce a stronger tone.

Languid[21]

One of the functions of the languid is to adjust the direction of the air stream that passes the mouth of the pipe, which normally, should always hit the upper lip. The direction of the air stream can be manipulated by moving the languid up or down. The positioning of the languid influences the character of the tone, both the attack and steady-state. If the languid is set low, the air stream will be directed inwards, resulting in a faster attack. If the languid is placed too low, it will make the pipe over-blow. If the languid is set higher, the air stream is directed outwards, resulting in a slower attack; if it is placed too high, no sound at all will be produced. The attack may be also made softer, or smoother. To do so, the voicer may apply a series of cuts along the languid, using a short pointy knife, a technique known as nicking.

The height of the languid also influences the steady state of the sound, mainly its overtone spectrum. A higher languid will produce more overtones and thus a richer, more brilliant sound. Conversely, a lower languid will result in the loss of upper partials, thus producing a darker tone.

Toe-hole

The width of the toe-hole of the pipe controls the amount of air that enters the pipe body, which influences amplitude. This factor may also influence the character of the tone. If there is less air entering the pipe, the tone will be lighter, quieter, even perhaps more fluty.

4.2 Reed pipes[22]

Reed tongue

The quality of the tone produced by a reed pipe is dependent on the vibration of the tongue. When voicing reed pipes, the most important task is to find the right curvature for the metal tongue. If the curve of the tongue is too accentuated—the tongue is too far from the shallot—the tone will be slow and rounded, with a loss of upper partials. If

the tongue is positioned almost straight, parallel to the shallot, the tone will potentially be more metallic, with more overtones. Like with flue pipes, the width of the toe-hole of reed pipes controls the amount of air that enters the pipe, thus its loudness.

4.3 The stop

Dynamic contrast over the range

The first step in voicing a full stop is to consider the overall relationship among the individual tones in the stop, to achieve a desirable voice. This includes thinking about the character of the attack, the vowel type of the steady state, the color, and the loudness. These features are initially considered individually for each pipe, and later for each region—bass, tenor, and treble.[23] But not all the individual tones in a stop are supposed to be similar. Apart from the obvious differences of pitch, and even they share similar tonal characteristics, their attack, color, and loudness may differ. This intentional difference, or rather, *contrast*, gives the full stop a varied range of shades and vowels, colors and amplitudes, and ultimately defines its character. This is an important principle of voicing, and a common concern of voicers. Out of these contrasting features, I would like to briefly emphasize the contrast in loudness and strength. This contrast is produced not by making individual tones randomly louder or softer, but by creating a gradual dynamic shape over the range of the stop. Concerning this feature, Goebel, for example, suggests that the different regions of the fundamental Principal stops should not be given the same strength (Stärker). For him, the 16' and 8' Principal stops specifically should be quieter in the bass region, and should then grow in strength all the way up to the tenor and treble regions. He applies that same principle for the Gedackt and Rohrflöte, as well as for other open flutes.[24] In fact, I have experienced the same underlying principle in Studio Acusticum—quieter lower pitches, growing in loudness towards the higher regions.

To refer to this particular feature of voicing in this dissertation—and since I have not come across any definitive, established terminology for this matter—I will use my own terminology, and I will call it *dynamic contrast over the range*.

The pyramid principle

Finally, we should also consider the fact that stops are not only voiced individually, but also comparatively, since they are supposed to be used together in musical performance. Geobel's *pyramid principle*[25] suggests that the stops should be voiced comparatively, taking into account their pitch. When the voicing of an 8' foundation stop is com-

pleted, the voicer should then move to the nearest 4' foundation stop, making constant brief checks on how they mix or respond to each other. The process then follows logically to 2', and to 1', then to multi-ranked stops, and so on—hence the term *pyramid*, in regard to pitch. When building such a pyramid, the voicer also takes into consideration the type of stops that are combined (flue or reed), and equally importantly, their loudness.

Chapter 3

COMPOSING FOR AN UNFINISHED ORGAN: MAJOR INFLUENCES

> The unvoiced sounds I collected during the voicing process—never heard before—had qualities in themselves, and they too should be freely explored. In my view, this new sound experience required a very specific musical approach, a musical language of its own. I thought that this musical language should naturally emerge from that experience; the musical outcome should emerge from the sounds, and not the other way around. Given this, I concluded that musical composition was more likely to produce results that could faithfully reflect my experience of voicing and sound. I therefore saw composition as an interesting endeavor.[26]

Although I am educated as a concert organist, and my initial expectations for this project were more related to the practice of performing organ repertoire, I did end up following one other path of musical exploration, that of musical composition (besides the performance of repertoire)—for reasons I will highlight later, in chapter 8. The result of my involvement with voicing and musical composition resulted in the creation of the musical piece presented in this dissertation, titled *The wind in the word—memorized sounds of voicing* (attached DVD, tracks 18-24). The present chapter offers the reader a brief historical and theoretical overview of some of the philosophical-artistic currents that served as a reference to my musical composition practice in the context of this research.

1. SOUND ITSELF

My collaborative work with the voicer Gerald Woehl, and my involvement in the practice of voicing, led me to a specific approach to musical composition: *musique concrète* and sound collage. As I will demonstrate further on in this dissertation, the approach to listening adopted during voicing influenced my relation to sounds, and ultimately my own

compositional ideas. That relation developed out of a specific listening attitude, which consisted essentially of a focus directed towards sound itself. Back in March 2011, I wrote:

> Sound, its components, its behavior, its qualities. There is only sound… Imagine a two-hour voicing session with any stop, let's say the Flûte harmonique 8' on the Hauptwerk, and keep in mind that you will be sitting in the same place for the whole session, and that the same sounds will be played and repeated many times. What do you hear after 30 or 40 minutes? Do you still hear that so-called Flûte harmonique? Probably not. I myself can't hear it anymore, I lose track of any such concept, and I simply hear a tone filling up the space. It is from here that all departs.[27]

Naturally, this type of listening experience led me to the work of composers like Pierre Schaeffer and Luc Ferrari—and to some extent John Cage—with ideas rooted in acousmatic theory.

Acousmatic listening

The term acousmatic, from the Greek *akousmatikoi*, refers to the practice of listening blindly, of paying attention to the characteristics of the sounds only, without paying any attention to their source—who or what produced them, and how, or what they might mean or represent. Pythagoras used the term akousmatikoi to refer to his peculiar teaching practice of talking behind a curtain in order to encourage his students to pay attention only to his words, without considering his gestures, or facial expressions.[28] In the late 1940s, Pierre Schaeffer borrowed the term and employed the same principle in his compositional ideas and methods, which would later culminate in his groundbreaking theory of musique concrète.

1.1 First influence: Schaeffer's musique concrète

The idea of treating noises as material for musical composition—consequence of the futuristic ideas emerging during the 1910s[29]—along with the new technological advances made in the field of sound recording and radio transmission in the 1920s, paved the way for the emergence of electroacoustic music in the 1940s, and the theories of musique concrète later in the 1950s.

Frenchman Pierre Schaeffer (1910-1995) was one of the first to make use of the technological medium available back then, to explore sound, and to elaborate a new

theory of musical composition. Schaeffer worked as an engineer at the Office de Radiodiffusion Télévision Française in Paris (from 1936). There, he experimented first with phonograph discs (which allowed basic manipulations such as slowing down or speeding up playback) and later with magnetic tape (which allowed a wider range of possibilities for sound manipulation, such as playing backwards, cutting and reassembling material in any number of ways). Using (and experimenting with) this technology, Schaeffer arrived at an important new concept: *l'objet sonore*, the *sound object* (or sonic object). The idea emerged precisely from the experience of listening to recorded (and manipulated) sounds in a blindfolded, acousmatic manner. One listened to sounds for their own intrinsic properties, and not for their cause or pre-established meaning. This ultimately suggested a new listening approach—coined *écoute reduite* (reduced listening)—that focused on the experience of sound itself, abstracting it from its real or supposed cause, as well from the meaning it might carry.[30] Such technological advances offered Schaeffer a set of tools that allowed him to construct new music, music that could bypass the mainstream tonal and serial (atonal) aesthetics of the day, as he wished.[31]

After the 1940s, Schaeffer created and assumed direction of what was then known as the Groupe de Recherche de Musique Concrète (in the 1950s, exploring the emerging field of electroacoustic music[32]), and which later would become the Groupe de Recherches Musicales (from 1960s to the present day), all in Paris. From there, during the 1960s and 1970s, the world saw the emergence of the music and theories of composers such as Pierre Henry, Luc Ferrari, Guy Reibel, and François Bayle. In 1966, Schaeffer published his groundbreaking treatise, titled *Traité des objets musicaux* (Treatise on Musical Objects). With it, musique concrète became established as a theory and a method of musical composition. It gave Schaeffer's theoretical work a broad reach, to other composers and other schools of thought all over Europe and America.

Under the signs of Edmund Husserl

> For years, we often did phenomenology without knowing it.[33]

Schaeffer saw the connections between the technological medium and the acousmatic experience of sound. That, together with a new theory of listening and musical composition, was certainly one of his most original insights.[34] Those insights developed out of a close relationship with the phenomenology of Edmund Husserl—under the motto "to the things themselves"—a philosophical method much in vogue in France during the 1940s.

Husserl's phenomenology[35] (also called *transcendental*, or *pure*) emerges out of a critique of psychologism (sometime around the 1900s[36]), and the notion that objective scientific methods were sufficient to tackle human issues. Husserl's perspective was quite different; he believed that it is people's way of living in the world that should be examined, and not the outer world, conceived as something separate from the individual. For Husserl, life-world is precisely what individuals experience (pre-reflectively), before any conceptualization and categorization[37]—thus explaining why his phenomenology is called transcendental[38]. Based on this premise, Husserl developed then a method of investigation that aimed to reach deep down to examine the essential—pre-reflective, pre-conceptual—stratum of individual experience. The method requires first an a priori awareness of established presuppositions associated with phenomena. Once those presuppositions are acknowledged, they are then to be gradually excluded, or temporarily bracketed-out; only then can experience be observed in its essential form. Note the explanation given by Moustakas:

> Phenomenology, step by step, attempts to eliminate everything that represents a prejudgement, setting aside presuppositions, and reaching a transcendental state of freshness and openness, a readiness to see in an unfettered way, not threat by the customs, beliefs, and prejudices of normal science, by the habits of the natural world or by knowledge based on unreflected everyday experience.[39]

The exclusion of such presuppositions is done through a set of procedures included within the overall phenomenological reduction—Husserlian terminology includes the bracketing (*epoché*), the physiological reduction, and the phenomenological reduction.[40] Through such a complex set of procedures, the object of experience is eventually reduced, and its essential properties revealed.[41] Only then can epistemological certainty be attained. The idea of the écoute reduite, first introduced by Schaeffer in his theory of musique concrète, is essentially a phenomenological reduction to listening. When Schaeffer suggests applying *epoché*, he is suggesting, more specifically, the bracketing-out of any spatial and temporal causes from that experience. After the reduction, all that is left is the acousmatic,[42] which ultimately is sound reduced to the field of hearing alone. The focus of the listener shifts considering the cause of the sound (the context[43]), to the content of perception itself (hearing itself)—sound itself.

Another key concept of phenomenology, both relevant to Schaeffer's theory of musique concrète and essential for understanding the sound object, is *intentionality*. The concept derives from the idea that consciousness is always directed towards an object that is not itself conscious;[44] it is precisely the essence of experience which is to be directed at, to be aimed at. In Husserl's words, "intentionality refers to consciousness, to the internal experience of being conscious of something"; to which he adds, "the act of consciousness and the object of consciousness are intentionally related."[45] This means that intentionality includes the whole process of experiencing (focus towards an object) and is constituted by both the conscious intention and the object of consciousness. Back in Schaeffer's musique concrète, we see that the sound object is precisely an intentional object of consciousness. After the acousmatic reduction, what is found is an entity which does not exist in itself, in the physical world, but only as the result of a human intention. This means that the sound object is not the physical signal, but its *correlate* object of consciousness; in Schaeffer's view, the sound object is "a perception worthy of being observed for itself."[46] Kim-Cohen writes:

> For Schaeffer…the sound object precedes any aural experience of it as "signal": "it is the sound object, given in perception which designates the signal to be studied;…it should never be a question of reconstructing it on the basis of the signal." The sound object is proposed as the ideal and objective form of the signal; the essence of any given heard-thing.[47]

Four listening modes

Schaeffer's theory proposes then four modes of listening. The modes were conceived to identify the correlation existing between the object of consciousness and the physical signal (and ultimately, to be used when studying his own music). Those modes are: 1. *Écouter*—the act of listening with intent to identify the cause of the sound; it is a form of information-gathering. 2. *Comprendre*—a form of meaning-gathering; that is, sounds are heard as communicative signs, as is the case with natural languages. For example, we not only perceive vowels and consonants (concretely), but we also listen to the meaning of words and sentences, and ultimately, we understand ideas. 3. *Ouïr*—the most inattentive form of listening. It is to perceive with the ear, to be struck by sounds. It resides at the most elementary level of perception. 4. *Entendre*—a selective, conscious way of listening. No attention is paid to the source or its meaning; there is only an active interest in sound itself, and how it appears to the ear.

1.2 Second influence: Luc Ferrari's son memorisé

In 1976, Schaeffer invited Luc Ferrari (a French-born composer of Italian heritage) to join the Groupe de Recherche Musicales in Paris. Both Ferrari and Schaeffer shared an interest in recorded sounds, and both praised the freedom that recordings and studio techniques offered from compositional orthodoxy. But Ferrari would soon depart from Schaeffer's well-established ideology of musique concrète and introduce a new perspective on electroacoustic composition. Whereas Schaeffer kept his compositional approach fundamentally linked to the idea of the sound object, as the primordial entity to be detached from any source, Ferrari would conceive sounds as entities connected to the world, to be connected to places, people, cultures, emotions,"to social, political and sentimental life."[48] Ferrari explains:

> From 1963 on I listened to all the sounds which I had recorded, I found that they were like images. Not only for me who could remember them, but also for innocent listeners. Provide images, I told myself, contradictory images which catapult in the head with even more freedom than if one really saw them. Play with images like one plays with words in poetry.[49]

If Schaeffer's ideas on sound paralleled Husserl's essential phenomenology, then Ferrari's conception of sound shared a closer connection to Merleau-Ponty's cultural phenomenology, which, in contrast to Husserl's phenomenology, accepts phenomena as "the permanent data of the problem which culture attempts to resolve."[50] This means that, contrarily to Schaeffer's acousmatic attitude, sounds are not completely detached from their meaning, neutralized as sounds themselves, but they are very much connected to any given social, cultural construct. In Ferrari's conception, the placement of the sounds in the composition may be determined precisely by the composer's own perspective of that social construct, or reality. Distinguishing himself from the conformism of musique concrète, Ferrari called then his approach to composition, in a humorous spirit, musique anecdotique. Though light-hearted, that definition did in fact illustrate some of the issues at play in his practice. His compositions were indeed more anedoctal than concrete, because sounds maintained a connection to the overall situation and the narrative from whence they were extracted. There, sounds were more like beings-in-the-world; they reflected, meaningfully, the situation in which they were recorded.

Ferrari has also referred to his tape compositions as *son memorisé* (memorized sound)—sounds were memorized in the technological medium, not as concrete materials, but as memories of past events and places. Ferrari's compositions may after all be

viewed as pieces of documentation, of reportage. Note his own thoughts on the composition of *Presque Rien No.* 2 (1977), where he went as far as to add his own narrative perspective upon the things being recorded, while walking around a village in Switzerland:

> There was also the idea of the walker/observer, who realises what he's recording and adds his ideas. In fact there's true and false involved—there are some things which were added for dramaturgical reasons, some commentaries which are completely bogus! In any case, playing with truth and lies is what makes up the concept…putting the walker inside the recording process and recognising him as a person, led me to think: "There are these natural sounds, and I'm going to make sounds too, incorporate a symbolic transcription of what comes into my head and then intervene as composer.[51]

1.3 The influences in the Wind in the Word

I saw the connections to Schaeffer and Ferrari when I began to conceive *The wind in the word*, not before. My compositional process and the ideas emerging during that process were gradually influenced by my experience of voicing. In *The wind in the word*, we find the first connection to Schaeffer mainly in my relationship to sound and listening. As highlighted above in this chapter, the experience of voicing led me toward a focus on sound itself. This was an approach different from from the one I had had before starting this project, and before engaging with voicing. Through the process of voicing, I became aware of sounds as objects, as materials devoid of pre-established meanings and other sorts of connotations—note the Flûte harmonique example, quoted above. Thus, in the process of composition I became less concerned with matters of language (meaning), and more concerned with the characteristics of the sounds (concrete) and with my own experiences of those sounds.

The connection to Schaeffer and musique concrète may be also seen in the techniques and materials used for the act of composition: the technological medium. The recorded sounds of voicing were edited—spliced, reversed, combined, etc.—digitally, using computer software. *The wind in the word* is, in the end, a sound collage.[52]

Ferrari's concept relates to my work in the way that the work offers a personal perspective upon the experiences lived in the context of voicing. The piece is not meant to be received as something detached from the context (aesthetic, cultural, social, etc.)

from which the sounds were extracted. Rather, it is intended to present a documentation of those sounds and lived experiences. To some extent, *The wind in the word* is a (musical) narrative of my own experience of voicing. That experience is embodied in the materials that make the piece—since I used my documentation material from the voicing sessions for composition—and in the way those materials are structured in the piece. Note my own thoughts on my musical work, extracted from chapter 10:

> What is offered in this musical work is a reproduction, in digital format, of the sounds heard and collected in voicing. We may trace a parallel with photography, where only a frame of the lived experience is captured, and only visually. Using this analogy, I might say that my artistic process consisted of collecting, selecting, cutting and framing those photographs. The result resembles a scrapbook of memories. These organized memories now offer the listener the opportunity to listen to something that is in the past and cannot be experienced again live… In regards to language, the motives and organization of ideas in the piece relate to my experience of organ voicing. Among those I must highlight the following three: repetition; stillness; silence.[53]

Chapter 4

FIELD OF RESEARCH AND METHODOLOGY

As already mentioned in chapter 1, my creative process of music-making—composing, performing, writing, reflecting etc.—has not developed unstructured, but has in fact emerged within a specific research academic context. The present chapter contextualizes my research methods; it describes the way I made my observations, my immersion in the field of voicing, and the voicer-musician collaboration.

1. THE FIELD OF ARTISTIC RESEARCH[54]

A branch of qualitative research

The field of artistic research, broadly speaking, shares common traits with other disciplines in the realm of qualitative research, be it in the methods employed, or in the overall goals set. One of the central aspects of qualitative research is that it places the researcher *in* the world, not *outside* of it. The researcher is like an observer who collects and interprets his or her own experiences *in* that world. Note Denzin's definition:

> Qualitative research consists of a set of interpretive, material practices that makes the world visible. These practices transform the world. They turn the world into a series of representations, including field notes, interviews, conversations, photographs, recordings, and memos to the self. At this level, qualitative research involves an interpretive, naturalistic approach to the world. This means that qualitative researchers study things in their natural settings, attempting to make sense of, or to interpret, phenomena in terms of the meanings people bring to them.[55]

Artistic research seems to emerge from an existential stance, where the artist, the individual, becomes the point of focus in the research. The artist-researcher reflects upon (in and through) his own practice, and is invited to reflect and to become aware of the relations and interactions emerging from that practice, both in relation to himself (body,

language, skills) and in relation to the surrounding environment. In this case, the borderline between researcher (subject) and researched (object) becomes blurred.[56]

From a methodological viewpoint, qualitative research allows for a diversity of theoretical, analytical, and epistemological frameworks,[57] and allows the use of data in various formats—text, image, sound, or others.[58] Similarly, in artistic research, the methods employed may vary according to the needs of the research project and the artistic practice itself, thus allowing the combination of different methods of research,[59] or what may be referred to as *methodological pluralism*.[60] Such methodological pluralism (which also permits material diversity) is essential to artistic research, simply because artists and their practices cannot be subjected to any predefined or pre-established methodologies; there can be no a predefined account of the goals that are to be set for each art and each artist. Ultimately, this means that artistic research offers the artist-researcher an open path for individual discovery and artistic exploration; ultimately, that individual exploration becomes the methodological path in research.[61] Borgdorff writes:

> Characteristic of artistic research is that art practice is central to the research process itself. Methodologically speaking, the creative process forms the pathway (or part of it) through which new insights, understandings and products come into being.[62]

This characteristic of artistic research is visible in this dissertation. At the very beginning of this project, there was little more than an expectation in regards to methodology; it was my involvement with the object of study that guided the development of a more solid methodological and artistic approach. I have consciously let myself be personally involved with the object of study: organ voicing, and I have allowed this involvement to influence and guide my own musical research practice. The reflections I am bringing here are certainly not detached from my involvement with people, the surrounding environment, and the practices approached during this study. Rather, all of that has influenced my path of research and artistic creation, ultimately "…attempting to make sense of, or to interpret, phenomena in terms of the meanings people bring to them"—myself included.

The value of the work of art

The result of a piece of artistic research, then, is articulated not only as a text but also as an artwork—the question of whether an artwork alone may be accepted as the sole result of an artistic research project is still hotly debated.[63] In traditional research, the

text is the primary source of information; the verbal description of facts, thoughts, theories and concepts serves as a clear articulation and communication of knowledge, in systematic form. In artistic research, however, the content of the text should be deeply intertwined with artistic practice, often a finished artwork; neither is not more important than the other; both, considered together, constitute the outcome of the research. But if the text may provide verbal accounts of lived experiences, thoughts, theories, explanations and such, what is the role of the work of art in this context? What value does it have in research?

From a broad epistemological perspective—not exclusively confined to the context of artistic research—Johnson (2011) argues that the value of an artwork lies precisely in the way it expresses the meaning of experience, and how it explores, imaginatively, the ways in which the world is or might be. Drawing on Dewey,[64] he proposes a shift of paradigm away from the traditional view of knowledge, as an objective fixed body of propositional claims, and towards experience, as a wider dimension which includes everything that is "thought, felt, hoped for, willed, desired, encountered, and done."[65] For Johnson, the act of creating an artwork is like an ongoing exercise in how to remake experience and enrich meaning. He offers an interesting example:

> [C]onsider van Gogh's famous *Starry Night*. We might suggest that van Gogh's painting could be a form of *research through art*, because it presents a certain vision of astronomical phenomena. But, although perhaps true, this cannot be a very enlightening thing to say about *Starry Night!* What seems more significant is the way the painting powerfully enacts van Gogh's organic vision of the universe as a whole. *Starry Night* presents us with a living, pulsing, growing world. It invites us to feel, qualitatively, this vitality of the cosmos. It *represents* a village under a starry sky, but it *presents* a way of being in and inhabiting a world. And that way of inhabiting a world is a legitimate form of knowing how to get on in the world. It gives us a vision—an understanding—of the nature of our cosmos, our world, our situation…The artworks exist as enacted in and through us. That enactment is a way of organizing experience. That particular way of engaging a world can be a form of knowing, and it can be more or less successful in helping us carry forward our experience.[66]

On this matter, and having this artistic research experience as a background, I myself realized that one of the aspects that concerned me the most while developing my ar-

tistic work was *communication*. One of the goals I had set for the musical works was precisely the goal of communicating knowledge—lived experiences, materials, and points of view collected in research. I saw my role of artist-researcher as being to observe and collect knowledge, with the ultimate goal of bringing such knowledge to the awareness of others, by exploring the very medium in which those things ought to be communicated, and even, if necessary, by creating other original mediums better suited to the knowledge to be communicated.

During my research, I have been surrounded by sound and voicing, and that is part of the knowledge I intend to communicate. But because our bodies are different, because our abilities are different, I cannot deliver intact my knowledge of listening and voicing to another self, to another body. Now, this is one of the points where, in my view, the work of art becomes a valuable asset in research, in the way that it allows the exploration and expression of human experiences in creative fashion, in new formats, and through original mediums. This means that knowledge may be communicated not only as solid theories and facts (verbalized as text), but also through forms of *resonance*, or *enactment* of experiences, brought by the artist to the awareness of others through the artwork. In this case, and since I cannot deliver my experience of voicing intact, it is the artwork (in the attached recording) which offer a resonance of that experience of sound and voicing, by bringing the listener to the center of his or her *own* experience of sound and voicing. It is the artwork which makes possible that resonance, that communication. In my view, the passionate artist is one who wishes to make that encounter possible, and investigates further the implications of that encounter. Regarding the artistic outcome of this dissertation, I wrote:

> The work presented here should speak for itself. The listener should become aware of his experience himself, and ask questions himself. In my view, no verbal explanations should intrude upon the personal experience of the work. There is no such thing as a correct or specific way to listen or appreciate sound. Each listener has his own experience and draws his own conclusions… Just as I heard voicing, silently sitting in the room, the listener is invited to do the same, to listen and become aware of his own experience of sound and listening.[67]

It seems to me that this idea concurs with Johnson's—and Dewey's—perspective on the value of the work of art, and even more clearly so when both refer to *enactment*, underlining the fact that art does not explain or describe, but rather presents.

> Art [in Dewey's view] does not so much *describe* or *explain*; rather, it *presents* or *enacts* the qualities, meanings, and values of a situation.[68]

A word on tacit knowledge

Let us keep the connection to organ voicing alive. Let us consider for a moment Goebel (1967), where in the *Zum Geleit* to his treatise is written:

> [F]or centuries, the art of voicing was transmitted orally from the master to the apprentice: the master voiced a pipe and told the apprentice: "So, now it is good; it has to sound like that, listen to it and do the same"; and he gives him some hints. No explanation can replace one's own hearing. "It is about such subtle things", says J. Goebel, "that one cannot explain them."[69]

This is certainly a good point of departure for some of the theoretical ideas approached in this dissertation, which I will get back to at the end of this section. To start, there is something else about voicing that goes beyond the Aristotelean notions of *techne* and *episteme*.[70] In fact, there are aspects of doing and knowing voicing which one cannot fully articulate with words. Knowing how to voice an organ cannot be simply reduced to matters of skill and theory. I recall a conversation with voicer Gerald Woehl in the beginning of 2014:

> When you voice, you are listening into the tone, so to speak, and when you are listening to someone play, it is the opposite: you hear what is coming out of the tone. First you listen into the tone and then you see what comes out. You could say it's the exact opposite. So you're observing, and of course you hear exactly what has to happen now—is the pressure too strong, or what you still have to do overall. I would say these are two totally different ways of listening.[71]

After Gerald's remark, I immediately asked for a description of that which is in the tone, to which he replied, "Oh, that's hard!" Certainly, whatever it is that is in the tone is something very personal, and lies beyond or on the border of the conceptual. It is this type of personal knowledge which is at the core of the voicer's personal motivations and cannot be simply communicated, or easily expressed. It is a form of embodied know-how; it is tacit.

The concept of *tacit knowledge* was introduced by Michael Polanyi in his groundbreaking *Personal Knowledge* (1958). It defies some of the epistemological views held by positivists up to that time. The distinction between the positivist perspective on knowledge and the one suggested by Polanyi is essentially that the first assumes that knowledge is an objective entity which can be codified into explicit facts by cognitive processes in the human brain, and the other sees knowledge as an ongoing process, embedded in practices and impossible to disembody and turn into objective form.[72] Depending on the perspective one holds on the matter, different methods of enquiry and different areas of research may be given more relevance within certain views and less or none within others. From an epistemological positivist viewpoint, for instance, the whole notion of tacit knowledge is senseless, since from that perspective knowledge is constituted by that what comes to be known, and that what is known is what is believed, verified, explainable, and ultimately justified by reason.

But Polanyi's view does not completely discard the objectivist's view; he merely claims that other forms of knowledge exist and should be observed, considered, and further examined. For him, true facts are in fact attainable through reasoning and logical deduction—to what he calls *explicit knowledge*—but knowledge cannot simply be reduced to that objective, justifiable, explicit truth; the scope of human knowledge is much broader than that, as is implied in his well-known remark "we can know more than we can tell."[73] The tacit dimension thus includes all those embodied know-hows which simply cannot be verbalized or justified. Those processes of knowing cannot be communicated, and even if they theoretically could be, they would become factual and explicit the moment they were verbalized. Koivunen writes:

> Tacit knowledge includes all the genetic, bodily, intuitive, mythical, archetypical and experiential knowledge the human being has, even though it cannot be expressed by means of verbal concepts. Tacit knowledge is present in the human being as a whole: it includes manual skills, knowledge of the skin and of thoughts. Tacit knowledge present in the individual guides his or her choices in the information flow.[74]

Tacit knowledge is action-oriented, it is actually an activity that can be described as *the process of knowing*. That process of knowing is dynamic (while doing), and it differs from *static knowledge*, which is focal-oriented. Once we stop doing whatever it is that we are doing (tacitly), and try to describe or reason about that experience of doing, we shift to the focal dimension, and therefore we leave the tacit. Tacit knowledge is intuitive,

embodied, alogical, and unconscious, and therefore indescribable and incommunicable. That said, we may now reconsider Goebel's (and Woehl's) remark, quoted above. There are certain aspects of voicing that clearly stand at the tacit level. Voicing is not only learned in theory (explicit knowledge); it is also learned through a process consisting on the gradual embodiment of tacit experiences.

2. Methodological approaches

The ethnographic model

In this study I have used a variety of methods; there is, so to say, a *methodological pluralism*.[75] It is possible, however, to find here a connection to *ethnography*, which is itself a type of research methodology that allows precisely a variety of methods and data-gathering techniques, depending on the goals set by the researcher and the specificities of the research.[76] As already highlighted in this introduction, the goal set for this research was to gather a considerable amount of data, with intent to shed light on the subject of organ voicing and its implications for musical performance, ultimately aiming at the creation of new artworks. Those goals were pursued from the perspective of the artist, myself, and the ethnographic model was used, applied to the field of artistic research. There are three main methodological frameworks here: fieldwork; collaboration; auto-ethnography.

2.1 Fieldwork

Fieldwork is the hallmark of the ethnographic model, and is characterized by a type of continuing, long-term immersion in the field of study. The researcher doing fieldwork must be located in the research site with the intent to collect data, using for that purpose a set of observation and documentation strategies. Those strategies include the choice of materials used for data-gathering and the role played by the researcher within the field of study. In this study I have fulfilled the role of *participant observer*,[77] which is a field strategy that combines document analysis, interviews, direct participation, observation, and introspection. In this role, the researcher is usually immersed in the community of study, and takes part in the activities of that community. Such participation may vary in type and intensity. Savin-Baden & Major (2013) distinguish five levels of participation, presenting them on a scale beginning with least involved (*peripheral participation* and *passive participation*), passing through an intermediary level (*balanced participation*), and ending in most involved (*active participation* and *complete participation*). My level of

participation was somewhat moderate, which within this model may be defined as balanced participation. It is described by Savin-Baden & Major as such:

> In balanced participation, the researcher strives to find a balance between the role of insider and outsider, participating occasionally but not fully. For balanced participation, the researcher joins in any activities that others do but not all of them…It requires the researcher to remain aware of the balance to be achieved as insider and outsider simultaneously. It also at times requires withdrawal from the site to retain the outsider role.[78]

In this study, my immersion in the field consisted of regular visits to the concert hall, with intent to observe and participate in the process of voicing. Over a period of roughly two years and three months, between August 2010 and October 2012, I visited the hall almost on a daily basis. My role as participant developed mainly within the practice of organ voicing, where I have been active as a kind of resident musician, available to play the instrument whenever necessary. My participation is considered balanced—not active or complete[79]—because I was not fully immersed in all the activities related to voicing or the building of the organ. I was in the field as an observer from the outside, as a musician interested in knowing something specific, and applying that knowledge to my own artistic practice; not as a voicer or a builder. In the field, roles and professional competences were clear and distinct.

Techniques and principles of observation

The techniques and principles of observation employed in this study evolved over the period of research. I first started observing things from a very broad perspective, applying a type of observation which was generally unstructured and exhaustive,[80] which developed alongside the needs and specific nature of the study, gradually evolving towards a more focused and selective[81] approach. After some time, I decided to keep in mind two major sets of observation principles, one concerning the type of data that was selected in the field (1. *what* data should be collected), and the way in which that data was documented (2. *how* should that data be described and organized).

The most important principle for observing and selecting information (1. *what*) was to keep in mind the topic of this study—not to navigate away from it—with the intent to focus on those things happening *in* the concert-hall, taking note of Gerald Woehl's practice on site, as well as my practice. Having this as a guideline, I privileged three main

settings in my observations: the voicer in his practice, while voicing the pipes; the moments of collaboration happening in the room; my own practice while experimenting with the sounds of the organ.

The principle used for description (2. *how*) was: describe facts; keep it simple, avoid being theoretical or explanatory, and avoid drawing conclusions on site. I documented the practices and interactions using a diversity of research tools and materials, including: field notes; sound recordings; interviews; photos.[82] From all of these documentation tools, field notes and sound recordings were the most relevant to this research.[83]

2.2 The collaborative stance

In addition to the traditional ethnographic research model, this project also adopts a collaborative approach. The voicer-musician encounter inspired the creation of new perspectives and new musical compositions, and opened space for new possibilities. From the very beginning of the project I made myself available to participate in the process of voicing, as a musician. Within this setting, Woehl and I shared our visions and discussed the characteristics of organ sounds as well as aspects of our own practices. There was a friendly exchange of services and competences. A sort of informal working relation emerged, and both Woehl and I assumed working positions that enabled open collaboration. We were both involved, to some extent, in each other's artistic processes.

From my perspective, as a musician, this was relevant in that it stimulated self-exploration and self-discovery, in a totally new and unexplored environment. It also allowed me to view the organ, as a musical instrument, from another perspective. For Woehl, I assume that my musical performance provided more technical assistance than artistic guidance, and this happened because the research was carried out in his own familiar working environment. I was the outsider, searching for new knowledge and new insight. The type of collaboration that emerged from this interaction may be seen as a form of *complementary collaboration*. This is, according to John-Steiner, the most widely practiced form of collaboration. She writes:

> [Complementary collaboration] is characterized by a division of labor based on complementary expertise, disciplinary knowledge, role and temperament. The insights that collaborators provide for each other may pertain to their craft, to their respective domains, or to their self-knowledge as creators. This is particularly true when the collaboration involves

> complementarity in scientific fields or in art forms. Differences in modalities - the translation of one's thoughts into a new language of expression or into the developed mode of expression of one's partner - are part of this rewarding process.[84]

Within that definition, John-Steiner also later states that "…in complementary collaboration participants negotiate their goals and strive for a common vision." But that does not apply here. We did not strive for a common vision, since we did not voice one organ together, and neither did we perform music or compose new pieces for the organ together. We borrowed each other's technical skills and shared visions within our own processes, aiming at two specific (yet related) artistic products: a completed musical instrument on the one hand, and musical compositions and performances developed using experiences gathered from voicing on the other. I would say that there were two parallel visions and two parallel goals. At some points in the process, those parallel lines shifted, with the intent to intersect (and influence) each other; but there were also periods of time during which those lines stayed on their own individual paths.

2.3 Auto-ethnography

Finally, my collaboration with Woehl was a platform for self-discovery and self-reflectivity, and it had a considerable impact on my own artistic and personal growth. After all, I have experienced myself in the context of organ voicing, as well as in the context of the collaboration with the voicer, and I have documented those lived experiences. Through writing, and to some extent even through sound recordings—and parallel to the *describe facts* standpoint highlighted above—I have also documented most of my emerging ideas, feelings, reflections, artistic visions, and experiments, as well as my working methods and schedules. For the purpose of this study, I have also observed myself in my own creative process, and I have reflected upon my own artistic practice and lived experiences in these settings. Here, I too am an object of study.

> Auto-ethnography generally is an approach in which researchers draw upon their experiences, stories and self-narratives to examine and connect with the social context. It is a form of self-narrative that places the self within a social context and includes methods of research and writing that combine autobiography and ethnography. In reality, a researcher who uses auto-ethnography writes in the first person and features dialogue and self stories. The idea is that a researcher uses his or her own

> experiences as the only primary data, interpreting his or her self in the world and cultural context, in relation to others.[85]

This explains why this monograph is presented almost always in autobiographical narrative form, where things are described and presented from my personal perspective, narrated in the first person.[86]

Chapter 5

CONTEXTUALIZING THE ORGAN IN STUDIO ACUSTICUM

Unlike any other musical instrument, an organ is always conceived exclusively to fit a specific purpose. Very rarely is one instrument an exact copy of another, even if built by the same builder. That distinctiveness is the result of the varied choice of styles and building techniques that have been evolving throughout history; a history which spans more than 2000 years. An organ is always the result of a specific artistic vision, or the result of a combination of different perspectives. The organ in Studio Acusticum is no exception. The vision of an instrument that enables the performance of music from the past, present, and future underlines this point very clearly. The instrument is built upon an eighteenth-century central German concept (the core of the instrument), with a French romantic Récit, expanded with numerous stops from different Romantic and symphonic traditions, and with percussion stops and other innovative features as well. Considering this scope of styles, and the fact that part of the artistic output of this dissertation explores some of the stylistic faces of the instrument—in chapter 12, in relation to the performances recorded in the DVD (track 25-32)—I found it convenient to add here a brief historical contextualization of those styles.

1. THE EIGHTEENTH-CENTURY CENTRAL GERMAN ORGAN

The eighteenth century is usually referred to as the Golden Age of the pipe organ. All over Europe, quite apart from the marked stylistic differences between the Protestant countries (with powerful, massive instruments), and the Catholic ones (with a refined taste for color and sound effects), instruments grew larger and louder, and were generally provided with a broader and richer tonal palette.[87] The eighteenth-century Central German[88] organ building style, more specifically, which is at the core of the organ in Studio Acusticum, is well represented in the works of builders such as Gottfried Silbermann (1683-1753) and Zacharias Hildebrandt (1688-1757).

Silbermann's instruments are considered the reference par excellence of the style. His instruments present manual combinations of Hauptwerk, Oberwerk, and Brustwerk, rejecting the Rückpositiv (which was otherwise common in organs in central Germany). Silbermann himself described the sound of his Hauptwerk as "large and grave," the Oberwerk as "sharp and penetrating," the Brustwerk as "delicate and sweet," and the Pedal as "strong and penetrating."[89] His organs also introduced a broader, perhaps almost 'international' tonal perspective—by the lights of that time. Although his instruments are essentially German, French influences (and to some extent Italian) are evident: wide-scale mutation stops, large-scaled open Cornets, stronger reeds, and the use of French nomenclature (Trompette and Clairon), all suggest the French influence. This is no surprise, since Gottfried had learned the craft from his older brother Andreas (1678–1734), who had studied with François Thierry in Paris (as well as with Casparini, an Italian-trained Silesian with his workshop in Görlitz, Germany). Gottfried himself spent two years in Paris, also at Thierry's workshop, from 1704 to 1706. The organs in Freiberg Cathedral (1710-1714), the Ponitz Dorfkirche (1737), and the Dresden Hofkirche (1755) are all remarkable examples of Silbermann's exquisite work.

Zacharias Hildebrandt (1688-1757) came to be known as Silbermann's finest student. I recall playing Hildebrandt's organ in Störmthal (1723) a few years ago; it is a small instrument with one manual and 14 stops. I remember the sounds being generally broad and present. The bass region was profound; the mixtures were sharp, yet not brilliant; the wind felt slightly irregular, and gave the sounds a life of their own; the flutes were dark, well-rounded, and sweet. Among other important instruments built by Hildebrandt we might especially mention the organ for the Nikolaikirche in Langhennersdorf, near Freiberg, built in 1722, with two manuals and Pedal, and 22 stops.

Links to J. S. Bach

The professional collaboration between Hildebrandt and J. S. Bach may have been a close one, and it might have led to Hildebrandt's relocation to Leipzig in 1734, where Bach was Kantor at the Thomas Church. Bach's recommendation might have influenced the decision to give Hildebrandt the commission to build the organ for the Wenzelskirche in Naumburg, in 1743–46 (with three manuals and 53 stops), which is what some scholars believe to be the closest available to what Bach may have wanted an organ to sound like;[90] Bach himself was involved in the planning and designing of that instrument. In 1723, Bach also examined Hildebrandt's organ in Störmthal which is still preserved in close to its original condition.[91]

Another builder in the style who also had links to J. S. Bach is Tobias Heinrich Trost (1680-1759), who built the organ at Altenburg (1735-39), with two manuals and pedal and 37 stops, which Bach played in September 1739. Bach remarked then that the organ was durably built, and that each stop was voiced with "the proper tone quality and delicacy."[92]

With this in mind, we should now recall that Gerald Woehl was the builder chosen to build the relatively new "Bach-Organ" (2000) in the Thomaskirche in Leipzig, with four manuals and pedal, and 61 stops.[93] Gerald Woehl's expertise and skill in this field is unquestionable. The organ in Studio Acusticum has also several stops based upon the building concepts of Silbermann and Hildebrandt.

2. Second technological revolution and the influence of Cavaillé-Coll

The industrial revolutions of the eighteenth and nineteenth centuries set a new course for Europe (and the world), and so too for the organ. Organs and technology had always gone hand in hand. If the invention of pallets, trackers, and sliders by the end of the fifteenth century—which had freed the organ from the stiff Blockwerk, giving rise to the so-called Werkprinzip—could be seen as a first great technological revolution, then the invention of electrification and line production in this period could perhaps be regarded as the major cause that set in motion the organ's second major technological revolution.[94]

Frenchman Aristide Cavaillé-Coll (1811–1899) was certainly the most influential builder of the nineteenth century. His ingenious work was not limited to the revolutionary introduction of the pneumatic lever,[95] first employed in St. Denis (Paris, 1841); he was also responsible for many other inventions that deeply transformed the organ as it had been conceived for nearly 200 years. His contribution influenced the way the organ functioned as a machine, and ultimately influenced the way it was used as a musical instrument. His instruments are characterized by the warm and seductive *Jeux de fonds* (Montre 8', Flûte harmonique 8', Gambe 8' [or Salicional], Bourdon 8'), and brilliant harmonic reeds, conceived upon different wind pressures throughout the range. Harmonic stops (flutes and reeds), which though they were not his invention were perfected by him, were built to double length, and became iconic symbols of his work.

Cavaillé-Coll's aesthetics emerged, to a great extent, out of the earlier French Classical organ. He expanded the Récit to full compass, with more stops, and enclosed

it within a swell box; this became the *Récit expressif*. The Positif became a more discrete division, and mixtures were set aside there. Generally, string sounds (and a céleste) were included, and cornets and mutations fell out of style. His organs were also provided with the *Jeux de combinaison*, which was a rudimentary, yet ingenious anticipation of the combination systems developed later on, and with parallel reservoirs for wind supply, which made the wind stable.[96] The implications of all this for the sound produced by the pipes, as well as the touch from the keys, was indeed revolutionary.

I should now remark that the organ in Studio Acusticum includes a Récit division that is reminiscent of Cavaillé-Coll's aesthetics. In fact, that division is based upon Cavaillé-Coll's original disposition for Ste. Clotilde (Paris, 1859).

Symphonic decay

The transition to the twentieth century was marked by a multitude of new styles and new ideas. From the second half of the nineteenth century up to the twentieth century—much influenced by the advent of electricity—builders in Europe and America found new resources available to enhance the power of the organ, its dramatic contrasts, its diverse orchestral effects, and its overall expressive flexibility. Organs were provided with steam-powered, hydraulic, and electric blowers, and they were given high wind pressures and more chests and divisions than ever before. Organs became very large machines, and by the end of the nineteenth century, pipe organs were being built in factories, first in America, and then in Europe.

Performers also experienced changes at the console. The first combination systems appeared, together with crescendo pedals (and the *Rollschweller* in Germany) pneumatic thumb pistons (patented by Henry Willis in 1851), relief pallets for lighter touch at the keys, electric action, and the first detached consoles. The organist had thus a set of tools available at the console that provided greater control over registration and overall expression. It was, however, precisely at this point that performers lost physical contact with the sound-producing parts of their instrument—mostly due to the introduction of electric-pneumatic action. The performance of music became something detached from the mechanical behavior of the instrument; and it was precisely this aspect, among many others, that would soon lead the organ into a period of reformation. Those reform trends first started in Germany, and later spread all over Europe and America.

3. Reform trends in the twentieth-century

The most important reform movement in the twentieth-century is known as the *Orgelbewegung*,[97] with the English equivalent *Organ Revival*, or *Organ Reform Movement*. Although the term is often used to refer to one greater movement that developed throughout the twentieth century, we may distinguish several lines or phases along which it developed.

The Alsatian reform movement (1910's)

The most iconic figure of the so-called *Elsässische Orgelreform* was the German medical doctor—and philosopher, theologian, organist, Bach scholar, and Nobel Peace Prize laureate (1952)—Albert Schweitzer (1875–1965). Schweitzer, along with Emil Rupp and others,[98] was instrumental in starting this movement, which was triggered by his articles published in 1905–06 under the title Deutsche und *Französische Orgelbaukunst* (German and French Art of Organ-Building). The movement aimed essentially at reinstating the principles of classic organ building, thought to consist of the construction of organs suited to the performance of J. S. Bach's organ works—"which, personal tastes aside, can hardly be maintained as a logical starting point."[99] More generally, however, Schweitzer defended a return to mechanical action, saying:

> The best method of connecting the keys with the pipes is a purely mechanical one. On an organ with such a mechanism, phrasing is easiest.[100]

He also argued for lower wind pressure, slider chests, and a reduction of the number of stops in the specification. This return to the artistic values of the past included a return to organ building ateliers, rather than the factories that had been developing in recent decades. Schweitzer considered Cavaillé-Coll's workshop, then run by Charles Mutin, a good example to follow.[101]

The German Orgelbewegung (1920s)

The interest in the work of artists from the past became even more accentuated from the 1920s onwards in Germany, specifically. Conferences were held to discuss the place of the organ in contemporary European culture, as well as matters of organ-building and design. The Freiburg conference of 1926—led by Christhard Mahrenholz[102]—marks the beginning of what could be referred to as the German Orgelbewegung, which would later lead to a surge of interest in Europe and North America. During the 1920s and 1930s, German publishers reprinted organ treatises by Werckmeister, Praetorius,

Biermann, Adlung, Schlick, and Bédos de Celles, among others. New instruments were built using the nomenclature, stop lists, and pipe scalings in these earlier treatises, as well as measurements taken from surviving historical instruments.

An interesting and well-known experiment that relates to the ideas of the Orgelbewegung is the Praetorius organ built by Wilibald Gurlitt and Oscar Walcker in Freiburg (1921).[103]

Eclectic tendencies (1940s)

Parallel to the revivalist currents emerging in Germany and spreading throughout Europe around the 1940s, the world saw the gradual development of an eclectic style of building, based on the idea that one single instrument should be suited to play music from different times (past and present), and different areas (notably France and Germany, and eventually others). The primary motivation for the emergence of the eclectic organ was the organist's growing need to perform repertoire from different schools on the same instrument. Builders seemed to have adopted a more or less standardized concept, a type of instrument usually conceived around a universal Hauptwerk (Manual I, containing stops from different traditions), a German Baroque Positif (Manual II), and a French Récit expressif (Manual III).[104]

Postwar Orgelbewegung (1960s)

The aesthetic tendencies seen in building between the 1960s and 1980s could be considered the last phase of the Orgelbewegung, also referred as the postwar Orgelbewegung. This period saw the building of instruments which found compromises between the aesthetic traditions of the Baroque (notably the North German and Dutch schools, as established by Schnitger and his pupils), and contemporary materials and building techniques. These organs were characterized by bright, sharp sounds, emphasizing upper partials and high-pitched mixtures, with open-toe voicing and low wind pressure levels, with a quasi-equal distribution of 8', 4' and 2' stops in the specification, balanced key action, and the use of modern materials such as aluminum, plywood, and even plastic.[105]

Among the instruments built in this postwar phase of the Orgelbewegung (1960s–1980s) we may refer to those originating in Denmark, and later on in Scandinavia, Germany, Switzerland, and the Netherlands. Builders representative of the style include Rudolf von Beckerath (Germany, 1907–1976), the Danish firm Marcussen & Son (no-

tably under Sybrand Zachariassen's leadership, from the 1920s), and the firm Frobenius Orgelbyggeri, also Danish.

Gerald Woehl himself may be seen as a son of the Orgelbewegung; born in 1940, he started his training around the 1960s, when the movement was at its peak; by then, the Historically Informed Organ Movement[106] had gradually been entering the international organ building scene as well.

The rebirth of the symphonic organ

Approaching the twenty-first century, in a natural development from the renewed eclectic tendencies of the 1960s, the 1990s saw the emergence of what could be called the neo-symphonic organ. European and American builders started looking back to the symphonic period of American organ-building with renewed interest. Traits of the American symphonic organ could now be found in the neo-symphonic organ, combined with a marked eclectic tendency and historically informed principles of building. The main ideas were once again to build larger and more expressive instruments, with more resources available at the console to give the player full control of the instrument, with the intent to maximize its expressive potential. What distinguishes these new instruments from the symphonic ones of the 1900s, is that they were conceived with higher artistic standards, applying historically informed building principles (with much gained from the practices of the Orgelbewegung), a careful blending of sounds and voicing techniques, a renewed awareness of styles, and a conscious avoidance of extremes. We may possibly see the organ in Studio Acusticum as a development of this idea, with the introduction of new experimental features.

4. Twentieth-century and beyond—experimental ventures

Some experimental organ projects have developed since the last century as well, and they cannot be included in any of the mainstream currents that have been discussed thus far. Underlying those projects are similar ideas that aim at broadening the spectral range of the organ (more overtones), exploring micro-tonality, or building systems that allow key-sensitive action to make it possible for the player to control wind pressure levels (and therefore tone and pitch) from the keys. Noise stops, MIDI implementation, percussion stops, and other similar things, have also been considered and implemented in some organs. From the past 70 years or so, I will mention five organ projects that aimed at pushing artistic and technological boundaries.[107]

Already during the 1970's, an avant-garde faction of builders and musicians had taken an experimental approach to organ building. Some builders started experimenting with uncommon mutations, at pitches such as $^{8}/_{9}$', $^{8}/_{11}$', $^{16}/_{19}$', or $^{1}/_{15}$', or with new pipe shapes. A good example is the 1972 Walcker-Meyer organ in Sinzig, Germany, designed in collaboration with German organist and composer Peter Bares. It pushes technical and aesthetic boundaries with its new mutation and mixture stops, new pipe shapes, a *Tastenfessel* (which works much like the piano sustain pedal), and many percussion registers. One of the most innovative features in this organ is the programmable mixture on Manual II. Basically, it works as a chromatic coupler that allows the performer to program his own mixture ranks at any desired pitch.

Peter Bares also developed the concept for St. Peter in Köln (Kunst-Station since 1987), Germany. The organ,[108] previously a neo-baroque instrument, was radically renovated in 2004 by Orgelbau Willi Peter, and was then referred by Bares himself as "die Orgel für neue Musik" (the organ for new music). The instrument, placed in a center for contemporary art, is complemented by two major cases, one high up in the balcony, and the other (an eight-meter tall choir organ) placed down on the floor. The organist can play both organs from the detached console up in the balcony, allowing both structures to work together as one. Much as in Sinzig, the organ includes exotic mutation and programmable mixture stops containing unusual partials, MIDI in/out, free reeds, and many other experimental features.[109]

Adriaan Fokker's interesting ventures into the concept of micro-tonality are well represented in his extreme thirty-one-tone organ, from the 1950's, initially based on the theories laid out by seventeenth-century Dutch physicist Christiaan Huygens.[110] The organ was built by the Dutch firm Pels, and it is today installed in Amsterdam's performance space *Centrum voor microtonale muziek* (Center for Microtonal Music).[111] The instrument is built upon a 31-tone equally-tempered system, which allows exploration of smaller intervals, like sub-semitones. Fokker believed that this instrument would allow us to revisit the practices of previous centuries,[112] but more importantly, it would open doors for new music and for composers to explore the sounds of other cultures and the world. It is a two-manual instrument, each manual covering nearly six octaves. The many necessary keys at the keyboard are arranged in black and white and blue.

In Switzerland, composer and organist Daniel Glaus, professor at the Bern University of the Arts and the Zurich School of Music, Drama, and Dance, has been developing interesting new experiments with flexible wind and sensitive action systems since the 1990s. In Glaus's view, the organ's major limitations are all related to its inflexible

wind, which results in a lack of tonal and dynamic control from the keys. Glaus argues that it is this type of limitation that has made the organ irrelevant as a musical instrument in the twentieth century.[113] The *Forschungsorgel*[114] explores new mechanical resources that aim at giving the player a greater control of wind pressure levels from the keys, and in this way allowing control over tone color, pitch, and dynamics. The instrument developed initially as a research project in collaboration with Peter Kraul (an organ builder based in Germany), Johannes Röhrig (a Swiss builder specialized in experimental pipe construction), and Daniel Debrunner (professor of electric control technology at the College of Engineering in Biel). To date, the research has resulted in the development of three prototypes.

The Modulorgue,[115] conceived by French builders Daniel Birouste and Mickaël Fourcade, puts new innovative technology at the service of musical expression, with the goal of developing a new organ that can be easily operated within a wider range of artistic and social contexts. The Modulorgue is essentially built upon the unit chest concept, which makes use of extension and transmission techniques for broadening pitch range and number of stops, using fewer pipe ranks. Some of the most relevant innovative features include the new valve technology and MIDI and software control mechanisms. The IPC (Individual Pipe Control) concept includes a system designed to allow the player to have a greater control over the attack and release of the tones, even from a detached keyboard. This electric valve mechanism was developed by Francis Bras, and it allows the control from the key of a series of minimal steps between fully open and closed valve positions. The Modulorgue was built in the small village of Aspiran, France, in 2007. This prototype organ consists of a console (two manuals and pedal) mounted on rollers, meant to be fully moveable.

2

Description of Practices

Chapter 6

THE ORGAN PROJECT FOR STUDIO ACUSTICUM

> Welcome to the world of contrasts. In Piteå and Norrbotten we have seasons of large variations. Summer half-year bright and balmy nights, interspersed with winter cold and darkness. Piteå's modern concert hall, Studio Acusticum, holds one of Scandinavia's largest organs, 10 meters wide, 9.5 meters high with 9,000 pipes and 208 stops. A unique instrument for the future of music never before heard or seen, with traditional craftsmanship combined with new technology. [A] symphonic instrument for the 21st century.[116]

The organ presented here is now named Organ Acusticum at Luleå University of Technology, and is placed in Studio Acusticum's main hall, in Piteå, a town with circa 41,000 inhabitants, located in northern Sweden, just below the arctic circle. Studio Acusticum—adjacent to the School of Music of Piteå—is a cultural center which operates within a larger cultural and business area (Acusticum), comprising a place for education and research (Campus Piteå of Luleå University of Technology [LTU], including the School of Music), an area for enterprise and entrepreneurship, and a stage for culture. That cultural stage comprises a smaller multi-use studio (Black Box) and a larger concert hall. The large hall,[117] where the organ is placed, seats approximately 630 people and was inaugurated in October of 2007.

Earlier, in March 2008, Hans-Ola Ericsson, then professor of organ at the Department of Arts, Communication and Education, gave a concert at Studio Acusticum to present the hall and his vision for a new organ. Members of the Kempe Foundations[118] were present in the audience and immediately offered to sponsor the organ project, offering financial support of ten million Swedish crowns. Following this offer, Luleå University of Technology approved the project and further fundraising, with the condition that the total budget not exceed eighteen million Swedish crowns. A fundraising group

was formed and local enterprises contacted to further finance the project. Around the spring of 2008, a group of renowned musicians and experts were invited to form a committee that would take active part in the development of the project, and contribute with further perspectives and artistic visions. This expert committee comprised project-leader Professor Hans-Ola Ericsson (Sweden/Canada), Professor and Honorary Doctor Harald Vogel (Germany), University Organist Kevin Bowyer (Glasgow), and Swedish concert-organist Hampus Lindwall, titular organist in Saint-Esprit (Paris).

1. The committee's offer (June 2008)

A preliminary concept for the new organ, including a basic set of artistic and technical requirements, was developed by the expert committee and published by LTU on June 17, 2008. This document served as a platform for organ-building firms interested in submitting a proposal for the new organ. Appendix 5 of that document gives a preliminary description of the organ that was envisioned along with the most essential artistic and technical requirements specified by the committee.[119] The concept outlined in the document combines tradition—ranging from the German building styles of Walcker and Sauer to the French romantic tradition of Cavaillé-Coll, passing through the English organs built by Willis—and innovation, including, for instance, MIDI and microphone implementations and video and light installations, all planned to enable future internet-based broadcasting.

The committee requested an organ that would provide a wide range of possibilities both in terms of styles and performance settings, and that would be suitable for solo repertoire as well as for chamber music. The document also suggested that the organ should have about 70 stops, with 3 to 5 manuals, and pedal. A 32' foundation was mandatory. The instrument should also include an overtone concept and several possibilities for sound effects, including non-pitched and pitched percussion instruments. The concept suggested in the tender was not style-specific. The intention of the expert committee was to allow artistic freedom to the applicants, and to choose from the most original and promising offers. Seven organ builders were invited by LTU and the committee to submit proposals, and six reached the committee's desk. On October 22, 2008 the expert committee and LTU announced that the organ would be built by Woehl Orgelbauwerkstatt of Marburg, Germany, led by the German builder Gerald Woehl.

2. Woehl's tender (September 2008)

Woehl's tender[120] to LTU and the expert committee is dated September 2008 and offers his vision for a large organ with 104 sounding stops (including 7 percussion stops, 2 Zimbelstern, and a Vogelgeschrei), distributed over five manuals and pedal, with Grand Choeur (Manual I), Hauptwerk (Manual II), Oberwerk (Manual III), Récit (Manual IV), and Solo (Manual V)—see Appendix A1, pp. 210-211, for the complete specification. Woehl's instrument is essentially a classical Central German organ expanded with numerous stops and other features from different Romantic and symphonic traditions.[121] Woehl describes the concept as a fusion of two main styles: the Classical organ; the Romantic, symphonic, and modern organ.

The Classical organ

The Classical organ in Woehl's proposal is conceived as a Classical central German organ, situated within the Hauptwerk (Man. II) and the Oberwerk (Man. III). According to Woehl, one of the main tonal characteristics of the German Classical style is the contrast that results from the combination of the sounds from these two divisions. The sounds from the Oberwerk, placed as a crown atop the organ with open shutters, reflect on the ceiling of the room and speak clearly and directly, both to the player and the audience. In contrast, the sounds from the Hauptwerk, placed in the middle of the organ, project more openly and freely to the room. According to Woehl, it is this exchange and combination of different sounds that makes such music lively and diverse. Woehl's Pedal is divided into a greater massive, solid section with three 32' stops (flue and reed), and a smaller chamber-like section around the area of the Hauptwerk, this one giving the organist better control of the sound while playing. Furthermore, the organist would be able to play the instrument on classical wind, a feature that could easily be turned ON and OFF at the stop panel display.[122]

The Romantic, symphonic, and modern organ

The Romantic, symphonic, and modern organ is placed essentially in the Grand Choeur division (Man. I) and is based on large-sounding stops. Woehl suggests that coupling any stop from any other division gives the player the possibility to explore a wide variety of sound colors. The concept also includes a section with sound effects including bells, drums, the metallic celeste, a wooden xylophone and a harp. All divisions, except the Hauptwerk, are enclosed. The Récit, on the fourth manual, is placed behind the Hauptwerk and Oberwerk, enclosed by expression doors all around. Horizontal high-

pressure reeds are placed on both sides of the Oberwerk, resulting on a very clear and distinct sound in the room. In addition to the expression pedals, the organ also includes a crescendo pedal and a Walze.

Other more experimental features include a complete overtone division from 32' (which, although suggested in writing, is not present in the specification) and a synthesizer that could reproduce recorded sounds, microtones, and much more. Woehl also presents an idea for sound and light installations—he suggests the placement of a set of microphones and speakers around the room and behind the organ, which could record, reproduce and interact randomly with the real sounds from the organ. The organ would also be prepared for the broadcasting of concerts, masterclasses, lessons or conferences via the internet.[123]

3. The collaboration between Woehl and the committee (October 2008 to March 2009)

After the decision announced in October 2008, Woehl and the expert committee entered into negotiations that lasted about four months. Some of the committees's early reactions to Woehl's tender are found on a document brought by Hans-Ola Ericsson to a meeting with Woehl in Germany (date not specified). At this stage, the expert group considered a few more additions to Woehl's concept, namely a number of stops to be added to the third, fourth, and fifth manuals, and the enlargement of the Appels division. Furthermore, all unison couplers should be made possible. This document shows that the committee suggested no alterations to the basic concept offered by Woehl, or to any of the foundation stops or their style; the additions were more complementary than anything else. For instance, the addition of a Terz 1 $^{3}/_{5}$' to the Oberwerk aims at filling the obvious gap existing between the Nasard 2 $^{2}/_{3}$' and the Larigot 1 $^{1}/_{3}$' in this division, as initially suggested by Woehl (see specification in Appendix A1, pp. 210-211). For the Récit and Solo, the committee suggested adding a less traditional set of mutation stops: three new stops for the Récit, and five for the Solo. One 32' manual reed was suggested as an addition to the Solo. Percussion instruments and other features were also considered as additions to the Appels division. The additions clearly aimed mostly at complementing and expanding the initial concept, and making the organ more versatile—this all clearly illustrates the committee's view of Woehl's project. With these suggestions, the concept for the organ was already larger than the one that had been suggested by Woehl in September 2008.

4. The definitive concept (March 2009)

In March 2009, the definitive specification was achieved, and the final concept for the organ was now ready (see Appendix A2 for the disposition, pp. 212-213). Woehl's vision of September 2008 was essentially preserved—"einer Mitteldeustchen Orgel, erweitert zu einer symphonischen Orgel"[124]—but it was still a slightly different organ. If I compare Woehl's initial specification of September 2008 (Appendix A1) and this new definitive concept from March 2009 (Appendix A2), I see the following obvious differences: a greater number of listed stops; a different ordering of the manuals at the console; a new floating division—the Obertonwerk.

The greater number of stops

The greater number of stops listed in the March 2009 specification shows that the organ has been significantly enlarged. Basically, string stops, mutations, mixtures, and reeds have been added to the September 2008 specification. The organ evolved from about 104 stops (September) to circa 240 (March 2009)—not counting couplers, or tremulants. This new instrument had also been given one large 64' stop and three extra 32' stops. More specifically, without counting the stops in the Obertonwerk, and the newly added transmissions (totaling 23) and extensions (totaling 12), compared to Woehl's September 2008 concept, the organ had now been added 16 completely new stops—2 for the Hauptwerk, 5 for the Oberwerk, 3 for the Récit, 1 for the Solo, and 5 for the Pedal (see Appendix A3, p. 215).

Stop family	Sep. 2008	March 2009 - OBTW	March 2009 + OBTW
Principals	17%	9%	10%
Flutes	26%	25%	18%
Strings	9%	14%	10%
Reeds	28%	27%	19%
Mutations and Mixtures	19%	24%	42%
Undulating	1%	1%	1%

The leftmost column lists six main types of stops ("undulating" refers to those types of stops tuned slightly higher or lower to produce an undulating effect when combined with other stops–for example, the Voix céleste). The three remaining columns give the percentages for

each stop family in the two concepts discussed here–September 2008 and March 2009. The rightmost columns give percentages for the March 2009 specification *without* and *with* the Obertonwerk (OBTW). I have considered the Obertonwerk separately because I see it as a new extra division, and not necessarily as a development of the September 2008 concept. I include it in this brief analysis to give an idea of how that vision would influence the relationships between stops in the specification.

Figure 6.1

Figure 6.1, above, offers a brief comparative analysis, using percentages, on the overall number of stops in the two dispositions (September 2008 and March 2009). This provides a clearer overview of the differences between Woehl's initial concept and the one finally agreed upon in March 2009. By considering only the overall number of displayed stops on all divisions, it is evident that the March 2009 specification (without the Obertonwerk), in comparison to Woehl's earlier concept, offers more mutations, mixtures, and strings in relation to principals (proportionally). Including the stops from the Obertonwerk in the latest disposition (+ OBTW), the instrument becomes even more dynamic, offering a wider range of registration and sound possibilities, but most importantly introducing perhaps a whole new different sound concept. The March 2009 vision for the organ (including the Obertonwerk) included a greater amount and variety of overtone and string sounds. What is very interesting here is the fact that the relation (proportionally) between the stops has drastically changed since Woehl's first offer. Note for instance the increasing number of mutations and mixtures throughout the three phases of development, as well as the changes happening among strings and principals in the two first phases. But above all, note the relationships among all the stop families in the last phase of the the project (March 2009 + OBTW). Mutations and mixtures make up nearly half of the whole instrument, flutes and reeds become the second most prominent group, and principals and strings the least prominent one. Clearly, this concept would make the harmonics more predominant and the fundamental less so in the overall sound of the organ.

Manuals and divisions

The modifications made to the manuals consisted mainly of the unification of the earlier Grand Choeur (earlier Manual I) and Hauptwerk (earlier Manual II) to the new first manual, now simply called Hauptwerk. This Hauptwerk division then included both the stops from the classical Central German organ and the louder symphonic stops. The Oberwerk descended to Manual II, and the Récit to Manual III. The Solo was now up on Man-

ual IV, and the Obertonwerk was to be conceived as a floating division, played primarily from Manual IV. This was now a four-manual and pedal instrument, with three enclosed expressive divisions (Manual II, III, and IV), a general crescendo pedal, and a Walze.

The Obertonwerk

The Obertonwerk, or harmonics division, is perhaps the most audacious and experimental feature suggested here. It is conceived to broaden the choice of sound textures and colors, and to enable the composition of personalized mixtures, but most importantly to open up opportunities for experimentation. Generally, what makes this Obertonwerk so peculiar is precisely the almost limitless possibilities it offers, from its large frequency ambitus and amount of displayed stops, to the ability to couple any tone at any chromatic relation. It is in fact a vision.

However, if we look at the present specification (Appendix A4, pp. 216-217) and compare it to the one presented in March 2009 (Appendix A2), we find one noticeable difference: the whole Obertonwerk section is not in place. Around the beginning of 2011, the expert committee had a period of discussions on the building of the harmonics division, considering for instance the possibility of using sampled sounds for that effect, as a provisory and even a experimental measure. On March 30, 2011, part of the committee met with Swedish computer programmer and composer Peter Bengtson and Chief Technology Officer of Inspired Acoustics Csaba Huszty of Budapest. The meeting took place in Piteå and developed throughout the day. The topic was the possibility of incorporating high-quality sampled organ sounds within the new organ. Gerald Woehl—though not present at the meeting—had previously suggested the use of diapason sampled sounds, since these would sound more natural in the context. The group discussed problems that might arise from this fusion of acoustic sounds and electronic sounds, noting for example that the changing temperature and humidity levels in the room would provoke an imbalance between the two sound layers. The artistic integrity of the instrument was also discussed, as the use of electronics in such an organ might be controversial and lead to a generalized artistic disappointment. Later in the process, the idea of using sampled sounds was discarded, and resources were redirected towards future research and the possibility of incorporating a whole acoustical harmonics division in the organ, as well as a whole new intelligent software system developed by Peter Bengtson to allow the organ to be operated more efficiently and in a more personalized, flexible way.

Other specifications

The organ has mechanical action for the Hauptwerk (Manual I), Oberwerk (Manual II), Récit (Manual III), and Pedal divisions, with suspended tracker action and slider chests. The fourth manual (Solo) is played on electric action, and additional symphonic strings, reeds, and some of the larger bass pipes have electro-pneumatic, electro-magnetic, or direct electric windchests, depending on the type and character of the stop.[125] The wind is supplied by fifteen magazine bellows in total, with wind pressure levels varying between 75 and 100 mm WS in the Hauptwerk, Oberwerk, and Récit, and up to 140 mm WS in the Solo. Wind supply to the different divisions is divided between bass and treble (with stronger wind in the treble and weaker in the bass).

Apart from the Obertonwerk concept, the organ also introduces a few other interesting features. The variable wind feature—named *Winddrossel* (wind restrictor) at the stop panel—is an ingenious mechanical system, a type of Sperrventil, that allows the performer to control the amount of air that leaves the bellows and arrives at the chests, thus allowing wind pressure levels to change in the chests. The function is switched ON or OFF at the stop panel (for Manual I and Manual III), and its intensity may be varied using a set of knobs placed above the fourth manual. The classical wind function—*klassischer Wind*—may be activated at the stop panel (ON or OFF), and influences those stops in the Hauptwerk and Oberwerk, which may be played on a more irregular, lively wind.

4.1 An eclectic organ

I have already mentioned the fact that different styles and aesthetics are combined in this instrument. All considered, the organ is clearly symphonic, around a Central German Classical core, expanded with other Classical French stops (notably reeds), with a French Romantic Récit, a symphonic Solo division—which includes high-pressure stops and some sound effects (influenced by 20th century theater organs, notably percussion)—and other innovative and experimental features, such as the Obertonwerk (as a concept). Some of Woehl's documents and technical drawings from around March 2009 illustrate the meticulous planning necessary for the conception of this multi-stylistic instrument. There, he clearly identifies four main individual styles and specifications within the organ: the Classical Central German organ; the Classical French organ; the Cavaillé-Coll from Ste. Clotilde in Paris; the symphonic organ.

The Classical Central German organ

The Classical Central German organ is presented individually (see the specification in Appendix A5, p. 218) with a total of about 55 stops, distributed among four divisions (Hauptwerk, Oberwerk, Echo, and Pedal). I found that the specification presented by Woehl shows many similarities to the specification of the organ in the Dresden Hofkirche, Silbermann's last instrument, from 1755.

The Classical French organ

The Classical French organ emerges from the Central German organ; that is, the stops used for that effect are roughly the same, excluding of course those that fall out of style, as for example the Fagott 16' or the Quintatön 16', which are more distinctively German. More specifically French stops are distributed among the different divisions, including some of the most characteristic reed and cornet sounds (see the specification for the French stops in Appendix A6, p. 219). Also, the shutters (*Klangklappen*) placed above the Oberwerk allow changes to the sound concept. With shutters closed, the division more resembles a French classical Positif; with shutters open the sound concept is more characteristic of a Central German Oberwerk.

The French romantic organ

The French romantic disposition is clearly and individually presented in Woehl's documents. The reference is the Cavaillé-Coll organ in Ste. Clotilde in Paris from1859 (see the specification in Appendix A7, p. 220). Woehl suggests that all stops are available in the organ, even though they are placed disparately throughout the different divisions. According to Woehl, by making the necessary adjustments (like coupling), players at this organ can recreate the disposition of Ste. Clotilde.

The symphonic organ

The symphonic organ is presented as the whole organ. All the styles and aesthetics are offered within this large and complex instrument. The symphonic instrument is the modern instrument, the "symphonic instrument for the 21st century," as quoted in the epigraph to this chapter. The Obertonwerk is the only missing feature at the moment.

5. The inauguration (October 2012)

The organ was completed in October 2012 and an inauguration festival took place from October 11–22. The event included several concerts, presentations, and a symposium. Nine concerts were played in the newly built organ, including the inaugural concert played by project leader Hans-Ola Ericsson, including performances of his own music, French music (Olivier Messiaen and César Franck), and a transcription of Mussorgsky's *Pictures at an Exhibition*, which made use of some of the symphonic resources of the instrument, including the percussion. Kevin Bowyer performed mostly new music, as well as Britten's *Rejoice in the Lamb* together with the chamber choir of the Piteå School of Music. Harald Vogel's program explored the music of J. S. Bach, and Hampus Lindwall improvised over Charlie Chaplin's silent movie *City Lights* from 1931, making extensive use of the percussion section of the organ, and even using external electronic and digital resources. Jean Guillou performed his own music, and Kimberly Marshall performed mostly new music, notably by American composers. Christoph Bossert explored the Romantic side of the organ, with performances of music by Reger and Reubke, among others. On Sunday, October 21, another side of the organ was explored: it served as a platform for a concert with Benny Andersson, formerly a member of the pop group ABBA, and Gunnar Idenstam at the organ. The festival concluded with a concert by American organist and composer Gary Verkade, where he mainly explored the fields of new music, making use of live electronics in his own composition.

On the morning of October 14, Gerald Woehl, Hans-Ola Ericsson, and Simon Buser[126] gave an informal short presentation of the organ to a small audience of curious people in the organ loft. According to Woehl, the organ should be regarded above all as a concert instrument. The space all around the organ was intentionally left open, so the organist is clearly visible to the audience while performing. The simple façade was conceived as a neutral space for light and color projection, since Woehl's vision was that of an organ that could look different, depending on the music being performed. Discussing building matters more specifically, Woehl states that the measurements of the pipes were all based upon the Classical Central German idea, which was the point of departure for the whole organ. The concept is not based upon Cavaillé-Coll or Sauer, but more upon the kind of organ that Bach may have had, and this is why, according to Woehl, this organ is ideal for such music.

Some other key figures in the project, notably the members of the expert committee, also left notes of introduction in the inauguration program book, expressing their own visions and thoughts. In his note, Harald Vogel describes the organ in Studio Acus-

ticum as a new venture that embraces elements of several historical concepts. Kevin Bowyer sees this organ not merely as a new artistic statement, but also as a provocation: he calls it "the First Organ on Mars." And project leader Hans-Ola Ericsson leaves us with a glimpse of the future envisioned for the instrument in the following statement:

> The instrument now to be inaugurated is the most important part, the heart, of the complete and complex instrument that has been, and still is, our vision…Since the instrument is being built at a living university, it is logical for it to continue to be developed along with contemporary demands for new sounds and achievements. In a first step, a harmonics division is planned—a sonic and experimental platform with no previous equivalent, where our vision is to able to work with a multitude of harmonics, yielding new kinds of mixtures, sound spectra, and microtonality. After this, we hope to shape the organ into a studio in order to be able to communicate with the outer world, actively as well as interactively. The vision is to be able to play the instrument across the broadband of the internet from anywhere in the world, to be able to give interactive master classes directly from the organ, etc. The last part is a vision of working in real time with lighting design, directly linked to the organ.[127]

The project introduces something totally new: the idea of a musical instrument as a permanent *work in progress*, open to change, to innovation and adaptation. Sverker Jullander notes in the program book: "…it thus represents a new phase in organ building practice, in which the instrument is seen not as a completed and definitive artefact but rather as an ongoing process."[128] This is interesting, I believe, because it expresses openness towards the future. The organ in Studio Acusticum, as artistic concept, is certainly an interesting space open for discovery, experimentation, and innovation.

Chapter 7

GERALD WOEHL'S VOICING PRACTICE IN STUDIO ACUSTICUM

This chapter describes the main voicing patterns that I followed and documented during the voicing of the organ in Studio Acusticum. The ideas presented here (although they may possibly apply to the general practice of organ voicing) refer specifically to the practice of the voicer Gerald Woehl. The organization of the process of voicing, as well as the definitions and the analysis presented in this description, are the result of my own observations, and they were not directly suggested by the voicer himself at any time in the process, unless stated otherwise.

1. VOICING PANORAMA

In total, the building of the organ in Studio Acusticum took around twenty-six months. Seventeen of those months (ca. 63% of the total time) were spent on voicing, meaning that nine months were used for the construction of structures and other installations, as well as for vacation (see Appendix B1 for a timeline of voicing, pp. 222-225[129]). During these twenty-six months, the voicing was more intensive in some periods and less so in others. At the extremes, Woehl's productivity varied from voicing three stops a week to less than one complete stop a week. This variation in productivity sometimes had logistical reasons, such as post office delays (pipes were sent by mail from Germany) or the necessity to build structures; but also, some stops simply required more attention during voicing than others.

Structure of the voicing process

In Studio Acusticum, the voicing of each individual stop followed a structure, a pattern. This voicing structure was composed of three major phases, each including one or two stages. Figure 7.1 illustrates my understanding of that working pattern.

Phase 1. Tonal preparation – first considerations for individual pipes
Stage 1.1. preparing the pipes for voicing, at the desk
Stage 1.2. preparatory considerations on tone, for individual pipes
Phase 2. Tonal adjustment–overall adjustment of the tones within the stop
Stage 2.1. considering the entire stop, from the mechanic console
Phase 3. Tonal finishing–adaptation to the room
Stage 3.1 considering the sounds in the acoustic space, from the room
Stage 3.2 evaluation within musical context

Figure 7.1

Considerations on terminology

Even though the process illustrated in Figure 7.1 clearly expresses my understanding of that general working pattern, I still feel it is important to consider the terminology usually employed in organ voicing, which is more or less standardized: *pre-voicing*, *voicing*, and *tonal finishing*.

The terms *pre-voicing* and *voicing* have on occasions led to problems of understanding, primarily because both terms conceptualize similar practices which are very closely linked to one another, aiming at the same goal: the voicing of the pipes. First, the distinction between pre-voicing and voicing is very thin, and it is difficult to clearly define where one ends and the other one starts. Second, and primarily, the terminology employed does not help the problem either. Voicing is the term generally used to refer to the overall process of voicing, which includes pre-voicing and voicing, and on occasion it is, oddly, used to refer specifically to tonal finishing as well. It is never clear what exactly voicing means as a concept with respect to the practice. Everything seems to count as voicing (and in fact, it does). But in my view, it is important that the terms should differ in relation to their semantic content, and that being so, voicing (as the whole process) and voicing (as referred to a core practice, within that process) should be distinguished. Voicing is the whole process of developing the tonal qualities of organ pipes and therefore, it comprises both the preliminary phase of preparing the pipes, and the subsequent tonal finishing. Given this, the preliminary phase before tonal finishing could very well be named *tonal preparation*. That name more clearly indicates the goal of this subset of practices and also relates it conceptually to the final phase of the overall voicing process. In Figure 7.1, we also see included a phase named *tonal adjustment*. For any process of development, the different stages within the process must be

interrelated as a chain of consequences and results; but in this particular case, *tonal finishing* cannot really be a direct consequence of *tonal preparation* because the two phases do not both relate to an intermediary core practice. I therefore suggest the employment of the term *tonal adjustment*, which seems to fill this void. It clearly expresses its core practice and relates to the phases that come before and after. It is a perfectly coherent intermediary stage in the context of the overall process of voicing an organ stop. Ultimately, the three major phases presented in Figure 7.1 perfectly correspond to and express the overall voicing practice of Gerald Woehl.

One other interesting aspect to note from Figure 7.1 is that each major phase includes its own individual goal. Woehl's work was always focused around three main parameters: the pipe, the stop as a whole, and the room. Interestingly, each of these parameters corresponds to one of the major phases. The main focus in tonal preparation was the individual pipe, in tonal adjustment it was the pipes within the context of the stop, and in tonal finishing it was the behavior of the stop in the room.

All considered, this system of terminology accurately describes my understanding of the general working pattern that emerged during the voicing of most of the stops in Studio Acusticum. From now on, I will refer to this process using the terms and symbols presented in Figure 7.1, referring more specifically to stage and phase numbers.

2. Voicing of flue pipes

2.1 Tonal preparation

> Every pipe should be made to speak, however crudely, before beginning any tuning or regulation.[130]

During this preparatory stage, the focus of the voicer was mainly on individual pipes—each considered separately—with the intent to make each pipe produce a tone. It was a rather technical stage, without major concern for the musical quality of the tones produced by the pipes. Cut-ups, toe-holes, lips, and languids were all adjusted to allow the air stream to flow naturally through the pipe, and to ultimately produce the pipe's first sound.

Probetöne (stage 1.1)

In Studio Acusticum, before anything else, the very first step in the voicing process was to unwrap the newly arrived pipes and arrange them according to pitch on an empty surface. This was standard procedure for all kinds of pipes. No pipes were built in Stu-

dio Acusticum; all were mailed to Piteå from Woehl's workshop in Marburg. Some stops arrived in the room completely unvoiced, while others had undergone tonal preparation at the workshop (stage 1.1). The pipes that arrived completely unvoiced were first voiced to stage 1.1 at the voicer's desk in Studio Acusticum. Stops which had received a tonal preparation (stage 1.1) at the workshop were usually placed directly on the chest and voiced immediately to stage 1.2 or stage 2.1, and more rarely to stage 3.1.

Let us now consider those stops which arrived Studio Acusticum completely unvoiced, without any preparatory voicing treatment given at the workshop. Woehl explained that some stops have to be voiced and adapted to the room from the very beginning (stage 1.1), because they are a basis of comparison for all the other stops: they are the core, the foundations of the entire organ, and they must be voiced according to the features of the room. This principle applied to the Principal stops (8', 4') in all divisions. When those pipes arrived, they were laid out in order on a empty surface. Four to six pipes were chosen from the stop, each from a different octave—mostly F's and C's; these were called Probetöne. In voicing the Probetöne, Gerald Woehl often followed the information displayed on a sheet of paper—a table with a detailed description of the measurements and techniques to use first on those few sample pipes (see Appendix B2, p. 226, for a transcription of one of the tables Woehl used). After measuring and cutting the pipes according to the indications given in such table, the pipes were placed on the chest and voiced from the room, as in tonal finishing. Once the voicing was concluded, the pipes were taken out of the chest and brought back to the desk, where the voicer measured them again. The parameters that changed—mostly the width of toehole and the height of the cut-up—were measured and noted down on a new chart, a *logarithmic grid,*[131] which was then used to calculate the measurements for the remaining pipes. After measuring and cutting all the pipes according to the indications given in such a chart, they were placed on the chest and voiced from the room (as in tonal finishing), now considering the complete stop.

Usually, voicing the Probetöne and then preparing the remaining pipes of the stop took approximately one to two working days. Afterwards, all the pipes within the stop were placed on the chest and voiced either to stage 1.2 or stage 2.1, or sometimes even to stage 3.1.

Preparatory considerations regarding tone (stage 1.2)

In contrast to what was described in the previous section, and as already mentioned above, some stops had their tonal preparation (stage 1.1) at the workshop in Germany. In fact, except for some of the principal stops, this was the most common procedure. When those stops arrived at Studio Acusticum, they were first carefully examined by the voicer. Woehl chose some random pipes from the whole range, and blew air into the foot of the pipe in order to examine the quality of the work done at the workshop. The air pressure or intensity of the blowing varied from very weak to very intense, even making the pipe overblow. Woehl used short, fast, and repetitive spitting to test the overall characteristics of the attack produced by the pipes. He also analyzed the arrangement of the various components of the pipe mouths, by looking carefully at these components from different angles.[132] This procedure was brief.

After Woehl's initial examination, all the pipes in the stop were placed in their respective place in the chest, and were voiced and tuned from inside the organ case. The most important consideration here was to make sure that the pipes were able to articulate a proper tone. Voicing in this setting consisted mainly of adjustments to the mouth of the pipe, specifically the position of the languid, the height of the cut-up, and the angle of the upper lip. While next to the pipes, the voicer constantly checked the quality of the attack, not only by playing them on the chest—from a MIDI keyboard remotely connected to the organ console—but also by blowing with his mouth into the pipe feet. This procedure was repeated over and over for each individual pipe. Once this stage was considered to be concluded, the voicing proceeded to tonal adjustment.

2.2 Tonal adjustment

> The creative part of voicing begins with the regulation of the pipes. The loudness, attack, and tone color of each pipe are evaluated in a deliberate and methodical way, organized so that several things are done at the same time.[133]

In this phase much attention was given to the tone produced by each individual pipe in relationship to the other pipes in the stop. At this stage, the pipes were already placed on the chest, and Woehl played the pipes from the organ console. All voicing decisions were made comparatively, taking into account the relationships among different tones within an octave, the different regions within the entire stop—bass and treble—and eventually the entire stop in relation to other stops. For tonal adjustment, the voicer al-

ways required the aid of an assistant. During voicing, that assistant was positioned inside the organ case, near the pipes being voiced. Woehl played the notes from the mechanical keyboard, and from there he instructed his assistant as to what specific techniques to apply to the pipes.

2.3 Tonal finishing

At this final stage of voicing, most attention was given to the overall quality of the tones produced by the pipes and their behavior in the room. Aspects considered included color (which refers to the overall harmonic structure of the steady state), which is mostly influenced by the height of the languid; and loudness and strength of tone, which is controlled by the amount of air, at a given pressure, that enters the foot of the pipe, and by the amount of air passing the windway. All these aspects were considered from the room, which ultimately works as an amplifier (or damper) of those parameters. This stage seemed to be a kind of last touch on all the work done to the pipes up to that point, incorporating necessary changes based on how the sounds behaved in the room.

For voicing from the room, an assistant and an automatic key-holder were essential. An automatic key-holder (Orgamat) was placed on top of the appropriate keyboard at the console and connected via a MIDI cable to the remote keyboard out in the room. Woehl sat in the room next to the MIDI keyboard; he played notes from that keyboard and instructed the assistant, near the pipes, on which procedures to apply. He also asked for feedback on the behavior of the pipes inside the case.

Voicing to the room (stage 3.1)

There were some interesting distinctive patterns in stage 3.1 that illustrate Woehl's very personal way of working with voicing. I observed two peculiar things: (1) the preference for voicing at a specific time of the day; (2) voicing without shoes.

(1) It was common for Woehl to start voicing sometime between 8 a.m. and 9 a.m. Stage 3.1 was mostly done in the early morning, finishing up at around 11am. The rest of the day was used for all other types of work, namely tonal preparation, tonal adjustment of other stops, or even office work. What is interesting here is that the time of the day chosen for doing tonal finishing did not seem to be arbitrary. The hall needed to be calm and silent, and the voicer's ears needed to be fresh. For instance, it was common to prepare the tonal finishing of a stop during the evening, and do it in more depth—more accurately and focused—during the morning of the next day. Tonal finishing did

not seem to be a simple measuring and cutting task that could be done at any time; rather, this voicing stage developed only whenever the voicer felt ready for it.

(2) I also observed that every time tonal finishing was done, Woehl removed his shoes. I had several speculations about this intriguing aspect of voicing: was it a symbolic act of respect for the work? Was it in order to feel certain vibrations at the level of the floor? Woehl later explained that he "hears better without shoes"—I will get back to this in chapter 9. It is also interesting to note that Organist Ralf Bibiella observed the same procedure during Woehl's voicing of his organ in the Katharinenkirche in Oppenheim, Germany (2004–2006).

Musical requests (stage 3.2)

After concluding stage 3.1, Woehl's normal practice was to ask for music to be played on the recently voiced stop (see Appendix B3, pp. 227-229, for a detailed descriptions of the requests made by Woehl in Studio Acusticum). I noted four main types of requests.

(1) The first type consisted of free musical exploration of a stop or combination of stops, revolving around specific musical parameters, often tempo, articulation, melody and accompanied solo voice, or even a particular region of a stop. Woehl did not specify what type of musical language the organist was supposed to explore. In the beginning, free musical exploration would suffice; it was only during such explorations that the requests would become more specific. Often, after exploring any sound or group of sounds, Woehl asked me to play slow and legato. In other similar situations, he asked me to explore a specific region of a sound, or only the bass region, or the treble, or both in several possible combinations. He might, for example request the combination of a solo line on one stop (in bass, tenor, or soprano) and the accompaniment on another.

(2) The second type of request was to play a particular set of stops in relation to each other, but still without specifying any musical style. Woehl would ask me to draw a combination of stops and play them in relation to each other. Requests specified the use of different manuals in alternation, possibly in order to hear how they matched. In this case the requests were rather simple and the playing sessions rather brief.

(3) Thirdly, I was asked to improvise in the styles of specific historical periods. For example, Woehl might ask that I improvise in the German Baroque style, or in the French Classical style, or any other Romantic style, etc. No further instructions were given, except in regards to the stops I should play on.

(4) The last type of request was also the most specific one. Woehl would ask for the music of a specific composer, or even for a related compositional form, such as a concerto, a fugue, or a chorale. During one session, Woehl asked me to play a specific chorale by J. S. Bach.

Usually, after a listening session—after any of these requests were fulfilled—the voicing ended with cone tuning (fine tuning): that is, if the sounds of the recently heard stop were considered satisfactory. If the sounds were not entirely satisfactory, the voicer would repeat stage 2.1 or stage 3.1, changing whatever had to be changed.

3. Voicing of reed pipes

Reed pipes underwent a voicing procedure slightly different from the flue pipe procedure I have described so far. First, reed pipe voicing departed slightly from the process of tonal development illustrated in Figure 7.1, in that it excluded stage 3.1. The other phases remained the same. Second, the voicing techniques applied obviously differed, and the voicer also had different concerns regarding the quality of the pipe sound.

Probetöne (stage 1.1)

Reed pipes arrived at Studio Acusticum disassembled into parts: boot, tongue, shallot, wedge, block (with socket), tuning wire, and resonator. The first course of action was to assemble some of the pipes, chosen randomly across the whole range of the stop. These reference pipes were then placed on the chest and voiced from the mechanical console—these were the Probetöne. After doing the first adjustments, the few pipes were taken out of the chest, and the proportions which resulted from this first adjustment were measured and noted on a table and later transferred to a logarithmic grid.[134] All the pipes in the stop were then assembled—using measurements read from the grid—and set in their places on the chest, ready for tonal adjustment.

Tonal adjustment

In the case of reed pipes, the quality of the sound attained in voicing depended greatly on the quality of the work done to the reed tongue. The first adjustment consisted in finding the right balance between the position of the tuning slot—which defines the speed of the vibration of the tongue and the quality of the sound (how clean or hoarse)—and the tuning roll (Stimmschlitz), which defines pitch tuning.[135] It was also possible to take the resonator out and close or open the toe-hole, which influenced amplitude.

The behavior of the tongue inside the boot is perhaps the most relevant physical aspect to consider for reed pipes[136]—as already mentioned in chapter 2. The tongue behavior is adjusted by bending or straightening it, a technical procedure that requires great technical expertise. The degree to which the tongue is bent influences the speed and precision of the attack of the tone. If the tongue is bent too far away from the shallot, the attack is slower; bending the tongue in the opposite direction has the opposite effect. In Studio Acusticum, the right balance was achieved by a technical procedure which forced the tongue to bend to a certain angle, or become slightly straighter, as needed. For this, tongues were generally placed on top of a slightly curved piece of wood, which had a proportional (increasing-decreasing) angular curvature that let the voicer choose the angle to which a tongue would be bent. After the tongue was positioned on the curved piece of wood, it was pressed against it a number of times. The voicer looked at the angle of the tongue and decided whether it was bent enough or not (the opposite also applied—if the angle of the tongue was too marked, then it was pressed onto a straight metal plaque).

After any of these procedures had been applied, all the parts of the pipe were assembled and the pipe was brought back to its place on the chest. The voicer then played the respective note from the mechanical keyboard, and decided whether the tone needed further adjustments or not.

Overall, voicing a reed stop was much faster than voicing a flue stop, even though the assembly of the reed pipes—before starting the actual voicing—always required a longer time. Generally, after this process of tonal adjustment, the pipes were tuned.

Musical requests (stage 3.2)

Not many musical requests were made for reed stops. In fact, Woehl only made one request, specifying a musical form in a specific style: a chorale, in the style of Reger or Liszt (Appendix B3, pp. 227-229). He asked to hear this on the Voix humaine 8' in the Récit, with the tremulant. No other requests were documented during the reed voicing process.

4. Voicing the organ in five phases

From a broader perspective, the voicing of the organ in Studio Acusticum, from the first stop to the last, between August 2010 and October 2012, developed mainly around the three chief aesthetic lines built into the organ: the Classical Central German organ; the

French Romantic organ; the symphonic organ. The voicing of the organ was structured in five phases, ordered chronologically.

Phase 1 comprised the voicing of the foundations of the French Romantic core. This phase started with the Viole de Gambe 8', one of the quietest stops, and progressed to the loudest stop, excluding mutations and reeds, organized in pitch from lower stops to higher ones. Phase 2 comprised the foundations of the Classical Central German organ core—flutes, strings, and principals—in the Hauptwerk and Oberwerk divisions. The voicing of this core started with the Rohrflöte 8' on the Hauptwerk and progressed from quieter to louder, and from lowest to highest in pitch. Phase 3 included the overall voicing of mutation and mixture stops in the Hauptwerk, Oberwerk, and Récit divisions. These complex stops were voiced upon the foundations already in place for the respective divisions, and they were voiced from lowest to highest in pitch as well—the mutations being voiced from least complex to most complex. Phase 4 consisted of the general voicing of reed stops for the Hauptwerk, Oberwerk, and Récit divisions, which tended to be voiced from the loudest to the quietest, in contrast to to the other type of stops. The voicing usually started with the 8' stops, followed by the 16', and concluded with the 4'. During this phase the first flue stops in the Pedal were also voiced. Finally, Phase 5 included the voicing of the symphonic core and the overall conclusion of the organ. Most stops voiced in this phase were for the Solo. The voicing progressed from quietest to loudest, starting with the Doppelflöte 8'. The flute stops were voiced first, followed by the string mixtures, then the cornets, and finally the high pressure reeds.

5. Sound examples of voicing

I will now offer six sound examples, referring to the voicing process I have described, and further illustrating the practice of the voicer Gerald Woehl. The first five examples are for flue pipes, in relation to the phases and stages of voicing discussed above; the sixth example is for reed pipes. Transcriptions of most dialogues are given in Appendix C.

5.1 Two examples of tonal adjustment of flue pipes

The following recordings are excerpts of the first voicing of the Octava 4' for the Hauptwerk on the morning of January 12, 2011. The pipes had already been given a tonal preparation, starting with the voicing of the Probetöne. All the pipes were then placed on the chest during the evening of January 11. Some basic and brief voicing adjustments were made that evening. The following sound examples, however, are represen-

tative of the most substantial tonal adjustment given to this stop. We hear the work of Gerald Woehl and his assistant and son Claudius May.

***Sound example 1, ca. 3 minutes* – track 1**

Before starting to voice, Woehl briefly plays the Octava 4' from the remote MIDI keyboard in the room. The playing of the tones, in the shape of a monody, does not seem to obey any specific order, whether chromatic, diatonic, or something else.[137] In the example, the tones seem to be combined randomly with minor and major second intervals, yet including at some moments larger intervals such as thirds. The melodic breaks, with the insistent repeated tones, relate to a particular focus given to a specific tone, and then in relation to its surrounding tones. Usually, this check-up procedure was concluded after five to ten minutes, before voicing started.

***Sound example 2, ca. 25 minutes* – track 2**

The playing is similar in procedure to sound example 1. Here however, when a tone needs an adjustment, the voicer interrupts the playing, holds that particular tone and instructs his assistant on the specific technical procedure for that pipe (follow the dialogue in Appendix C1, pp. 233-237). The assistant then removes the pipe and, depending on the voicer's request, he either applies the necessary technique himself or brings the pipe down to the voicer's hands. In the former case, Woehl keeps on playing the surrounding tones, while the assistant performs the actual technical procedure. In the latter case, Woehl stops playing and walks to the side of the organ and receives the pipe from the assistant. He then applies the necessary technique himself. After this technical procedure is applied, both people return to their original positions and the playing of the tones continues in the same manner, first focusing around the recently voiced tone, and then moving to other tones.

In this particular session, Woehl started voicing around the fifth octave, moving then to the sixth, later to the fourth, and concluding on the third octave. Most work was done around the fifth and third octaves. The tones which required most work in this session were C5 (adjusted ten times), and E5 (adjusted four times). The remaining tones were adjusted up to three times. The voicing of C5 seemed to be particularly challenging here. In the example, Woehl insists on making the tone stronger (stärker), but the pipe does not respond effectively to the techniques employed. As a last resort, Woehl decides to ask the assistant to widen the respective hole on the chest with a drill. That solves the problem.

As demonstrated in sound examples 1 and 2, this stage of tonal adjustment generally focused on both the attack and the steady state of the individual tone, comparing these with the surrounding tones and sound regions. The attack was adjusted chiefly by adjusting the position of the languid (lower or higher), which affected the speed of the attack, and by nicking the languid, which softened the attack. Regarding the steady state of the tone, the voicers concentrated on the parameter of strength (making the sound stronger, stärker), for example by changing the windway (making it narrower or wider), the circumference of the toe-hole (narrower or wider, weaker or stronger respectively), and the wind pressure levels.

5.2 One example of stage 3.1 – flue pipes

Sound example 3 was recorded on Thursday, June 2, 2011. Woehl and May are voicing. The session lasted around 40 minutes, and the example is an excerpt of that session.

Sound example 3, ca. 22 minutes **– track 3**

The Gemshorn 8' on the Oberwerk is being voiced. Woehl is sitting in the hall playing the pipes from the MIDI keyboard. May is in the organ, close to the Oberwerk chest. Woehl instructs May from the room on which voicing techniques to apply (follow the dialogue in Appendix C2, pp. 238-243). There is a particular focus on the lowest octave tones G1 and A1, which do not seem to please Woehl, either in terms of strength or color—Woehl wants the sound to be stronger (stärker), and darker (dunkler).

5.3 Two examples of stage 3.2 – flue pipes

Several organists visited Studio Acusticum while the organ was being built, and they eventually played music. I documented those moments. Project leader Hans-Ola Ericsson was one visitor who often played the organ. The following sound examples serve to illustrate how stage 3.2 developed in the room. I have chosen these particular examples mainly for the fact that they present a dialogue. They illustrate the type of dialogue that happened between musician and voicer in the process of voicing; here between Ericsson and Woehl. Sound example 4 exemplifies the most common type of dialogue, taking place shortly after musical performance. Sound example 5 exemplifies the voicer's requests in the context of an organ demonstration, to a musician visiting the hall and the project. At this point in time, perhaps $^{3}/_{4}$ of the stops were in place in the organ,

and not all had been completely voiced. In the example, brief comments are made regarding the sounds heard in this experimentation session.

***Sound example 4, ca. 2 minutes* – track 4**

The sound example presented here is an excerpt. This session was short, lasting about 15 minutes. In this particular session, the musician enters the hall and, with no specific musical requests made by the voicer, he starts experimenting freely with some of the sounds available in the organ, namely the recently voiced Octava 4' in the Hauptwerk. After about 10 minutes, Woehl makes some specific musical requests: "play something by Bach"; and even, "play a Ricercare" (follow the dialogue in Appendix C3, p. 244). After the playing, musician and voicer discuss the qualities of the Hauptwerk Octava 4'.

***Sound example 5, ca. 10 minutes* – track 5**

In this particular setting, Woehl demonstrates, through the hands of organist Hans-Ola Ericsson, some of the sound possibilities of the instrument. This session took place while an organist from the Netherlands was visiting the project. Woehl is eager to demonstrate some of the sound possibilities of the instrument. The session lasted about 50 minutes (shortened in the example to 10 minutes). The comments mostly concern the quality of the sounds heard in performance (follow the dialogue in Appendix C4, pp. 245-248). They also take up a few mechanical aspects, namely the shutters above the Oberwerk, and the fact that no stop panel or combination system was available at the console at that point. May was positioned inside the organ near the chests to pull the stops that were requested by the voicer and the organist.

The session explored the following registrations: the Oberwerk Plenum (Principal 8', 4', 2', Gedackt 8', Mixtur 4fach, Cimbel 3fach, Trompete 8'), a set of flutes (Récit: Flûte traversiére 8'; Oberwerk: Konzertflöte 8'; Hauptwerk: Flûte harmonique 8'), and a variation on the flute registration with string stops added in the Récit (Récit: Viole de Gambe 8', Voix Céleste 8'; Oberwerk: Konzertflöte 8'; Hauptwerk: Flûte harmonique 8').

5.4 One example of tonal adjustment—reed pipes

This sound example was recorded on Saturday, July 30, 2011, in the early evening. There were a few people working in the organ that day. Woehl was leading the voicing, as usual, assisted by May. The organist in this session is a friend or an acquaintance of Woehl's. He was visiting the project and staying for some days in Piteå.

***Sound example 6, ca. 6 minutes* – track 6**

This is an excerpt of the very first voicing work (tonal adjustment) done for the Trompete 8' in the Oberwerk. On this day, the pipes were assembled and put on the chest, ready for voicing. In this particular session, the voicer first asks the organist to play all the tones in the stop, from the console, chromatically. After this, the organist plays some tonal chords. The stop is then adjusted for ten minutes, and then played again.

Chapter 8

MY MUSICAL RESEARCH PRACTICE: A RETROSPECTIVE

> I have now been in the field for about seven months. Following the voicing process of this organ and developing a parallel artistic connection was, from the very beginning, the main goal. Gathering information on the working methods and the voicing process itself is something that works as, under the light of these seven months, a tool for my creative process. I don't mean that voicing is not in focus, on the contrary, this knowledge must be the diving board for my artistic exploration and personal development. But what kinds of knowledge do I gather here? And how can this possibly lead or influence my artistic work?[138]

Finding answers in the chaotic environment in Studio Acusticum was indeed challenging. During the period of this research, the organ there was constantly changing and evolving—back and forth, faster and slower—and at some points in the process, I even feared it would remain eternally unfinished. I felt I was in the midst of a huge puzzle, trying to catch lost pieces here and there, never knowing what was going to happen the next day. From the very start, I had no point of reference in any previous research or artistic work. It was diving into the unknown. The environment and the objects around me, like pieces of pipes, and pieces of wood, or parts of a keyboard, or a pedal board which was either in or out, or an old bench which was far too high for me, were things I did not associate with the experience of organ playing and musical performance. I did not recognize the instrument, and it was challenging to play any music for most of the time. The action at the keys was not regulated until the organ was almost finished. There was no stop panel at the console, no stop knobs, and no music stand either.

My collaboration with the voicer Gerald Woehl went through some periods of silence. We did not speak the same language, and our professional and artistic backgrounds were obviously different. Our life experiences were certainly different too. For

most of the time, we communicated only through the sounds of the organ: not because we did not want to talk to each other, but because voicing was a process that required silence and concentration. I took part in that process too, by sitting silently in the room, and eventually, at some points, by playing the organ during our sessions, and even briefly discussing the sounds heard. In general, experiencing the sounds and the silence in the hall was a rewarding experience, even though I must admit that it added extra challenges to the research, which ultimately had to be articulated verbally, even theoretically.

In this chapter, I guide readers through the development of my own artistic and research practice in this environment.

1. First musical approaches to voicing

First musical guidelines

I first met Gerald Woehl on August 18, 2010, in Studio Acusticum. In this informal meeting I had the opportunity to introduce myself and to explain some of the features of my research project. Woehl showed interest in my project and immediately consented to the documentation of his voicing process, as well as my musical practice in that context. When I asked him to share his thoughts on the most suitable musical approach to voicing, he immediately stated that free musical experimentation was enough, and performing repertoire would not be necessary. He then specified that the music played should allow him to listen to: the different regions of the stops (bass, tenor, soprano); the acoustics of the room (by breathing among phrases); the different types of articulation (staccato, legato, attack and release). To this, he later added, within that first week, that the most important thing would be to make the instrument sing, because for him, the tones produced by the pipes should have "a good singing quality". Now, this request was different from the others. Whereas exploring the whole range of the keyboard and exploring different types of articulation were requests of a technical nature, easily put into practice, to make the organ sing was something rather abstract. This became a first point of reflection.

Given these premises, my goal was to incorporate these aspects into my musical performance practice, not only within the voicing sessions, but also within my individual musical experimentation, happening parallel to the voicing process. Those experiments took place when I was alone in the room with the instrument. I was mostly concerned with the characteristics and qualities of the sounds produced by the pipes, and less

with technical aspects of musical performance. I experimented with playing sounds monodically, slowly, chromatically as well as diatonically, up and down the range of the keyboard, always maintaining a very focused listening approach. I also used chains of simple tonal chords and cadences with the goal of exploring the relationships between different tones and different stops.

An early étude

The first concrete result of the incorporation of these guidelines into my musical practice came two weeks after our meeting in the form of a short, three-page composition, written specifically for one of the few stops then available in the organ, the Viole de Gambe 8' in the Récit. The piece is dated September 1, 2010, and is written in an improvisatory manner, in free form. An excerpt is reproduced in Figure 8.1.

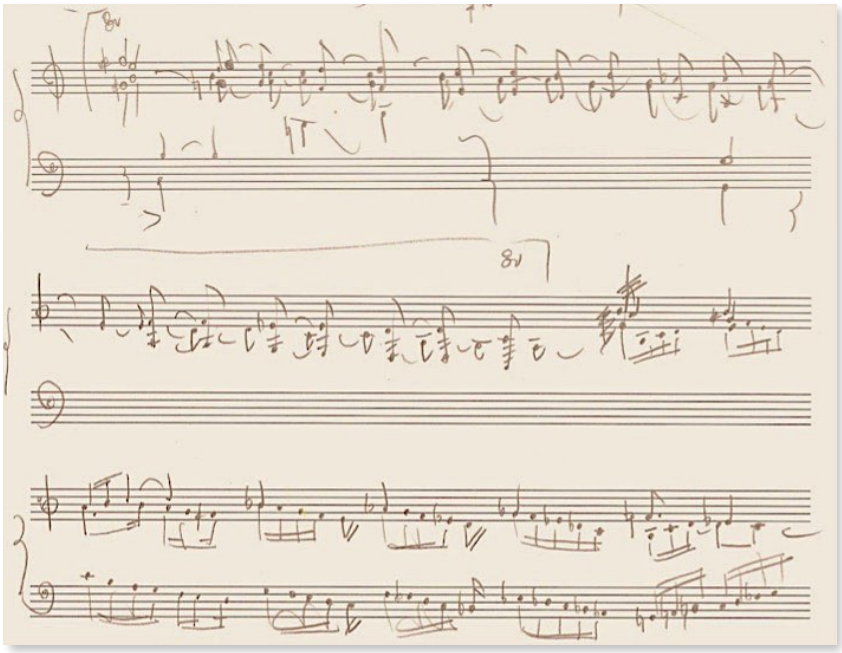


Figure 8.1

The writing suggests independent, continuously flowing voices. The overall descending melodic contour illustrates my attempt to explore the different regions of the keyboard—the soprano line, for example, explores a range of two octaves in this excerpt. The har-

monic language is also somewhat exploratory. Although there is an underlying tonal principle, no tonal harmonic relations are established. The abrupt change of harmonies—as for instance in the third system in Figure 8.1—serves the purpose of exploring a wider range of tones. Here I took into consideration the fact that a simple tonal étude—as in c minor, or f sharp major, etc.—would potentially emphasize some tones more than others, which would contradict my intention to explore as many tones as possible. The harmonic instability also illustrates my vision upon the recently voiced Viole de Gambe 8', which was not quite finished yet and slightly out of tune. The rhythmical irregularities and the lack of bar lines also express that vision.

The piece was not recorded, since at that early stage I did not yet have recording equipment set up. Therefore, I cannot provide a sound example of the piece. Only the manuscript remains.

The voicer's perspective on playing—"ganz sinnlich"

Apart from my own musical experiments, which developed while I was alone with the instrument, my participation in the voicing sessions led me to a few other interesting musical perspectives as well. One of the most interesting perspectives suggested a more holistic approach to performance—*to play sensuously*. That approach emerged naturally as I played during the voicing process. The atmosphere of silence and concentration that dominated the hall also suggested a calm, controlled, focused playing on my part. More specifically, the expression "ganz sinnlich" was brought forward by Woehl himself when I asked him later about musical performance in the context of organ voicing, in February 2014. He explained:

> But in voicing, I would say, one does not have to play literature. An organist who doesn't play his music, but music for tones, if I can say it like that…And it is important to find out how the tones behave in different regions…well, that one can hear them and that they are free. So one can say: this tone, doesn't matter what you play on it, it is always hearable. Yes…I have to say [one has to] play very, very sensuously.[139]

Literally, to play sensuously is to play with the senses; to play in a sensible manner. This is a rather abstract vision of playing that has implications for musical parameters, namely tempo, vocal texture, harmony, melody, and articulation.

When playing in a sensuous manner, the tempo should be regular and flowing, yet not fast. A moderate, slow tempo was ideal. This gave the voicer the opportunity to listen to the tones develop fully, and to consider their attack, steady-state, and behavior in the room. Fast tempi would produce condensed and unclear information.

The use of a consistent vocal texture was ideal. Experimentation with three to four voices allowed the voicer to listen attentively to the different tones in relation to each other. Voice leading was an important musical concern. It was important to play around a tonal basis, mainly using consonant intervals such as major and minor thirds and their respective inversions. However, the music should not be restricted to one tonal center, but should pass through as many keys as possible. Constant modulation was essential.

The melodic lines should have a round shape, as much as possible. Random intervals, large jumps, and irregular melodic motives were not really helpful. There should be a consistent, coherent melodic shape. Regarding melody, there were also two other concerns: to explore the whole span of the keyboard, and to produce phrases that had a tonal, regular consistency, both in terms of melody and rhythm. This meant that the melodic lines should be built of ascending and descending motives. Those motives should change gradually throughout the compass, and not too abruptly. For instance, a melodic ascending line should be made of simple ascending motives, moving upwards gradually, and vice versa for a descending line. Also, ideally, melodic lines should be two or three bars long, and made up of simple melodic and rhythmic motives.

Finally, the player's articulation should be as refined as possible. A vocal texture could be attained with a good legato as well as open legato (connected but slightly detached, soft releases). In this context, I always avoided playing staccato or overlegato. Melodic intervals should be heard neither over each other, nor too distanced from each other. A gentle, balanced legato was ideal: one might say a *sensuous* legato.

1.1 One example of sensuous playing

Sound example 7 illustrates this practice. In it, I am performing within the context of a voicing session. The example was recorded on April 30, 2011. I am playing the Gemshorn 8' and Unda Maris 8' in the Oberwerk. The example is an excerpt from a longer musical invention. A transcript is given in Figure 8.2.

***Sound example 7, ca. 1 minute* – track 7**

We hear a moderately slow and regularly flowing tempo. There is a clear texture of three to four voices, moving parallel to each other. Note the lower voice and the middle voice, moving mostly in parallel thirds, one octave apart (sometimes in parallel sixths). The same happens between the middle voice and the higher voice, specifically in bars 10, 14, and 16. The phrasing is also rather simple. From bar 3 to bar 8, a simple ascending melodic motive repeats in the upper voice as a pattern, three times. That ascending motive is present from bar 4, from D4, with a descending syncopated motive of three tones (D4, C4, B3), followed by a resolving fourth tone (C4). The same motive is repeated two more times, always transposed a fourth higher, and therefore giving the overall melodic contour an ascending character. After a peak in bar 10, the melodic direction develops in the opposite manner and moves gradually down. Essentially, the playing is legato, with slight changes of articulation at some points. The intent to explore the whole ambitus of the stop is also clear. The lower voice, for instance, starts on the lowest C1 in bar 1, moves gradually upwards, and reaches B3 in the middle of bar 10. This is a range of three octaves within the scope of ten bars. The same principle is applied to the other voices.

Even though the playing is based merely on momentary intuition, without any source, the thought is not far from that of playing a continuo part. In Figure 8.2 the lower voice provides the melodic contour, whether up or down, and the remaining upper voices provide harmonies over the bass line. With this approach, I often felt that I had a guideline—the bass—but still enough melodic and harmonic freedom in the remaining voices. The basso continuo style also comes through in the harmonic patterns used. For the ascending line, for example, the harmonic pattern is mostly 7 - 6# - 6 - 9b - 8, and for the descending line, the pattern is the very conventional 4/2 - 6/5 - 4/2 - 6/5.

1.2 From voicing to attentive listening

After two months documenting the process of voicing, I realized that the technical procedures applied to the pipes were standardized, even repetitive. Most of those technical procedures were already described in organ building treatises or in other research on the subject of organ voicing. What then was so personal about voicing an organ, if the techniques applied were so standardized?

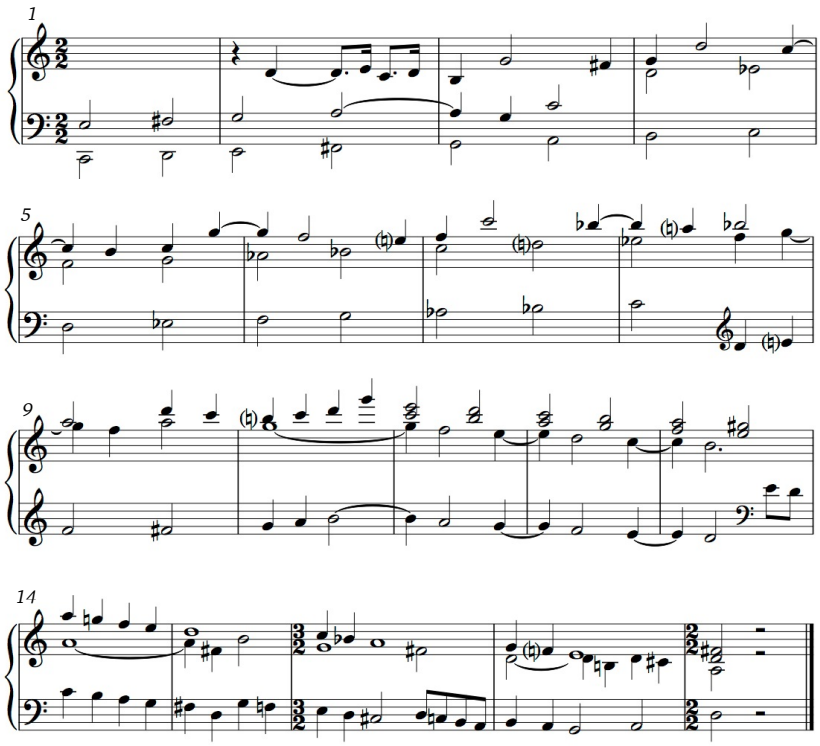


Figure 8.2

I myself had been involved in Gerald Woehl's voicing process, and in Studio Acusticum I had the opportunity to document and visualize the handling of tools and the manual skills involved. I had certainly learned much about the basic technical procedures and the theories. But this was not enough to fully understand the practice of voicing, I felt. There were still aspects of the practice that were hard to grasp. I eventually became aware that I and Woehl did not hear the sounds produced by the pipes in the same way, and we had a different relation to those sounds. This became evident when I was not able to hear all the sonic variations resulting from the adjustments done to the pipes. I also noticed that voicing was not about making all the tones equally balanced all over the stop, but about doing something else beyond that, which was intriguing. I did not fully understand Gerald Woehl's habit of taking off his shoes when preparing to voice either. There was something mysterious, something unseen and untold about all that practice. Later on I concluded that Gerald Woehl had a personal relation to sounds

that was much different from mine. I realized that the voicer's most fundamental knowledge was precisely the knowledge of sounds and listening. The techniques employed to voice the pipes were simply the medium through which sounds were shaped. They served only a practical, utilitarian purpose. The most important materials used in voicing were not the pipes or the tools, but **sound**, in its raw, concrete form. The voicer's motivations developed out of his very personal experience of those sounds. I recall one of Gerald's remark:

> Here is the thing: [to become a good voicer] one naturally has to be interested in sounds. This might not always be easy.[140]

Listening thus became one of the most intriguing, even fascinating, aspects of voicing. This influenced my musical and research practice in a definitive way. From that moment on, I too became interested in sounds and the experience of sounds. My approach to the sounds produced by the pipes became then more concrete, even more phenomenological. My interest in the perspectives of composers like Pierre Schaeffer, Luc Ferrari, and John Cage grew as my research progressed, and as that interest grew, an approach to musical composition emerged. *The wind in the word—memorized sounds of voicing* is the musical piece that resulted from the accumulation of those ideas that came out of the experience of voicing, which I will be addressing in full in chapter 10.

2. Approaching musical composition as practice

The fact that I am a concert organist, educated to perform repertoire, created some initial expectations for the final artistic outcome of this dissertation. Even before the actual research started, I had already assumed that one of the ways to explore voicing would be through performing repertoire, and that most probably, one of the products of the dissertation would be recordings of repertoire. One of my initial ideas was to record the same set of pieces throughout the different stages of the development of the sounds. These recordings, all collected at the end of the research, would offer a comparative look into the overall development of the organ, and specifically the development of those sounds. This seemed at first a good idea. But there were unexpected changes, and soon after started my research, I realized that recordings of organ repertoire would not suffice as an artistic outcome. I felt that such a result would not do justice to the personal experiences I was gathering in voicing, and most importantly, it did not seem to contribute much to my own artistic practice either.

Using musical performance for comparative purposes was, in my view, reductive. If the ultimate aim of my musical practice was to evaluate the development of organ sounds by means of comparison, then music would have been the medium to illustrate something else, and not the end in itself. In this setting, my artistic practice would have served to demonstrate the practice of the voicer, through the sounds of the organ, by means of a fixed and somewhat pre-defined musical activity. Such a comparative approach would also be based on the very reductive premise that the sounds of the organ are made to suit that specific practice, thus leaving aside the possibility of allowing this experience to lead the way to new, original works and perspectives.

The experience of voicing was different from that of playing repertoire, and in fact, the practice of organ voicing itself had almost nothing to do with performance of repertoire—remember what Gerald said: "…in voicing one does not have to play repertoire." Organ voicing, as practice, was about sounds and the experience of listening to those sounds. There, musical performance was secondary, and it had a merely utilitarian purpose—to contextualize those sounds. Sounds themselves were the most important thing, the main focus, and I wanted to introduce that ideal in my musical practice as well.

The unvoiced sounds I collected during the voicing process—never heard before—had qualities in themselves, and they too should be freely explored. In my view, this new sound experience required a very specific musical approach, a musical language of its own. I thought that this musical language should naturally emerge from that experience; the musical outcome should emerge from the sounds, and not the other way around. Given this, I concluded that musical composition was more likely to produce results that could faithfully reflect my experience of voicing and sound. I therefore saw composition as an interesting endeavor.

The impermanence of sounds

Having settled on musical composition as the most suitable artistic approach to the research, I now faced new challenges. One problem related to the fact that sounds, the basis of my compositional practice, were not permanent, but always changing in the process of voicing. This happened because voicing is essentially a process of gradual transformation of sound. My frustration emerged then from the fact that I had no control over those sounds, and I could not capture them, hold them still, and compose for them. Any interesting sound might be available one day and vanished the next.

Another problem was the practice of composition itself, also in relationship to the problem of the impermanence of sounds. The fact that I had concluded that musical composition was the best approach did not mean that I knew already how to develop that practice in this very specific context. I did not know what my compositions would look or sound like; I did not know what type of musical pieces would ultimately emerge. I knew, however that traditional methods of composition would not work in this environment. Using pen and paper would not work. If I had written (in score) pieces of music during the process of voicing, those pieces would become worthless the moment those sounds were voiced again. If I had written music in score, then only the vision would have remained and not the materials, not the sounds themselves.

Eventually I came to the conclusion that the only way to overcome all these issues would be to find a way to capture sounds and keep them still. The only viable solution was to use sound recordings. Recordings would capture a great number and variety of sounds and make them permanent. This also meant that I could always revisit and reuse them, which was ideal. The use of recorded sounds for musical composition was also a practical solution, because I was already using recordings as a method for documenting the process of voicing. My documentation became my material of composition.

Voicing as process of composition

Although I had decided on an artistic practice and the materials to use in that practice, I did not yet have a process. Process should guide the practice of composition, and it can be based on a concept, an idea, a form, a style, or something else. What was clear to me was that the artistic outcome of this dissertation ought to reflect or represent my knowledge and experiences of organ voicing. In this scenario, the first relevant idea was to trace a parallel between some of those aspects of voicing and those of musical performance, or even to incorporate some of the practices of voicing into my own musical practice. The idea of listening attentively to sounds, and paying attention to aspects of texture, strength, attack, and so on, was a good starting point. But this was not much of a process. I came then to the idea that the best way to express musically the knowledge of voicing would be to fully incorporate the practice of voicing into my musical performance practice—composition. In that way, my practice would literally embody the practice and the knowledge of voicing.

In studying Woehl's process in detail, I realized that it consisted of four major phases: (1) attentive listening; (2) personal perspectives on sounds; (3) technical adjustments; (4) refreshed listening.

(1) Attentive listening was the method used for understanding the material, the sounds. During this first stage, I spent time playing tones individually, for relatively long periods of time, listening attentively to their properties— attack, color, amount of noise, loudness, and the development of those qualities in the room. (2) Thinking in personal or subjective terms about the sounds came later. Both in voicing and musical performance, a tone could be perceived as dirty, raw, spitting, undulating, airy, beautiful, pressed, ugly, etc. Any personal perspective on a sound would spur a course of action—either leaving it as is, or changing it to produce a different effect or fulfill a different artistic goal. (3) After these personal evaluations, the sounding material was shaped in a process of technical adjustment. In voicing, tones were shaped through the physical manipulation of the pipe. In my musical experimentation, sounds were given shape within a musical contour. (4) Refreshed listening was the last part of the process. It consisted of listening to all of the material with "fresh ears," usually the day after. Much as in voicing, it was important for me to leave the musical sounds for a while, to go out in the world and experience other sounds and then come back to listen to the work that had been done with a renewed critical attitude.

3. From recorded experimentation to musical work Conceiving The wind in the word

The wind in the word—memorized sounds of voicing is the musical piece that resulted from the considerations I have discussed thus far in this chapter. The environment in Studio Acusticum, the observations I made and the knowledge I attained all inspired the creation of the piece. What I have described until now is the path of creation. The path continues with a closer look at the musical experiments I have previously referred to, which resulted in the very first études of the work.

3.1 First étude

The first substantial experiment started on a Monday, February 28, 2011. It developed throughout that week, and culminated in a written reflection and a complete first étude. This étude, based on some of the flute sounds available at that time, was my first relevant artistic achievement. It staked out the path for the artistic work yet to come. Con-

cerns about listening, the impermanence of sounds, and matters of style and process had all been addressed at this point, and this étude was the result. Back then I wrote:

> Sound, without a musical context or tradition, is exactly what I am experiencing while following the voicing process. Musically, I listen to these sounds from another perspective: listen to their tonal characteristics (concrete) and how the tones relate to each other, and very importantly, to the room. I have been working with frequencies and unfinished voicing (much air, irregular attack, irregular pressure, etc.). I have tried to focus more on these aspects. The flute étude was recorded on February 28, 2011, a Monday. The piece explores the mystical character of the flutes, as well as the bass region of the Rohrflöte 8' in the Hauptwerk, which is at the moment not ready with voicing. There is somehow an emotional ground to the piece. It has a lonely, repetitive, fading character.[141]

This first experiment was relevant in two ways. First, it was conceived based on the realization that the sounds available in the organ are not permanent, and therefore that I could only use recorded material for my compositions. Second, it helped me to define a new creative method—from recorded experimentation to musical work. This method consisted in first recording my musical experiments and sound explorations, and then listening to them attentively. From there I chose the sounds that best captured the state of the instrument at the time of recording, but also the sounds (noises included) that I found most interesting. I then placed those most interesting sounds (motives, textures, attacks, colors, etc.) within a musical form, often organized intuitively. To do so I used an editing software program, which allowed me to cut, paste, edit, and combine different stereo tracks.

By then, my musical experiments at the organ were rather structured. Figure 8.3 is a transcription of a note developed while exploring some of the sounds available in the organ, dated March 8, 2011. The hand-written note includes descriptions of sounds and musical ideas, and presents the first choices made in the experiment referred to in the quote above, as well as descriptions of sounds and textures found in the Oberwerk Gedackt 8' and the Hauptwerk Rohrflöte 8'. I developed the note while listening attentively to the sounds available. I first played the tones slowly, monodically, up and down the range of the keyboard, and memorized those with peculiar features—for instance the stronger tones, or the ones that were unfinished and produced interesting effects.

Some of the characteristics of those interesting tones and effects suggested to me certain musical ideas, motives, melodies, etc.

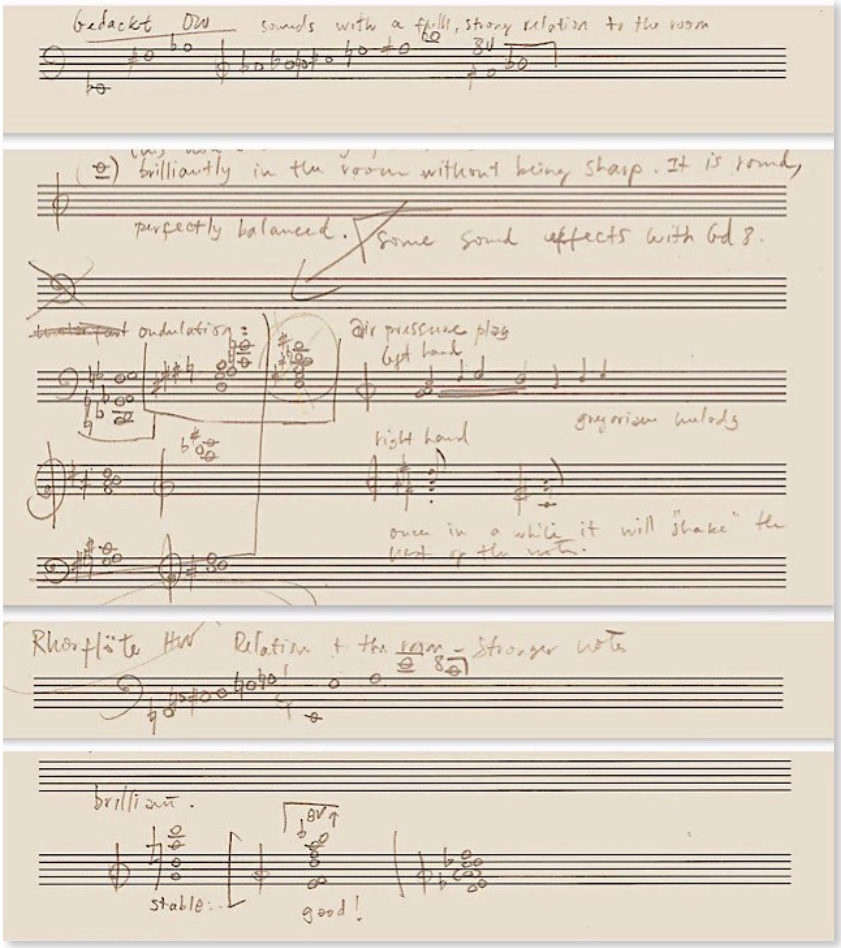


Figure 8.3

The first written sentence, in the top, “Gedackt 8 OW (Oberwerk) sounds with a full, strong relation to the room,” shows a concern for the development of those sounds in the room. Before writing that remark, I had played all the tones in that stop, and I had listened carefully to their properties and how they developed in the room, mainly focusing on amplitude. The ten tones depicted immediately under the remark were the strongest tones in that stop. As the note says, they sounded “full” and “strong” in the

room. In the middle of the page, a different indication is given: “Some sound effects with Gd. 8 (Gedackt 8)/undulating.” These sound aggregates were assembled taking into account the untuned state of some of the tones in the Gedackt 8’—hence “undulating.” As a standard procedure, aggregates were built starting with the choice of one individual tone, then through the addition of other tones, always with the intent to attain interesting textures. My preference was always to combine different types of sounds, to create exotic combinations. In building aggregates, I also considered the tension created by the choice of harmonic intervals, as for example minor seconds combined with other intervals would always produce interesting vibrations. That overall combination of mixed sounds and intervals would result in an aggregate which in itself would sound very unusual.

In Figure 8.3, to the right of the undulating aggregates, we can also see the indications “air pressure play left hand/Gregorian melody/right hand/shake the rest of the tones.” It is not totally clear what these indications refer to, precisely. Unfortunately, I was not more specific back then, and I cannot fully remember what the remarks mean. It is clear, though, that they are instructions on which tones to play, and even seem to depict a musical idea (“Gregorian melody”) or an effect (“shake the rest of the tones”). The figure also shows similar indications for the Hauptwerk Rohrflöte.

3.2 Three examples of sound exploration

Sound examples 8 to 11 are excerpts of my experiments with some of the flute sounds available in the organ by February 2011. More specifically, they relate to the note presented in Figure 8.3, as well as to Étude III from *The wind in the word.* They are all extracted from an experimentation session happening on February 28.

Sound example 8, ca. 30 seconds – track 8

Note the indication in Figure 8.3—“[this note echoes] brilliantly in the room without being sharp. It is round, balanced.” This tone differed from the surrounding tones in that stop, the Gedackt 8' in the Oberwerk. It seemed to me that the other tones had a more controlled attack, and the steady state was in fact more stable. This tone, in contrast, was very much fluctuating in every way. Both the attack and the release have a very peculiar round contour. It rises and falls lightly, without weight. I hear “woh.”

***Sound example 9, ca. 30 seconds* – track 9**

The slow attack and release of the tones (Oberwerk Gedackt 8') is manipulated from the keys. The amount of air versus the amount of tone can be controlled simply by depressing the key very slowly, and by releasing it in the same way. Several voicing factors may have contributed to this effect, but most probably the variable wind function was activated, which resulted in irregular wind pressure levels, and thus the effect heard in the example.

***Sound example 10, ca. 20 seconds* – track 10**

This example illustrates the state of the bass region of the Rohrflöte 8' in the Hauptwerk before the voicing was finished. Note that some of the pipes produce two or more tones. We hear a percussive attack, followed by a great amount of white noise and other interesting sounds that result from the vibrations produced in the body of the pipe, and very predominant upper partials.

***Sound example 11, ca. 30 seconds* – track 11**

In this example, the low C sharp of the Hauptwerk Rohrflöte 8' sounds as if no voicing had been done at all. One of the interesting features of this sound is that it is composed of two layers. At the bottom, the lower frequency is the actual C sharp, while the higher frequency is changing up and down chromatically, glissando. The change in pitch of the higher tone was controlled from the action at the key. The variations in pitch are the result of the minimal movements of my finger on the key. If the key was depressed slightly, the reedy tone would go up, glissando; if the key was slowly released, the opposite effect was produced and the reedy tone would gradually fall down in pitch. Once the key was completely depressed, the higher frequency would vanish. The higher tone could only be produced when the key was depressed about halfway. From there, any minimal movement would result in this variation of pitch. The louder sound heard from sec. 16 to sec. 18 is a different tone. In this session I was also experimenting with different tones together—what I referred to earlier as *aggregates*.

3.3 Second étude and the definition of a method

By November 2011, I had assembled a sufficient amount of documentation, experiences, and reflections to be able to draw up a path, a method for the continued work. I now wanted to further develop my own artistic work on a larger scale. The creation of a

second étude was important because it established a method. This was a good method because it was rather open, leaving space for creativity and further improvement. The use of recordings and the number of different types of sounds and stops available also granted me a wide range of possibilities. At this point I felt that I would not run out of sounds. With the second étude, I also arrived at the idea of basing each piece on a particular stop family. For instance, the previous étude was mainly based on the flute sounds available in the organ at that time; this étude, in contrast, was based on the principal sounds.

3.4 Two examples of sound exploration

***Sound example 12, ca. 20 seconds* – track 12**

This example serves to illustrate the type of exploration I did in Studio Acusticum. In this example, recorded on November 1, 2011, I initially explore the characteristics of the attack of the Principal 8' in the Hauptwerk. This particular exploration developed further, and it became a point of departure for one of the motives used in Étude II from *The wind in the word.*

***Sound example 13, ca. 1 minute* – track 13**

In this example we hear the bass region of the Principal 16' in the Hauptwerk. The pipes are placed in the façade, and they had not had any voicing treatment whatsoever. The sounds are completely raw. The pipes are not yet capable of articulating a tone; there is only air and noise.

4. The realization of voice – approaching the finished organ

After almost a year of research, practicing musical composition and regular documentation, a turn of events and an important realization occurred. For the first time, I was able to hear the German Baroque core of the instrument. On the morning of July 26, 2011, the pedal board was attached to the console, and with a good number of stops already available in the organ, including those for the Pedal, I could perform repertoire. That morning, I had the opportunity to play a set of Bach pieces. I played the *Fantasia et Fuga in g*, BWV 542, *Schmücke dich, o liebe Seele* BWV 654, and the trio *Allein Gott in Der Höh Sei Ehr* BWV 676. I could now envision, for the first time, the finished instrument. On that day I wrote:

> The plenum in the Oberwerk is extremely well balanced, in terms of loudness and brilliance, but also in the way all the stops come together. The different regions (bass, tenor, treble) are very rich in their own way, but complement each other as well. The bass is very much to the ground, with body, although it is not loud. It fills the room properly and gives a good basis for the rest of the sounds. The attack is also fast enough and clear. The tenor region is very balanced and the sound is very controlled as well as the treble, which is not loud or sharp. It is a pleasant balance. However, apart from the balance, the sound is alive, not boring or uninteresting. I realized that the attack is different in different regions, some sounds are faster and others slower, some are more spitting, but somehow they work all well together.[142]

The experience did in fact provide a new perspective upon the sounds of the organ, and upon the practice and goals of voicing in general. Until this point, I had mainly been listening to these sounds in the context of voicing sessions, which mostly dealt with sounds as concrete materials, the focus being directed towards each individual tone and its properties. But now I had had a different experience. This realization led to an essential question: how did tones suddenly became voices? The description in the quote from my logbook is certainly a description of voice. I refer to balance, brilliance, the different sound regions in relation to each other, loudness, clarity, and behavior in the room. I also mention the fact that the sounds are free, and that the attack is diverse and interesting. But most importantly, I make the remark: "the sound is alive." The realization of voice came through musical language, which had not been part of the process until that moment. It was also at that point that I came to the realization that voice was something that emerged only in the context of a musical language. The organ was voiced taking into account the language that it was supposed to speak, the language in the example referred to here, the language of J. S. Bach.

4.1 Two examples of the music of J. S. Bach

The next two sound examples were recorded on a Tuesday morning, July 26, 2011. I arrived in the room and since no work was done in the organ, I sat at the console and started playing. Soon after hearing Bach's fantasia, Gerald Woehl, Claudius May, and I engaged in conversation. We discussed registration possibilities and the sounds available in the organ at that time. At the console, there was an old bench which was too

high for me, and there was no music stand either. My scores were propped on top of the fourth manual, constantly falling down. The action at the keys was not regulated either. It was all uncomfortable. I did enjoy playing these pieces in that session though. The sounds were promising.

***Sound example 14, ca. 3 minutes and 30 seconds* – track 14**

In this example, the pedal may sound weak compared to the manuals. These were the sounds available at that time. In any case, even with only a few stops, the pedal still carries the rest of the voices. The bass is not loud or forced, but it is still present. It is also interesting to note the clarity of voices and their diversity in the context. For instance, the tenor region comes through very clearly at most points in the fugue. The higher region is also heard clearly, but it is not sharp. The mixtures are strong. In the example we hear the Gedackt 8', Octave 4', Octave 2', and Mixtur 4fach in the Oberwerk, and the Subbass 16', Octave 8', and Octave 4' in the Pedal.

***Sound example 15, ca. 3 minutes* – track 15**

In this example the registration is not ideal, since the solo line is played on a cornet composed with stops from the Récit. Ideally, the solo line would have been played in the Oberwerk, and the accompaniment on the Hauptwerk. This was not possible though, since there was no Principal 8' available in the Hauptwerk yet—this also demonstrates the type of challenges I was still facing, even after nearly one year of voicing. In the example we hear the Principal 8' in the Oberwerk as accompaniment, and the Flûte traversiére 8', Dulciane 4', Quinte 2 $^{2}/_{3}$', and Tierce harmonique 1 $^{3}/_{5}$' as solo, played on the Récit. The Pedal plays the Subbass 16' and Octave 8'.

4.2 Recording the eclectic organ

Approaching the final stages of my research, and having collected a considerable amount of facts and experiences up to that point, sometime around the beginning of 2014 and more than one year after the inauguration of the organ, I felt that it was indeed necessary to record the finished instrument and reflect upon those finished sounds. In *The wind in the word* I had explored the process of voicing, but I had not yet explored the more conventional artistic use of the organ. Earlier, I had thought recording repertoire would be something reductive, not adding much to my own artistic practice, as brought out earlier in this chapter. However, I came to see things from another angle. Recording classic repertoire would in fact complement the original musical composition

presented here, and make a logical conclusion to the study. By recording the finished organ, I would be experiencing the process of voicing until the end, the final result, and ultimately I would be sharing that experience with the reader-listener of this dissertation. This would be a good way to conclude. I also considered that the ultimate goal of voicing was to produce sounds that were to be used in specific musical contexts. They served a purpose. It would be a loss not to explore the sounds in that context as well. I decided then to explore those finished sounds by including them in the performance of repertoire suited to their main purpose, their style, and to examine those sounds critically in the text.

The set of pieces available on the DVD (from track 25 to track 32)[143]—*Franck, Reger, Kagel, and J. S. Bach*—explores the finished organ and its most prominent aesthetic faces: the French Romantic organ; the symphonic organ; the central German Baroque organ. I chose to record short character pieces with the intent to explore the characteristics of the sounds in that aesthetic context, but also to examine how my performance of that repertoire would be affected by the characteristics of the sounds produced by voicing.

3

Discussion and Musical Exploration

Premise to Part 3

ENCOUNTER:
Potsdam, February 17, 2014

The following text is a transcription of parts of a conversation held between me and the voicer Gerald Woehl, in his atelier in Potsdam (Sanssouci), on February 17, 2014. This meeting took place one year and four months after the inauguration of the organ in Studio Acusticum, and after our collaboration. A longer excerpt is transcribed in Appendix C5, pp. 249-260. What is offered here, in this Premise, is a selection of some particular moments from that dialogue. The content of this excerpt serves as a point of departure for the discussions offered in part 3 of this dissertation.

Gerald, which aspects would you consider essential for an organ builder to become a good voicer? What makes a good voicer?

Here is the thing: as a person one naturally has to be interested in sounds. This might not always be that easy. I especially love Mahler. Two or three years ago in Berlin all the Mahler symphonies were performed. If you go there as a voicer, if I can call myself that, then you hear the music quite strong, because these sounds—doesn't matter if it is an organ or an orchestra—especially in Mahler, there are the excellent soli in the strings, horns, brass, etc., and which are extreme. This is where I get ideas for sounds. How do sounds have to sound, so that they speak to you? So that it is not a tone that you just produce, but goes into your soul. That is the crucial thing. I don't really know. You have to take in everything.

An organ has to have strong voices, weak voices, poetic voices, and even ugly voices. Like a Bombarde, it's so penetrating. Or a Krummhorn, in the low region: these are not exactly beautiful tones. You can hardly say that. A good voicer can fill out the whole artistic spectrum. Whether it's beautiful or not. There are beautiful organs but they are often boring. Beautiful is not necessarily artistic. I would say. I think that may be the most important thing that defines a voicer…When the voicer brings a harmony to the whole instrument. It doesn't have to be beautiful, but everything has to be in it. A place where every person can see a reflection of himself, in whatever mood he is in at that moment. That's the best. And another important thing is that a good instrument—or, a good voicer will make every organ sound a little different for every organist. The more extreme the organ is, the better, I would say. That is what makes a voicer good. If he brings the most extreme things into one thing. Playing is exactly the same. No difference at all. But of course you hear everything somehow…You have to filter all the sounds. And the most important ones one has to keep. There is something else a voicer has to be able to do: He has to construct a kind of sound framework for himself. A musicologist has to know exactly what happened in what years. In 1770 this occurred. This and that and the other happened then. A good voicer has to do the same thing. He has to memorize good sounds.

What would you say is the difference, while voicing, between listening to the tones during the process, when you are actually voicing, and when a musician plays music with those recently voiced sounds? Do you listen differently to those sounds in these

two different situations? Do you look for different things in these two different settings?

First of all, you need to be quite focused when you are voicing, because you need to keep the whole keyboard in your ear, so to speak. You need to know how it sounds in the bass, you recognize the notes in the treble, and so on. It requires a certain amount of concentration to grasp a whole stop. When you voice, you are listening into the tone, so to speak, and when you are listening to someone play, it is the opposite: you hear what is coming out of the tone. First you listen into the tone and then you see what comes out. You could say it's the exact opposite. So you're observing, and of course you hear exactly what has to happen now—is the pressure too strong, or what you still have to do overall. I would say these are two totally different ways of listening.

This is interesting. What is it exactly that you focus in the tone? What does it mean to go in the tone? What do you look for in the tone?

Oh! That's hard.

Ok, let's say it like that then: what do you consider to be a good tone?

Well, I will start from the outside. There are voicers who only listen from the outside. They listen to the stop, what comes out, and respond to that. They don't listen into it, they only voice from the outside. What's right in front of me? What do I still have to do? It's like when you look in the mirror: I still have to do this, I still have to do that. Listening into the tone is something different…[long pause]

Well, I already said before, you can shape a tone so that it stays in the pipe. You can bring it to the front, you can make it a head voice. You can do all of that with a tone, with voicing. I think it is important to—maybe Claudius can confirm this—I work an incredible amount with the languid. I'm always knocking the languid up or down—but only the very tiniest bit! Knocking it once is already too much. And I think that is the most important thing. That is, the most important thing for me is that the tone be as if it is sung. It cannot be forced, it has to be able to develop freely. Like a singer, whether he forces it or whether he is completely free…I think this is the important thing, that you recognize what is in the tone, that this really comes out, and you don't just try to change the façade. Of course you can do the façade, make the pipes speak somehow, follow the theory, and then just smooth them out, put make-

up on them. That is not the real thing. You have to go deeper—I don't find loudness so very important, if one tone is a little louder. It's like that in a choir, too: one person sings a little louder, another a little softer. It's perfectly natural. One person has a terrific voice, someone else's voice is not as full, etc. But what's really conspicuous is when someone forces the sound. When someone is...[putting his hands around his stomach] forcing and their voice is stuck—that sticks out over the whole choir. If someone sings louder or softer is not critical…and this is the most important thing that I am always working on.

I would say, the better the organ, the more easily it speaks. I once asked [Gustav] Leonhardt—you might know of him, the harpsichord guru, and organ too, he recently passed away, but he was the greatest figure of my generation—I asked him how he judged whether an instrument was good. And he said: It has to play by itself. He was right. It makes a difference, whether I come to an organ and I have to work at it, there are organs where you have to work really hard and there are organs where you just touch them and it's all there. And I think listening into the tone is like this. If I only work on the façade then I don't hear the people who are forcing. And I just make everything even. But if you make every tone speak freely, it doesn't matter if one of them is louder or softer. I don't work much at all with loud and soft. There will be always some notes that are a bit louder. It doesn't bother me at all. And another person won't notice it either, because loudness is not the criterium. The criterium is that the tone speaks as easily as possible and as freely as possible.

I have noticed that you take off your shoes when voicing, especially when voicing from the room. Do you want to reveal something more about that? Well, there has been speculation, I am curious to hear what you have to say about it.

Well, I maintain that you can hear through your feet. I have a good friend, an acquaintance, she is a pastor and she takes off her shoes for every sermon.

Ah! That is interesting.

Well, I didn't do it now because you are here. When I go to the opera I take off my shoes. I hear better then.

Chapter 9

DISCUSSION I: THE SKILL OF LISTENING

Intersubjective listening

As I mentioned in chapter 4 (see p. 35; *A word on tacit knowledge*), the skill of listening in voicing is often learned by doing, and by listening to others doing it. It is a process of the embodiment of tacit experiences—just like my experience in Studio Acusticum. There, I sat in the hall, listening to voicing. Silently, with time and patience, I developed my own listening practice. It was a non-verbal form of training. Given those conditions, and since this was from the start a study on voicing (and musical performance), I saw a good opportunity to develop a better understanding of the topic of listening; to draw some conclusions and to articulate them in terms of theory. Even if it was a good idea, it was not a simple task.

One of the problems had to do with the fact that I was trying to describe not only my own experience of listening, but also someone else's—the voicer's. This was a process which I could never access directly, because the voicer's listening skills always remained within himself; I could not see or hear them. The only way to reach the voicer's experience of listening was through his own descriptions of sounds. This, however, was also problematic: the analysis of those descriptions could potentially end up being mere personal interpretations, and eventually I would simply be left with a documentation of signs and symbols that anyway might mean different things for different people. Seen from this perspective, the voicer's experience of listening seemed inevitably lost in translation. I then reached down to the ultimate question: can I actually know something about the voicer's experience of listening? To answer that question I had to consider the overall setting in which my investigation was carried out.

First, I was physically present at the voicing sessions; I was even involved in that practice. It was important to experience sounds together with the voicer, and under the same conditions. In this setting, I first made an effort to be consciously aware of my own experience of the sounds, and to simultaneously observe the body language of the voicer, which I tried to contextualize within the observable flow of events. My idea was to relate the voicer's actions and intentions with my own impressions of those sounds,

and to find possible parallels. Those parallels were found between (and within) my experience of listening and that of the voicer's, which ultimately suggests an overall research attitude that relies on the notion of *intersubjectivity.*[144] A concrete example: if I heard a tone that was too sharp, and if at the same moment the voicer instructed his assistant to make that same tone less sharp, then our notions of sharpness were possibly related. I could then understand, theorize and describe my idea of sharpness (and by parallel, the voicer's). This is obviously a simplified example, however. The process was not this clear-cut.

Secondly, I was able to talk about those experiences with the voicer himself, and on some occasions to discuss them at length. Certainly, descriptions are always personal, and they might mean different things. But there was a difference here: I was not only dealing with an analysis of words and concepts, as a hermeneutical process, but with descriptions of events that were also experienced by myself, intersubjectively—considering my constant presence in the hall, and my lived experiences and observations during that process.

Under these circumstances, I was convinced that some form of knowledge and understanding inevitably had to be attained. After a long period of investigation, and taking into account my verbal communications with Woehl and the shared descriptions, I came to conclude that our experiences seemed to connect at some points. Even though our listening processes were clearly personal, we still tried to make our perspectives and experiences clear to each other, and to some extent, I think we succeeded. I then concluded that it was in fact possible for me to know something about the voicer's experience of listening in voicing, and I could certainly develop some form of understanding of that experience. The reflections and conclusions presented here are the result of this encounter. What I am about to describe may be therefore regarded as a synthesis of listening experiences.

1. Two personal listening experiences in voicing

Influences on my approach to listening include Ihde's *Listening and Voice*, Schaeffer's theory of musique concréte, and Jean-Luc Nancy's *Listening*. These texts have influenced some of the perspectives presented in this discussion, and essentially, they are all phenomenology-based. In fact, both Ihde's and Nancy's texts are phenomenological investigations proper. The reason why I first came across these specific references had mainly to do with the very nature of this study. One of the goals I had set for myself was to investigate the voicer's personal experience of listening (and mine too). Therefore, I

became interested in that particular field of philosophy, since it offered help in uncovering some of the most essential aspects of the overall experience of listening—these references seemed relevant to my particular aim. From a certain point in time, my experiences and observations in the hall became echoes of the ideas and theories offered by these authors. Phenomenology became a guideline that influenced my position as an observer, as a listener, and as a musician. Let us consider Ihde's brief explanation on "listening phenomenologically."

> What is to listen *phenomenologically*? It is more than an intense and concentrated attention to sound and listening, it is also to be aware in the process of the pervasiveness of certain "beliefs" that intrude into my attempt to listen "to the things themselves." Thus the first listenings inevitably are not yet fully existentialized but occur in the midst of preliminary approximations. Listening begins with the ordinary, by proximately working its way into what is as yet unheard. In the process the gradual deconstruction of those beliefs that must be surpassed occurs.[145] […] Potentially, anyone can do a "phenomenology." But nothing is harder than a phenomenology, precisely because the very familiarity of our experience makes it hide itself from us. Like glasses for our eyes, our experience remains silently and unseeingly presupposed, unthematized. It contains within itself the uninterrogated and overlooked beliefs and actions that we daily live through but do not critically examine.[146]

In the quote, Ihde implies the notion of *epoché*, which is the ancient Greek term for suspension (abstention), and the term used for the phenomenological reduction overall.[147] The term epoché is one of the cornerstones of Husserl's transcendental phenomenology, which stands on the motto *to the things themselves*. Reaching out for listening itself implies focusing first on a personal experience of listening. In my investigation of voicing, specifically, it was precisely those "overlooked beliefs" that I "daily live through but do not critically examine" that I had to first become aware of, in order to better understand listening and voicing. I had first to look into my own experience of listening, and then set aside (suspend) all the previous listening I was bringing with me as a trained musician. I had to search for *sounds themselves*. Back then, I was convinced that by doing so, by focusing attentively on the experience of sound, I might be able to hear more, and bring to light some of the hidden mysteries of the tones and sounds that filled that room during voicing.

Here is an excerpt that exemplifies those attempts to listen in such unfettered way. The passage is extracted from my logbook; it is dated January 14, 2011:

> On the first seat row there is more bass, the sound is more to the ground and the speech not so perceptible. At the end of the room, the stationary part is more characteristic, less to the ground, and more flat. If I would consider a scale from 0 to 100, imagining the height of the sound, I would say that sitting in the first row means getting a number between 28/30; in the end of the room, sitting higher, I get a 86/90, also with more reverberation; the voicer has been sitting in the middle of the room, and there feels like 56/60, where the middle region of the sound is more perceptible, as well as the attack.[148]

The quote describes my experience of a particular tone, or a group of tones, as I walked in Studio Acusticum and listened to Woehl voicing. I am describing the parallel variations occurring between my position in the room and the experience of the tone. What is most interesting is my attempt to describe that experience of sound in its most immediate form—thus suggesting a certain naiveté. This is observable in the type of language I employ, which is admittedly rather ambiguous. That day, I heard the attack of the tone in terms of its presence, or how perceptible it was, and the stationary part in terms of its height and depth (flat). Today, I think the height may relate to the physical relationship between the fundamental and its partials. Generally, I felt that the center of the tone was positioned differently within itself, varying according to my position in the hall. Apart from what I heard, and what can be found in the tone, I also remember a visual impression emerging as I listened. That figure did not appear as the result of a conscious creative impulse, but spontaneously, simply as an emerging object. The visual imprint resembled very much the shapes and colors painted by Mark Rothko, perhaps something similar to his *Mauve and Orange* (Figure 9.1). The height of the sound, described in the quote, appeared represented in the figure as the line that separates the two rectangles in that paining. The color red, and shades of orange and yellow, also emerged naturally, and I cannot directly relate those colors to the sound heard.

Mark Rothko. *Mauve and Orange*. Oil on canvas, 1961.

Figure 9.1

Here is another description of a personal sound experience, emerging during a voicing session. This one is dated March 14, 2011:

> Sound, its components, its behavior, its qualities. There is only sound. Necessary aesthetic considerations made by the voicer are only a vehicle to the artistic work on sound, and it is clear that the aesthetic foundations are laid out already at the time of the building of the pipes, and less at the time of the voicing, which is the adjustment of such aesthetic pillars to a particular setting. By now, it makes sense to me that the voicer, while voicing, is working with sound in its most concrete form. Imagine a

> two-hour voicing session with any stop, let's say the Flûte harmonique 8' on the Hauptwerk, and keep in mind that you will be sitting in the same place for the whole session, and that the same sounds will be played and repeated many times. What do you hear after 30 or 40 minutes? Do you still hear that so-called Flûte harmonique? Probably not. I myself can't hear it anymore, I lose track of any such concept, and I simply hear a tone filling up the space. It is from here that all departs. I also believe that this same principle applies to the voicing of any other stop.[149]

The quote describes precisely that setting aside of pre-established concepts and meaningful associations—"the Flûte harmonique"; for sound alone, as a concrete object—"a tone filling up the space". This does not represent the whole spectrum of listening concretely to sound, but it illustrates my first step towards that type of awareness. I was trying to dive *into* the tone. I was diving into reduced listening.

After being involved for a while in the process of voicing, sitting silently in the room, I eventually ended up finding something which I thought was relevant—sound itself (as in Schaeffer's notion of écoute reduite). I traced the parallel between my personal experience and the voicer's, and for a period I thought that only from that very same reduced perspective could the voicer himself hear all the minimal tonal variations, noises, textures, and nuances that constituted a tone. I thought that the voicer's experience of the sounds was possibly similar to that one. But I was wrong, and soon I realized that his listening mechanisms were slightly different from mine.

2. THE VOICER'S IDEAL OBJECTS: *INSIDE* AND *OUTSIDE*

Let us revisit Woehl's remark, transcribed in the Premise:

> First of all, you need to be quite focused when you are voicing, because you need to keep the whole keyboard in your ear, so to speak. You need to know how it sounds in the bass, you recognize the notes in the treble, and so on. It requires a certain amount of concentration to grasp a whole stop. When you voice, you are listening into the tone, so to speak, and when you are listening to someone play, it is the opposite: you hear what is coming out of the tone. First you listen into the tone and then you see what comes out. You could say it's the exact opposite. So you're observing, and of course you hear exactly what has to happen now—is the

> pressure too strong, or what you still have to do overall. I would say these are two totally different ways of listening.[150]

The *inside* and the *outside* of the tone may be regarded here as two ideal objects of the voicer's listening experience. Woehl himself acknowledges the fact that one (the inside) differs from the other (the outside). These objects are evidently not objects of daily experience; rather they emerge out of an attentive, focused form of listening.[151] Those objects are not out there in the physical world; nor are they found at the level of the ear, or even somewhere *in* the pipe. They are found within the listener's personal experience only, and that is why, when I asked Woehl to describe what is *inside* the tone, he immediately replied "Oh! That's hard." The experience of inside and outside emerges as an overall feeling that is **embodied**, thus difficult to verbalize. This possibly means that we cannot really know *what* these dimensions are precisely, or how they *look* like, and—which is an even more relevant question—*where* they are.

We may however ask: *how did Woehl himself reach those levels of listening? How did he become aware of them, and how did he get there in the first place?* One thing was clear: whereas I had to search for different objects within my own act of listening, through a process of research that meant excluding (and searching) my experience, the voicer already knew where to find those objects (inside and outside) within his experience. His training, and his skill, was aimed at knowing where the inside and the outside of the tones are located. It seems that any other person who is not trained in voicing cannot listen to sounds in the same manner the voicer does, and that is mainly because that person is simply not capable of locating those objects within his or her own experience.

2.1 The inside of the tone

In order to contextualize Woehl's perspective of the inside, and to enrich this discussion, I decided to to bring in the remark of another voicer. Consider Goebel's perspective on voicing:

> It is necessary, while voicing,…to feel with the soul of the tone.[152]

To feel with the soul of the tone is, in my view, close to meaning *going into the tone*. From the outset, this does not seem to tell us much about listening. But surprisingly, if we look at it carefully, it does. Goebel's remark expresses succinctly what it is to go into the tone, and as I will demonstrate here, it does express the feel of that kind of experi-

ence. To understand Goebel's perspective in full we must examine his words and search for their meaning. We must look at the meaning of *feel*, *with*, and *soul*, and consider what they might refer to in this context.

To feel

To feel clearly implies more than to listen (with the ear). For example, if I say that I feel, then I am generally acknowledging that I experience, that I feel within myself, without specifying the kind of experience I am having, or where, how, or when. The notion of feel, in Goebel's description, is certainly not that of emotional feeling, or physical feeling. Instead, I assume that he refers to overall sensory perception. The experience of listening results not only from what the ear perceives, but also from what the whole body senses. Ihde gives us an interesting example:

> As an exercise in focal attention, the auditory dimension from the outset begins to display itself as a pervasive characteristic of bodily experience. Phenomenologically, I do not hear with my ears, I hear with my whole body. My ears are at best the focal organs of hearing. This may be detected quite dramatically in listening to loud rock music. The bass notes reverberate in my stomach, and even my feet "hear" the sound of the auditory orgy.[153]

Remember for instance the fact that Woehl took off his shoes when voicing. He also explained later that he hears better with bare feet: "I maintain that you can hear through your feet. When I go to the opera I take off my shoes. I hear better then."[154] We may consider also that Woehl described specific characteristics of a tone by pointing to specific parts of his body. He explained, along with gestures:

> You can shape a tone so that it stays in the pipe [gesture: hands around the stomach]. You can bring it to the front [gesture: open hands under the chin], you can make it a head voice [gesture: hands above the head].[155]

In my view, this also refers to the feel mentioned by Goebel, which, interestingly, resonates with that of Woehl. This is, of course, why I chose Goebel's reference in the first place. It might also lead us to ask whether there is a general approach to voicing or not. Here, however, I can only conclude that *to feel* is to let the whole experience of sound

penetrate, and involve the whole body, and it is to be conscious of that experience overall.

With

The preposition with specifies the position of the voicer, as the one who feels, in relationship to that what is felt, which in Goebel's words is specifically *the soul of the tone*. The word itself (in German, *mit*), is synonymous with *by*, *along*, *next to*, *toward*, *in the company of*, and so on. This means that the voicer feels (in his body) along, toward, or in the company of the soul of the tone.

Interesting parallels come to mind. Imagine, for example, a midwife breathing along with a woman in labor. It is a form of parallel breathing, which is essentially a mechanical process. One does it by following, or imitating the other. But Goebel is talking about something different. He is not simply guided by the tone, or imitating what the tone does. He does not simply breathe with the tone. Goebel refers *to feeling along with* the tone, which is perhaps something more like *sensing along with* the tone. This ultimately suggests a form of embodiment of a *shared* feeling or sensation. This means that to feel with the soul of the tone, the voicer must take that feeling (sensation) within himself. He must fully embody the feel of being the tone. The voicer must somehow imagine what it is to be the pipe and the tone itself, and he must therefore feel (sense) the process of development of the tone within it-(him-)self. He therefore embodies the whole process of tone production too.

Gerald Woehl clearly demonstrates this kind of embodiment in the description I quoted above, where he explains that he feels with (embodies) the tone in his stomach, his chin, or his head, or even perhaps at the level of his feet. He becomes the pipe, and he produces (feels) the tone within and through it-(him)-self. At this point, we may consider Nancy's perspective as an interesting take:

> A subject feels: that is his characteristic and his definition. This means that he hears (himself), sees (himself), touches (himself), tastes (himself), and so on, and that he thinks himself or represents himself, approaches himself and strays from himself, and thus always feels himself feeling a "self" that escapes or hides as long as it resounds elsewhere as it does in itself, in a world and in the other.[156]

The soul

Note Woehl's remark:

> How do sounds have to sound, so that they speak to you? So that it is not a tone that you just produce, but goes into your soul. That is the crucial thing. I don't really know. You have to take in everything.[157]

There is a kind of mysticism in both Wohel's and Goebel's choice of words too: for instance, in the term *soul*, which they use to refer to something (and everything) about the tone. This could eventually lead us into the realms of metaphysics and beyond, but I don't think we need to go that far to approach the notion of soul. In my view, the reference and its meaning are more accessible and direct than it might appear at first. I will take Ihde's reference to soul as departure. He writes:

> In the ancient mythologies the word for soul was often related to the word for breath. In the biblical myth of the creation, God breathes life into Adam, and that breath is both life and word […] But in the words about breath there lurk ancient significances by which we take in the haleness or health of the air that for the ancients was spirit. From breath and the submersion in air also comes *in-spire*, "to take in spirit," and on a final *ex-halation* we ex-(s)-pire, and the spirit leaves us without life […] But the air that is breathed is not neutral or lifeless, for it has its life in *sound* and *voice*. Its sound ranges from the barely or not-at-all noticed background of our own breathing to the noises of the world and the singing of word and song among humans.[158]

It seems to me that Goebel chose the term soul to refer to something that is not visible, not palpable, not even heard, but only felt. That soul he refers to is not only the air that is breathed or the air stream that flows into and through the pipe; the soul is felt as feeling and experience overall, fully embodied, and it is more precisely what Ihde calls "sound and voice". It is the air that is not only physical process, but air that has life in its own. It is the being that emerges within sound. The soul is the character of the tone, it is voice, identity. *To feel with the soul of the tone* is therefore *to embody the feeling of being within the tone*, not only as a physical process, but most importantly, as a voicing process. This means that the voicer *is* within the tone; he embodies the pipe and enacts the voice (soul). Ultimately, this implies going into himself and searching for feelings and sensations (which are found within the tone). The ability to feel with the soul of the

tone is the ability to be voice within the tone. Equally, to go into the tone is to dive into the tone, and be the tone, and produce, and feel the tone within himself too. It is embodying the behavior of the pipe, and thus the sound and tone that the pipe produces.

2.2 The outside of the tone

Regarding the outside of the tone, in the Premise, we heard Woehl say:

> There are voicers who only listen from the outside. They listen to the stop, what comes out, and respond to that. They don't listen into it, they only voice from the outside. What's right in front of me? What do I still have to do? It's like when you look in the mirror: I still have to do this, I still have to do that. Listening into the tone is something different…I think this is the important thing, that you recognize what is in the tone, that this really comes out, and you don't just try to change the façade. Otherwise you can do the façade, make the pipes speak somehow, follow the theory, and then just smooth them out, put make-up on them. That is not the real thing.[159]

The outside of the tone is the surface of the tone. In contrast to the inside, the outside is made up of specific properties easily identified by the ear. Those include mainly parameters related to articulation, including the characteristics of the attack and the steady state of the tone. Within each of those temporal parts, other characteristics may also be identified. Unlike going into the tone, what is out of the tone is not something necessarily embodied or enacted, but simply something heard. This implies a form of attentive listening, where the focus of the listener is directed towards sound itself, just as it appears to the ear. In terms of Schaeffer's listening modes (chapter 3, p. 27) the outside of the tone may be regarded as a form of *entendre.*

At the surface we find the attack, or initial transient of the tone. There, we may hear different types of consonants. Phonetics, a sub-discipline of linguistics, presents categorized information about a wealth of consonants used in different human languages. We can categorize the attack of an organ pipe as *obstruent affricate*, and divide this into three main types: *sibilant*, *non-sibilant*, and *lateral*. The sibilant category includes a large number of combinations that are essentially variations of the phonemes 'ts' and 'dz'. The non-sibilant category includes variations of the phoneme 'pf' (which is very clearly audible for instance in most low-pitched flue sounds). The lateral type includes variations of the least common phoneme, 'tl'.

The initial transient may also be heard in terms of its presence, which includes the parameters duration and speed, amount of noise, and loudness. The attack of the tone emerges and dissipates immediately into the steady state, and duration refers to the time that this attack takes to develop into the tone itself; it can therefore be longer or shorter (slower or faster, as it is often referred to). The amount of noise in the attack is independent of the type of consonant. The attack can be of any kind and still produce either much or little noise, as for instance the metallic hiss that is often heard alongside the consonant. The attack can also be either louder or quieter. It is a matter of amplitude.

The steady state may vary in vowel type. From a phonetic viewpoint, those vowels are essentially sonorant vowels, and they can be close (which includes variations of the phonemes 'i', 'y', and 'u'), mid (variations of 'e'), or open (variations of 'a'). The steady state may also be heard in terms of its harmonic spectrum and amplitude. The harmonic spectrum was usually referred to by the German organ builders in Studio Acusticum as *Klangfarben* (literally, tone colors). The sensation of color (darker, brighter, etc.) results primarily from the overall disposition of the partials in the steady state of a tone. A richer tone may have a wider spectrum. A tone with a higher range of upper partials will most likely sound brilliant. A tone with a lower harmonic range will possibly sound flat, even dark. The relationship between the partials and the fundamental is also important. A good balance will result in a well-rounded, balanced tone. If the fundamental is too dominant, the tone will probably sound heavier. This phenomenon is also observable when mixing different harmonic ranks in registration. If I build up a cornet (i.e. 8', 4', 3', 2', 1 $^{3}/_{5}$') on a Principal 8', the sound is potentially more broad and closer to the ground. If I build the partials upon a lighter fundamental 8', for instance a flute, then the overall tone will sound lighter, and possibly brighter. If the third partial (the fifth) is dominant, then the tone potentially becomes more nasal. The same principle applies to the voicing of each individual tone.

This remark on Klangfarbe may lead the reader to make a direct association with timbre. In fact, Klangfarbe is understood as the German term for timbre. Timbre, however is a complex property—and a topic of discussion in itself—and I will not discuss it at length here. Suffice it to say that the sensation of timbre is also affected by the initial impulse of the tone—the attack—and therefore cannot only refer to the harmonic spectrum of the steady state alone. It is in fact the sensation that results from the overall tone that is perceived. Ultimately, timbre is actually sound, and cannot be detached (as a

property) from any of the other related properties that constitute an individual tone. Nancy explains:

> In speaking of timbre, one is aiming precisely at what does not stem from a decomposition: even if it remains possible and true to distinguish it from pitch, duration, intensity, there is, however, no pitch, and so on, without timbre (just as there is no line or surface without color)…Timbre is the resonance of sound: or sound itself…Its very characteristic is itself to be, more than a component, a composition whose complexity continues to increase as acoustic analysis is refined and as it goes beyond mere determination of a sound by its harmonics. Timbre is above all the unity of a diversity that its unity does not reabsorb.[160]

2.3 The source of the tone

While reflecting upon the experience of listening in voicing, I realized that not only sounds were important (both the inside and the outside), but also the source that produces them: the pipe. Listening, in voicing, cannot be focused on the tone alone. It must somehow also include technical considerations focused on the pipe, otherwise no technical adjustments could result from the listening process.

This focus towards the source (écouter)—the pipe and its physical and mechanical behavior—is voicing-specific. Here, sound is used as a vehicle that brings back technical (theoretical) information about such things as the width of the windway, the diameter of the foot-hole, the wind pressure levels, the height of the languid, and so on. The techniques applied to the pipe, and the relationship between those techniques and the quality of the tone, is actually the subject of most treatises on organ building and organ voicing: those of Monette, Goebel, Audsley, and Dom-Bédos, for instance. The variety of techniques employed are well documented and explained in those sources, and because I am reflecting specifically on the subject of listening (and not voicing as a manual craft), I will not describe these techniques here. The most important thing is to remember that the voicer, while listening, also gathers information on the source of the sound, and manipulates that sound, technically and skillfully, from the source.

2.4 Voicing as listening process

Based on all of this, we can conclude that there are three main forms of listening in voicing. I consider the deepest and most personal form of listening to be the *inside* of the

tone. It is embodied feel, enacted voice. The sound resonates in the voicer's body; the voicer feels and enacts the pipe and the tone within it-(him)-self. Woehl himself calls this the most important form of listening. The second form of listening is already more superficial. It is the *outside* of the tone, or listening attentively (with the ear) to the properties of the tone, the thing itself (entendre). The furthermost outside form of listening implies a focus towards to the source of the sound and the mechanical processes involved in the sound's production (écouter).

Now, these forms of listening are all different objects of experience, and I assume that they emerge almost simultaneously while listening, because they are all evidently interrelated. But Woehl suggests an order of events. He says:

> First you try to get into the tone, and then you see what you did in there, what's now coming out.[161]

The voicer does not focus on three different objects at the same time. These three forms of listening are different objects of experience through which his focus moves (navigates) while listening. This is evident here, as Woehl clearly suggests an order (even a priority) of events. The pertinent question is perhaps how fast and how often this shift occurs while listening in voicing.

From my observations in Studio Acusticum, I can assume that the shift happens in matters of seconds. While playing a tone, Woehl would spend five to ten seconds listening into the tone (embodying the feel of the tone), and then shifting back to the source (écouter), and relating the feel of the tone to the physical, mechanical behavior of the pipe. After an adjustment had been made, he would dive into the tone again. If the feel was right, he would then play the note again, repeatedly—even in comparison with other tones, for instance as chords—to listen briefly to the surface, the outside (attack, harmonic spectrum, etc). The process would often be repeated again and again for any individual tone; it was essentially a circular process.

Chapter 10

THE WIND IN THE WORD MEMORIZED SOUNDS OF VOICING

> The beginning of man is in the midst of the word. And the center of word is in breath and sound, in listening and speaking. In the ancient mythologies the word for soul was often related to the word for breath. In the biblical myth of the creation, God breathes life into Adam, and that breath is both life and word…[T]he air that is breathed…has its life in *sound* and *voice*. Its sound ranges from the barely or not-at-all noticed background of our own breathing to the noises of the world and the singing of word and song among humans. The silence of the invisible comes to life in sound. For the human listener there is a multiplicity of senses in which *there is word in the wind.*[162]

1. CONCEPT

The composition presented here expresses my experience of organ voicing. That experience is not only articulated in concepts (forms, symbols) but also embodied in the materials, the sounds—the composition is made up of the exact same materials used in voicing: raw sounds, noises. My ultimate goal for the piece, apart from expressing my own experience, is to bring the listener into this atmosphere of sounds, and to clearly illustrate the idea that voicing is essentially about the experience of sound.

The title of the piece is inspired by Ihde's words: "…there is word in the wind." The title expresses my own realization that *there is* wind in the word, and therefore reverses Ihde's phrase. This serves to illustrate the idea that there is more to the sounds produced by organ pipes than only words. There is also wind and breath, and tone, and noise. Words are symbols considered in music; they are articulated (heard—*comprendre*) in musical language.[163] Wind is a metaphor for the breath of the organ. It is the wind that is pumped by the bellows, enters the chests, passes continuously through the foot of the pipe, flows through the body, and is expelled through the mouth; it is the

breath that is not audible, it is “the silence of the invisible.” In the piece I ended up by merging these two perspectives. We hear traces of voicing sessions—we hear the tools, the dialogues, the noises, the constant repetition of tones; we hear the breath of the organ. Simultaneously, we hear my *musical* experimentations developing in the midst of all that—we hear forms and shapes; we hear words and language.

The composition of the piece took place over a period of roughly two years and eight months. The final order of the seven pieces in the composition is not the order in which they were composed. Étude I, for example, was begun in May 2012 and not concluded until the middle of 2014, so although it is the first piece in the work, it was one of the last to be finished. The intermezzi were created hapharzadly, almost as outbursts, some in a single day.

1.1 Structure

The piece is structured as follows:

Etude I—Flutes, reeds, mutations, voices.
Intermezzo I—Wind, voices, action noises, door slam, Flûte harmonique.
Etude II—Principals from Hauptwerk and Oberwerk, Diapason 8 from Récit.
Intermezzo II—Mutations, principals, flutes, Bombarde 16'.
Etude III—Rohrflöte 8', Gedackt 8', Cor de nuit 8'.
Intermezzo III—Toccata (Principals).
Etude IV—Reversed sounds, noises, wind.

The structure is built mostly of études, punctuated by intermezzi. The études are longer, and each one explores a type of sound or a type of stop. They also explore parameters such as attack, release, dynamic contrasts, and unfinished voicing (raw sounds). The intermezzi are shorter character pieces, bringing lightness to the overall structure, which otherwise would be exclusively composed of long pieces. They also unify the structure and help achieve a balance, in terms of colors and dynamics, throughout the piece.

1.2 Significance

What is offered in this musical work is a reproduction, in digital format, of the sounds heard and collected in voicing. We may trace a parallel with photography, where only a frame of the lived experience is captured, and only visually. Using this analogy, I might

say that my artistic process consisted of collecting, selecting, cutting and framing those photographs. The result resembles a scrapbook of memories. These organized memories now offer the listener the opportunity to listen to something that is in the past and cannot be experienced again live. The sounds of voicing, those fugacious materials, cannot be experienced again, because the organ is now concluded and the voicing process cannot be reversed, just as these pieces cannot be performed again. There is no score for this work. The performance of these sounds and musical works can only happen digitally.

Another significant aspect of this piece is that it presents, in digital format, organ sounds which were never heard before. The raw sounds of voicing are usually lost in time and space, and only heard by those who take part in the process of building and voicing: mostly organ-builders, occasionally musicians. Traditionally, these sounds are not considered relevant material for an artistic end, but only a component in a process. Here, these sounds take the stage.

1.3 Musical resources and language

As mentioned in chapter 8, I used digital recordings to capture my experiments in Studio Acusticum. Sessions of musical experimentation were recorded in full, often with a length of between one and two hours. A selection process followed, in which I listened to the recordings and marked the most interesting sounds and musical ideas. The final part of the process was the actual compositional process, which was essentially a process of *collage*. Here, the cutting and editing was done digitally, using computer software. The software allowed me to cut and paste the sounds I had previously selected. Sounds were dragged onto stereo tracks and combined simultaneously with other tracks. In this process, a number of effects were added to the sounds, mostly fades, echoes, reverb, gain (amplitude), and inversions. It is important to underline, however, that no effects were used with intent to modify the tones captured from the source. No changes were made to the attack or timbre of tones. For example, the gain effect (amplitude) was mainly used for noises.

In regards to language, the motives and organization of ideas in the piece relate to my experience of organ voicing. Among those I must highlight the following three: (1) repetition; (2) stillness; (3) silence. (1) Repetition was an essential element of voicing. Tones were played insistently in the voicing process. In the music, this is audible as repetition of motives, as well as in the repetition of single tones. At the very beginning of Étude III, the initial chords are repeated twenty-one times in a row. This is also audible

on the C played on the Gedackt 8' in the Oberwerk, from around minute 4, also in Étude III. Étude II also makes use of a repeated tone as thematic material, starting from the very beginning. Repetition is an interesting musical resource, as it drives the focus of the listener towards aspects of the material, thus pulling us back to the idea of voicing. (2) Stillness refers to lack of movement. Still was how I felt during most of the voicing sessions. Sounds would fill the room, for hours in a row, and there were no developments, at least in a musical sense. If voicing was a musical composition, that composition would be made of repetitions and still movement, without any greater developments. This is audible in most of the pieces from *The wind in the word*. Note for instance the still, static movement of Étude I, from the start. A similar idea is found all over the other études as well. (3) Silence is another important parameter. It was important for the voicer to listen to the room, to the acoustic space. Silence is an interesting resource because it makes one more aware of the experience of sound. The contrast between silence and sound brings out aspects of the material, by making the listener aware of the physical, acoustic space, and therefore detaching him from preconceived ideas about those sounds. During voicing, I sat in the hall for long periods of time writing, or thinking, and that silent space became part of the experience. Silence is a resource explored mostly in Étude IV.

2. Brief overview of each movement

The work presented here should speak for itself. The listener should become aware of his experience himself, and ask questions himself. In my view, no verbal explanations should intrude upon the personal experience of the work. There is no such thing as a correct or specific way to listen or appreciate sound. Each listener has his own experience and draws his own conclusions. What is offered below is a description of each movement, giving concise information on the pieces such as date, place of composition, and materials used, as well as a few comments on musical resources or form. The descriptions are mere contextualizations of what is heard and are not intended to guide the listener's experience. Just as I heard voicing, silently sitting in the room, the listener is invited to do the same, to listen and become aware of his own experience of sound and listening.

***Étude I* – track 18**

Recordings: June and August 2011, Studio Acusticum.
Composition: May 2013, Montreal. June to September 2014, Lübbenau, Germany.

The first sounds heard are from the Cor de Nuit 8' in the Récit. Note interesting variations of attacks and releases in the initial passage. Gradually, to the static mantle produced by the Cor de Nuit, a few reeds and noises are added, and the piece gets louder. The climax is achieved on loud reeds and Principal sounds, including clusters and glissandi. Throughout this movement, we hear the tuning of reed pipes from the voicing sessions, producing interesting glissando effects.

***Intermezzo I* – track 19**

Recordings: November 2011, Studio Acusticum
Composition: November 10 to 20, 2013, Lübbenau, Germany.

This brief intermezzo explores the dialogues happening between musician and voicer in the hall. It also brings in the dialogues between voicer and assistant, during the voicing sessions. None of those dialogues are perceptible, though; what is heard is a mishmash of voices (even reversed), echoing in the hall. We hear a door slam (slightly amplified, with an echo filter). I heard that door slam very often while sitting in the room, even while listening to recordings. It became one of those iconic sounds from Studio Acusticum's main hall. Noises from the unregulated action at the keys are also heard (slightly amplified). At the end, the Flûte harmonique 8' from the Hauptwerk makes an appearance, and fades out.

***Étude II* – track 20**

Recordings: November 2012, Studio Acusticum.
Composition: November 4 to 11, 2012, Piteå. June 2014, Lübbenau.

The second étude—mentioned briefly above, in chapter 8—explores some of the principal sounds available at the organ by November 2012. From the start we hear the very characteristic 'chiff' of the attack of the Principal 8' in the Hauptwerk. The long repetition of that tone serves precisely to direct the listener to the characteristics of the attack—spitting. From around 5:00, we hear whistles, surrounded by airy noises. Those airy noises are produced by some of the pipes of the Principal 16' in the façade, which were in place but not voiced. Those noises are played in a loop. The whistles are extracted from a voicing session with the Principal 8' in the Hauptwerk. The voicer Gerald

Woehl blows air into each individual pipe in order to examine the characteristics of the attack. The order in which those whistles are placed in the composition are exactly the same as in that voicing session, now placed one after the other. The piece moves to an exploration of dynamic effects produced by the opening and closing of the swell boxes, both in the Récit and Oberwerk. It concludes with a repetition of the initial 'chiff'.

***Intermezzo II* – track 21**

Recordings: June 4, 2011, Studio Acusticum.
Composition: October 2014, Lübbenau.

We hear the exquisite effects produced by the staccato chords on some of the unfinished mutation stops in the Oberwerk. This brief intermezzo serves as a bridge to the coming étude, which also starts with quieter staccato chords.

***Étude III* – track 22**

Recordings: February 28, 2011, Studio Acusticum.
Composition: February 29 to March 9, 2011, Piteå.

The piece starts with a repetition of similar chords, played on the Rohrflöte 8' in the Hauptwerk. The lower tones of that stop are unvoiced, and therefore we hear a percussive, airy sound in the bass region, accompanying the chords. The piece develops around the flute sounds available in the organ at that time—the Cor de Nuit 8' (Récit), the Gedackt 8' (Oberwerk), and the Rohrflöte 8' (Hauptwerk). As I wrote in my logbook, back in February 2011, "…the piece explores the mystical character of the flutes, as well as the bass region of the Rohrflöte, which is at the moment not ready with voicing. There is somehow an emotional ground to the piece, a lonely, repetitive, fading character."

***Intermezzo III* – track 23**

Recordings: November 2012, Studio Acusticum.
Composition: November 2013, Lübbenau.

This brief intermezzo is an excerpt of a musical experimentation session, done in Studio Acusticum. We hear principal sounds and some flue pedal stops. A shimmering tone and a bright whistle are added to the climax. Those sounds are borrowed from voicing sessions of reeds (as heard in Étude I) and principal stops (as heard in Étude II), respectively.

***Étude IV* – track 24**

Recordings: Unspecific.

Composition: September 2014, Lübbenau.

This last, larger étude moves slightly away from the raw sounds of voicing and my on-site musical experiments. I wanted to more freely explore the idea of wind, using for that effect all sorts of noises (extracted from my recordings done in Studio Acusticum only) and a variety of digital effects. We hear at first a recollection (reversed) of some of the motives presented in the previous movements, and then we dive into silence. The slowly dying ending is a reflection upon the breath of the organ—"…the barely or not-at-all noticed background of our own breathing."[164]

3. Invitation to performance

The reader is now invited to listen to the piece on the DVD, starting on track 18, up until track 24. The work is conceived to be heard in full, from beginning to end. Movements are connected to each other, without breaks in between. However, and since the piece may be perceived as long, the listener can choose to hear it in parts. The use of a good pair of headphones is more likely to produce a better (and more focused) listening experience.

Chapter 11

Discussion II: Voice

Thus far, we have discussed the practice of voicing, with focus on the working methods of the voicer Gerald Woehl as he voiced the organ in Studio Acusticum. We have also discussed the skill of listening and the voicer's relationship to sounds. We have been sitting in the hall in Studio Acusticum observing all that practice, and we have, in a manner of speaking, experienced the voicer's body in the midst of voicing, and in the midst of listening and sound. I now suggest a slight change of perspective: that we begin to discuss voicing as a practice, considered as a professional activity. In this chapter, we will try to discern some of the essential features of voicing—its methods, intentions, and products—and then compare voicing to other possibly related artistic-professional activities, to see if they share similar traits. I intend to introduce here a brief contextualization of voicing as practice. At the end of the chapter I will try to develop some form of understanding of the implications of voicing for musical performance, and clarify how the two activities intersect with one another.

1. Idealized voices

The ultimate goal of the instrument builder is to build instruments; similarly, we see that the goal of the voicer is to create voices. This is logical. There is, however, one important difference between the builder and the voicer: the nature of their final products. Whereas a musical instrument—here the pipe organ—is something *real* (touched and seen in the physical world, an object that has a defined physical aspect), a voice is more of an *ideal* (a concept which cannot be touched or seen in the physical world). We saw in chapter 2 (p. 14) that this distinction between *real* and *ideal* may be seen in light of Husserl's notions of the *real object* and *ideal object*. This means that we are not considering *physical* phenomena here (the signal), but rather, the aesthetic intentions and visions that emerge from such phenomena (voice). The ultimate product of the activity of voicing is voice. That product is not standardized, or bound to one universal concept, but may vary from organ to organ, from voicer to voicer. The aesthetic intentions and

visions of voicers vary depending upon the context, and so do the voices. This means that voices are original products; they are the result of a voicer's personal choices and aesthetic visions, and thus difficult to categorize and difficult to understand. With this in mind, I went on searching for Woehl's perspectives. By studying his practice, and by talking to him, I eventually came to understand some of his own approaches and ideas. I took note of Woehl's perspectives while we discussed the sounds and the characteristics of the different stops in the organ. I observed his verbal explanations and body language in those moments. As a result, I can now suggest four ways that I believe he conceived of voice: singing voice; voice as organic entity; dramatic voice; and voice as shape.

Singing voice

> The Germshorn should resemble the singing of a child from the countryside.[165]

In the voicer's conception of voice, if there is one clear musical intention or element, it is that of *singing*. For Woehl, a voice must have the ability to sing. Other voicers have also told me the same thing. Woehl says that tones should not be forced or tense, but should unfold freely. In musical performance, this voicing intention is not really heard with the ears. It is something felt along with the music. The voice should not struggle in performance, and all the tones should come out naturally, without the feeling of being controlled. Note Woehl's explanation, from the Premise:

> The most important thing for me is that the tone be as if it is sung. It cannot be forced, it has to be able to develop freely. Like a singer, whether he forces it or whether he is completely free…I think this is the important thing…I don't find loudness so very important, if one tone is a little louder. It's like that in a choir, too: one person sings a little louder, another a little softer. It's perfectly natural. One person has a terrific voice, someone else's voice is not as full, etc. But what's really conspicuous is when someone forces the sound. When someone is forcing and their voice is stuck—that sticks out over the whole choir. If someone sings louder or softer is not critical…There will be always some notes that are a bit louder. It doesn't bother me at all. And another person won't notice it either,

> because loudness is not the criterium. The criterium is that the tone speaks as easily as possible and as freely as possible.[166]

An interesting example comes to my mind. I think now of Sara Vaughan singing *East of the Sun* (1955).[167] Her voice is powerful, so broad, very seductive, but most importantly it feels effortless, perhaps weightless. It is as if the voice is revealed, as if it appears only by itself, as if it would transcend the body. I can also think of my performance of any musical work at the organ in these terms. My musical intention is embodied in sounds and technical skills, but ideally it should *transcend* those concerns. If my technical concerns appear in the performance of a musical work, then I am still at the level of the body, and the music does not yet unfold freely, effortlessly, by itself. In my view, the free, singing voices produced by the voicer influence the performance of music in that sort of way. In the way that it allows the sound to transcend the physical, and become something weightless, not rooted in the body.

Voice as organic entity

> The curled lower lip on the bass pipes of the Gamba makes it sound like a beard-frog.[168]

Voice is here idealized as something organic, like an organism that has an inner physiology that speaks and spits, as something alive. From this point of view, the different parameters that constitute a tone (and the stop) are viewed as characteristics of utterances of specific and nonspecific types of organisms. In Studio Acusticum, this was a concept often associated with the characteristics of the attack of some stops. It is however difficult to identify how such idealized voices might influence musical performance.

Dramatic voice

> For example it is very extreme with the Flûte harmonique. In the bass it is quite transparent and nearly bright, it gets [grows] darker and more sad, and in the treble it is a bit melancholic. Yes, that's what a romantic piece needs. Melancholy is a very important element; it plays a role in Romantic [music].[169]

Voices can be idealized as dramaturgical entities, embodying different kinds of feelings, moods, emotions. In musical performance, these voices act as actors on stage; they

are the medium through which forms of expression are communicated. The voicer shapes the character, the personality of the voices. We may perhaps even say the *psychological profile* of the voices. It is hard to pinpoint—if possible at all—precisely *where* and *how* a voice can embody such forms of expression. Like with other types of voices, we know that this type of aesthetic *ideal* must inevitably emerge from the correlated physical elements found in the voice, notably: attack, harmonic spectrum of tones, vowels, undulation, dynamic contrast over the range, and so on. In fact, in the remark cited above, Woehl refers to the different regions of the stop and the contrast between them. These are concrete (physical) elements of the voice. It is not quite clear, however, how the bass can sound "sad" and the treble "melancholic." These are essentially aesthetic ideals; visions.

Voice as shape

The sonic elements considered along the range of an organ stop—attacks, harmonic spectrum of tones, vowels, amplitude levels and dynamic contrast over the range, undulation, etc.—all put together, are the components of voice as a unified structure. These elements may possibly be imagined concretely as lines, dots, colors, or dimensions (depth), taking part in an overall structure, or shape. Note Gerald's explanation:

> First of all, you need to be quite focused when you are voicing, because you need to keep the whole keyboard in your ear, so to speak. You need to know how it sounds in the bass, you recognize the notes in the treble, and so on. It requires a certain amount of concentration to grasp a whole stop.[170]

The voice is not one-dimensional and flat, but rather dynamic and full of contrasts. Consider, for instance, the dynamic contrast over the range: all the individual tones are combined to form that dynamic contrast, and only together do they form one structure, which is the voice, with regards to its overall dynamic shape. All the remaining individual elements, like the attack, the color, and the vowel type, also combine to form one voice. Depending on the type of contrast resulting from the combination of individual tones, the voice may be more edgy, round, equal, contrasting, uneven, etc. This perspective may influence the performance of music in several different ways. A voice with a more accentuated dynamic shape, for example, will make a musical passage sound more contrasting, more uneven. The voicer may possibly think that such an accentuated feature will make the music lively. On the other hand, it may also distort the intentions in the

music, if this dynamic shape does not follow the melodic and dynamic guidelines in the score. The attack of the tones may also vary in quality over the range of the voice. This corresponds with the effect produced by the dynamic contrast, and it may add more or less clarity (more or less contrast) to the different regions of the voice.

2. Is voice a work of art?

The question is relevant. We have seen that a voicer conceptualizes voices, and we have seen that those voices can be idealized as forms, shapes, moods, organisms, and perhaps more. We have seen that these are aesthetic ideals. With this in mind, we may now ask whether a voice can be considered an artistic product after all. Eventually, we may ask whether this act of conceptualizing voices—voicing—can be regarded as an art, or an artistic practice in essence. We will now examine these questions by exploring the parallel between the practice of voicing and two other established, well-known art forms; specifically: music and sound-art. We start with musical composition.

2.1 By the lights of musical composition

The parallel between these two practices lies in the fact that neither of them are performative practices from the start, but rather activities that consist essentially in conceptualizing and idealizing sounds, forms and shapes. Whereas the composer situates his ideal musical work in the *not-yet-performed* score, the voicer situates his ideal voice in the *not-yet-performed* organ. Essentially, both practices achieve their sounding products by combining pitches, timbres, and dynamics in a variety of ways. To strengthen this parallel, we may also consider the element of *choice* and intention found in both practices. A voicer has freedom of choice, and in his personal choices, he projects his visions and intentions on the sounds of the organ. These eventually result in voices. Those voices embody the ideals of the person who created them. The same happens in composition, where sounds are intentionally organized by the composer. The musical work embodies the ideals of the composer. But this parallel proves inconsistent. For example, the sound sequences created by the composer are arranged temporally in the musical work. A voice, in contrast, is not something intentionally structured in time. It is an ideal that has no specified durations. Furthermore, the musical work envisioned by the composer is communicated to others through the score, which has specific instructions. In voicing, the voicer leaves no instructions but the sounds themselves. The composer's score often indicates how pitch, timbre, and dynamics (among other parameters) should move through time. In fact, the composition itself is a structure that has a

beginning and an end; it has a duration. Voice is not bound to time; it has no chronological shape and no specified duration. Thus, voice is not a musical composition, and neither it is a musical work.

2.2 By the lights of sound-art

Voice may not be a musical composition, but it may still be considered a composition, in the literal sense of the word. Voice is a whole that emerges out of an intentional combination of different elements—sounds, pitches, attacks, different levels of loudness, colors, etc. As such, we may immediately define it as a composition of sounds, and ultimately, a *sound composition*. With this definition in mind, we shift from the previous musical perspective—the requirement being that sounds should have specified durations—to a spatial perspective, where duration is not considered as fixed element; instead, the foremost concern is the relation of sounds to the acoustic space. LaBelle writes:

> [S]ound's relation condition can be traced through modes of spatiality, for sound and space in particular have a dynamic relationship. This no doubt stands at the core of the very practice of sound art—the activation of the existing relation between sound and space.[171]

We have been pulled into the realms of sound-art. My natural inclination is thus to think of voice in architectural (sculptural) terms, as a form (an inanimate object) which fills a space and relates to that space. Earlier we have seen that a voicer considers the sounds of the organ in the acoustic space. Spatial concerns are truly important in voicing, because the room is always the unchangeable resonance chamber of the pipe-organ. The sounds are not simply produced in the instrument's body and later on projected out in *any* room—as it is the case with most musical instruments—rather, they are considered in relationship to one specific space. This also explains why voicer's voice their instruments out in the room, and not at a close distance to the sound-producing parts of the instrument. The voices of the organ take form in the acoustic space, not in the instrument's body.

Maintaining our parallel to sound-art, we may then envision the voicer's voice as an object hovering the acoustic space, and which we may think of as a *sound sculpture*.[172] In this conception, the sound is the physical phenomenon, and the sculpture is the form created by the voicer. That sculpture is made of different elements, which are intrinsical-

ly related to each other; they are: materials; shape; space. These are essential traits of the sounding sculpture.

Materials

The materials are the individual tones themselves, which have an *inside* and an *outside*, as discussed in chapter 9. In voicing, tones are felt (embodied) and heard (*entendre* and *écouter*) out in the room. The most important parameters of a tone are: pitch, prominence of attack, freedom, harmonic spectrum (color), texture, vowel type, amplitude. It is also interesting to mention that these materials are shaped already from the very first phase of voicing—tonal preparation—considering the process of tonal development discussed earlier in chapter 7, illustrated in Figure 7.1, p. 68.

Shape

The shape is built up from the relationship between the different tones and the different regions of the entire stop (bass, tenor, soprano), including such things as the dynamic contrast over the range, the multitude of attacks, colors, and so on. In the process of tonal development discussed in chapter 7 (Figure 7.1, p. 68), this type of concern appears mostly during tonal adjustment. At that point, the stop is already something analogous with the voice; the voicer starts defining its shape.

Space

The two elements discussed above—materials and shape—and its related parameters, will eventually be projected out in the acoustic space. The individual tones and the relationship established between them does not happen in a vacuum; it does not end there because the room will influence the perception of those elements too. When those elements are brought out in the room, they are then considered in relationship to the listener sitting in the hall—a concern taken up during the last phase of voicing: tonal finishing (see Figure 7.1, p. 68). That relationship includes two main parameters, or considerations: *distance* and *direction*. Distance seems to me very much dependent on the clarity and prominence of the attack of the tones. Very clear, prominent attacks give an impression of closeness; inconspicuous attacks make the sound feel further away. Monette explains:

> Good pipe work has the characteristic of presence, of immediacy and completeness, sounding as if it is nearby and meant to be heard from

> close at hand. If the pipe work is distant from the listener—or from the player—it cannot be effective in its ordinary use.[173]

We may also consider direction. From my experience in Studio Acusticum, I am inclined to suggest that it is the harmonic spectrum of the steady state, as well as the amplitude of the tone, which defines that parameter. A voice with a narrower harmonic spectrum, distinctively low in amplitude, generally produces a sensation of *less room*, and it may easily lead the listener towards a specific point in space—the source of the sound. In contrast, a voice richer in harmonic partials, with a broader spectrum and a generous amplitude—projecting well out into the room—will produce the sensation of *wider* (even *brighter*) *space*. I recall Gerald Woehl's comments on his vision for an organ for a Klangkirche (a "church of sound") in Frankfurt am Main. He said:

> [When I was planning the organ I thought:] if this is a church of sound, then you have to sit in sound, so to speak, when you listen to the organ. You have to be in sound, and you have to be sound yourself. I have to say, I thought of this as soon as I stepped inside [the room]: this will be an organ where you sit inside.[174]

Woehl suggests omnidirectional sounds. This means that one has to be embraced by sound, fully surrounded. Woehl describes his vision for the overall sound of that organ, however, I do think the same principle applies to individual voices in the organ; they can be conceived as more embracing (omnidirectional), or more source-specific (unidirectional).

Timespace

Woehl never really mentioned *time* as a parameter of voice or a major concern of voicing and voicers. Time and the duration of tone did not seem relevant parameters of the voice. Perhaps because the majority of organ tones are conceived to be continuous, to be held for as long as the organ has air—which can be a long time.[175] We should now recall that our connection to sound-art comes from the premise stated above, that "the activation of the existing relation between sound and space, stands at the core of the very practice of sound art."[176] Earlier we noted that the voice has no specified durations, thus we turned to sound-art. But can a work of a sound-art be conceived (and perceived) exclusively in space? Is the relationship established between sound and space the only condition for sound to be considered a work of sound-art? Let us for a moment consider Voegelin's perspective on this. She writes:

> The interrelationship between time and space in sound challenges the possibility of a dialectic definition that purports their autonomous discussion and pretends them as stable absolutes (Gesammtheiten): time exclusive of its spatial manifestation, and space exclusive of its temporal dimension. The notion of 'time' in sound is neither time as opposed to space nor is it time plus space. At the same time the sonic idea of 'space' is not opposed to that time nor is it space plus time. Sound prompts a re-thinking of temporality and spatiality vis-à-vis each other and invites the experience of ephemeral stability and fixed fluidity. These are not terms of contradiction or even paradoxes. Rather they reveal how time and space extend each other and produce each other as immaterial composite without dialectical conflict in agonistic playfulness. Listening to sound art and the sonic environment engages in the playful tensions of spatio-temporal productions and highlights the critical equivalence between spatial and temporal processes. Pre-empting the sonic dynamic of this non-dialectical play I remove the dash between time-space and bring time and space together in the term timespace. This avoids the possibility of separation and subsequent return to exclusivity, and instead joins them in one complex sensory concept.[177]

If, as Voegelin suggests, sound and timespace are "stable absolutes," then sound cannot happen exclusively in space. It must be perceived in time as well. Thus, if the voicer's conception of voice defines space but not time, then that voice is no more than a *timeless* idealized object, a vision which cannot be *physically* realized. If the voice is to be physically heard, then it must be heard in timespace. If this is true, then we may conclude that a voice is merely a concept, and it cannot appear to our senses (in its entirety), because it cannot be physically heard in time(space). But before making such a claim we should first examine some of those temporal parameters—considered only theoretically—and try to understand what role they play in defining the overall outcome of voicing: the voice. I see three relevant temporal aspects to consider here: (1) movement; (2) temporal shape; (3) occurrence.

(1) If there are any concerns of temporal nature in voicing, they are related to *movement*. This includes specifically the characteristics of the temporal parts of the tone (notably the speed of the attack), and the undulation of the steady state. In voicing, these aspects must be considered temporally, not spatially. Note that the spatial elements discussed above may be imagined as inanimate things—like figures, lines, dots,

shapes, textures, materials, etc. Those elements form a steady object that may be pictured exclusively in space: a sound sculpture. In contrast, the speed of the attack and the undulation of the steady state must be considered temporally. These elements are essentially temporal sequences, and they suggest *movement*. The attack may be faster or slower, the undulation of the steady state may be regular or irregular, and also faster or slower. These are some of the few temporal elements considered in voicing, and they define the temporal character of the voice in precisely those terms: fast-slow, regular-irregular. But these elements are not sufficient to define the overall temporal contour of a voice, and certainly they are not the only temporal elements an object must have in order to appear complete in time(space). These elements alone do not turn the voice into a fully animate object. There is still the need for stable temporal pillars and the delineation of a temporal shape.

(2) *Temporal shape* refers to the overall length (in time) of the voice. That shape begins with the very first initial attack of the tones and lasts through the complete dissipation of the steady state—thus it may be longer or shorter. Imagine, for example, the sound of a piano: after a key is depressed, the tone will dissipate over time. Of course, the length of the tone will be dependent on the force applied to the key. Nevertheless, we know that the piano builder, when building the instrument, will have to take that trait into consideration—*for how long can a tone be held in time?* Now, if I had to compare the sounds produced by two different pianos, from different builders, I might come to realize that one has the capacity for a longer sustain than the other. This is distinct from the force applied to the key, and I can recognize such a temporal trait as an *essential* and distinctive characteristic of one instrument and the other. We may perhaps say that the voice of one instrument essentially has a longer breath (or, in this case, resonance), and the other a shorter breath. But we cannot say the same for the voices found in the organ, for they have no temporal shape. The voicer does not define time for the voice, simply because the tones can be held for as long as the organ has air. For that reason, *temporal shape* is not a concern of voicing and voicers. The voicer adjusts the attack of the tones, and he may even consider the release (and possibly the reverberation time) of those tones, but the distance between the attack and the release is not specific to the voice. Rather, it is something left to chance, or perhaps left to music (duration).

(3) A piece of sound-art must develop in timespace, as an event. That event may even occur randomly in timespace, and it may not be planned to have specified durations (in a musical sense). What is most important is that the occurrence must take place; sound must occur in timespace in order to be heard (felt) as an object of sound-

art. Timespace is there to be felt, and to invite a relation to those who experience it—that occurrence is the performance. Based on that, we may therefore exclude the possibility of voice being an event or performance of sound-art, for the simple reason that such voice has no specified instructions as to when or for how long it should occur. The voicer's voice is conceived behind closed doors, in the silent and focused hall. A performance only occurs when music is played on this voice, which happens after and upon the conception of the voice. When we consider a voice in performance, we are inevitably considering that voice in the light of the field of musical performance, and not as an artistic product of voicing exclusively. By excluding musical performance, we eventually see that the voicer's ideal voice does not physically appear by itself. That voice cannot appear simply because it has no duration and no time specified. Simply, that voice is not conceived to be an event or a performance.

All considered, we may therefore say that the voicer conceptualizes voices, and those voices are unrealized, unfinished works. Moreover, those voices are conceived as the tools for a specific artistic end: musical performance. This ultimately means that a voice does not convey a message by itself, but is conceived on the assumption that any message will be conveyed through (or in collaboration with) another practice. The voicer's voice, by itself, does not bring forth language nor materials, but awaits others who will bring them forth.

2.3 Voicing as practice

If the product of voicing (voice) remains an idealized, unfinished object, without clear connections to any other forms of artistic expression, then how can we define the practice of voicing? What exactly is this practice about? Can we consider it as an *artistic practice* after all?

Technical artist

Eva Hertz (1937) offers an interesting perspective on *artistic practice*, with reference to the practice of keyboard instrument builders in general. In her study, she locates the profession of builders somewhere between the realms of art (Kunst) and craft (Handwerk), demonstrating that it incorporates elements of both, but it does not belong to one or the other. Instrument building may certainly be considered a craft, since it mainly deals with the materiality of things, aiming at the creation of objects (musical instruments) which by themselves do not stand as finished artistic products, but instead de-

pend on the intervention of others. But since the creation of those objects also requires some kind of scientific knowledge (like engineering, mechanics, physics, etc.), and since the objects serve a practical need, she suggests a parallel between instrument building and applied sciences and engineering (Technik). On the other hand, she also recognizes that the knowledge of builders and the considerations of their practice may at some points transcend that parallel as well, and may indeed "enter into a closer relationship with the world of the arts,"[178] depending of course on the skills and intentions of each individual builder. Hertz finally suggests the term "technical artist" (technischer Künstler) is the most appropriate to define the profession of the builder—"an artist who expresses himself through the medium of technology."[179]

Practice vs. intention

We should keep in mind that we are dealing here specifically with the practice of voicing only, not with the practice of organ building generally. This means that we are not considering the instrument as a whole (the artefact), but just the voices found there. The question is then if voicing can be regarded as an essentially artistic practice. Above, we have seen that voice is not an artwork (a product, an event). This, however, does not exclude the possibility of voicing being an activity filled with artistic *intentions*. This distinction between practice and intention is somehow implied in Hertz's perspective—the craftsman (technischer) who also has artistic motivations, who enters "…into a closer relationship with the wold of the arts" (Künstler). This is not so different from the perspective I want to suggest in regard to voicing. There is evidently a strong element of craft (Handwerk) in that practice, and there are also intentions of an artistic nature. We may view the voicer's artistic intentions as essentially rooted in aesthetic concerns. Remember for instance his description (concepts) of voices as poetic in nature, quiet or strong, nostalgic, ugly, or filled with character and peculiar features. The concern with singing and with the form and shape of voices are also aesthetic/artistic concerns. Furthermore, we have seen that the voicer's work with sound not only fulfills a practical function, but also includes considerations at the level of sensory perception with clearly marked aesthetic goals: "…you have to sit in sound, so to speak, when you listen to the organ. You have to be in sound, and you have to be sound yourself." The practice (Handwerk) of voicing, in contrast, is not intended to be artistic in itself, or to fulfill aesthetic goals. That practice is not performative, and it does not include aesthetic considerations. It does require excellent manual dexterity and a solid theoretical knowledge, and it serves a technical purpose—to make the pipe produce the right tone. With this in

mind, and partially based on Hertz's perspective, I am inclined to suggest that the actual manipulation done to the pipes is the craft (Handwerk and Technik), and the conceptualization of voices is the *artistic intention*, rooted in aesthetic concerns (Künstler).

The practice is not the art

Still, we ask the question: is voicing an artistic practice?

In my view, it is the marked distinction between *craft* and *artistic intention* that eventually brings us to the answer: voicing is not an artistic practice, but a craft. This is mainly because, in voicing, the artistic intention is not embedded in the practice. Rather, they are distinct things, happening at different times, involving different people and different practices. In voicing, the art is distinct from the practice. One is not an immediate direct consequence of the other. Thus, voicing cannot be regarded as in essence *artistic practice*. Let us consider a few examples. In musical performance, the act of playing a musical instrument is inseparable from the act of music-making and performance. They are intrinsically related to one another; they are embedded in one another. Music happens immediately after I move my fingers and my feet; it starts there and it ends there. Thus, my practice is the art, hence artistic practice. Voicing is clearly different: the practice itself is not the art. Voicing is certainly a practice filled with artistic intentions, but the doing (the practice) is not artistic in itself, but merely technical, without any immediate artistic result. This means that the voicer is not the practitioner of the art.

That said, I must admit that I have a hard time understanding why many authors choose to title their technical treatises "the art of…something"; as for instance "the art of organ voicing" or "the art of organ building." From the perspective I have outlined, such titles are totally misleading, because after all what is dealt with in those books is generally the craft (Handwerk), and not something beyond that. Moreover, as I have just said, one is not even a direct consequence of the other, and in the specific case of voicing, they may very well be considered separately. The art of organ voicing remains an unrealized vision.

3. Voicing and musical performance

After working through a definition of voice and voicing, it remains for us to finally bring that practice to the stage, and see it by the lights of musical performance. What do the voicer and his practice ultimately bring to musical performance? And where do these practices intersect with one another? Let us for a moment consider Graham's remark:

> Michelangelo needed marble to enable us to see the image of David that his genius led him to imagine; Dickens needed print and paper to tell the story of David Copperfield that he had invented. Jackson Pollock needed copious quantities of metallic paint for his 'action' paintings. In this way, sculptors, novelists and painters also rely upon other people to help them bring their artworks to reality: Michelangelo on the stonemason, Dickens on the printer, Pollock on the paint manufacturer. But there is an important difference—no one thinks the stonemason or the printer are themselves artists. Since the stone with which the sculptor has been provided does not play any direct part in making the artwork what it is, and since the story of David Copperfiled remains the same irrespective of the typeface used to print it or the paper it is printed on, in neither case does the medium add an artistic element of its own. True, it is the manufacturer who produced paint of precisely the colour that is to be found in Pollock's painting, but Pollock who chose to put it there. The implication is that the people involved in supplying these media, essential though they are, are not themselves artists. Dickens needs the printer, but not in a way that makes the printer a sort of novelist.[180]

Can we see the voicer as the paint manufacturer described in the text, and the musician as the painter (the artist)? Is voicing, underneath the metaphor, the practice of manufacturing paint and (sound) colors?

This metaphor is a very interesting one. It relates to our discussion in the sense that a voicer also helps the performer (and the composer) "bring their artworks to reality," by leaving the sounds and shapes and colors in the organ. But this parallel is not clear-cut, and certainly, the voicer is not really like the stonemason or the printer described in the text. Graham considers above all the fact that these practices (the medium) do not add any artistic element to the artwork: they "do not play any direct part in making the artwork what it is" and "in neither case does the medium add an artistic element of its own." But whereas I see this to be true for the stonemason and for the paint manufacturer, I do not see it as being true for the voicer. The difference is that the voicer *does* add an artistic element of its own to musical performance—the voices. Those voices, as we have seen, are not simple objects like stones, or pigments, or paper. They are somewhat more than that: they are concepts executed through (shaped upon, and emerging from) aesthetic intentions. These concepts take part in musical performance, and contribute to that musical practice. That contribution consists not only of raw materials

(sound: transient, harmonic spectrum, amplitude, etc.), but also of the very materials shaped (by the voicer) with the intent to provoke an aesthetic experience, or sensation in the listener. Ultimately, those materials are shaped in relation to the acoustic configuration of the room, eventually forming what could be viewed as a *sound sculpture*. This means that the voicer defines the contour (shape, form) of the voices in the acoustic space, and he contributes to musical performance with that spatial delineation. Clearly, this is different from the task of the stonemason. In this scenario, we must see the contribution of the voicer as a truly relevant one—even more relevant than for builders of other musical instruments, because in the organ, those spatial contours cannot be changed by the performer, as we know. This means that during the event of musical performance what we inevitably hear is an encounter of perspectives, a *fusion of horizons*. In this encounter, the voicer is the architect (visionary) of the voice, and the musician is the one who articulates that voice, the performer of the voice. The voicer defines the voice in the physical space and the performer makes it *move* in time(space), through the performance of musical works (with defined durations). Since the performer has no full control over the spatial contours of sound and voice, what is left to performance is time. Thus, what we hear in the performance of organ music is the encounter of time (music) and space (voicing).

4. Invitation to performance

Bearing this discussion in mind, I now invite readers to listen to the performance on the DVD, from track 25 to track 32. I suggest listening with a focus on the spatial qualities of the sounds heard in the performance. I examine the pieces on the recording in chapter 12, giving special consideration to voicing and its implications for musical performance.

Chapter 12

FRANCK, REGER, KAGEL, AND J. S. BACH

1. ON SOUNDS AND REGISTRATION

All the sounds in the organ are voiced with distinctive characters, with accentuated features, mostly audible in the attack, the dynamic contrast over the range, the loudness, and the color of tones. These parameters differ not only among stops but also within single stops, meaning that different sound regions—bass, tenor, treble—have different shades of vowels, different tone colors, and different amplitude levels. This is all clearly audible. Most sounds are generally broad, fully present in the room; others give the sensation of being in the front. The organ overall sounds dark, yet sharp and powerful—this is the dominating feature of the German Baroque core.

Registration

The accentuated features of most 8' stops makes the practice of registration and combination of sounds a rather sensitive issue. The more individual the stop is, the harder is to combine with any other. This means that a combination of different 8' stops may result in an unbalanced sound, if not chosen properly or according to style. Most sounds in Studio Acusticum are sensitive to additions and doubling. For example, combining one solo stop with any other stop at the panel will not only broaden or enrich the dominant solo sound—as it is often the practice in registration—but most likely will also

change its character. The deeper flue sounds, 32' and 16', both in the manuals and in the Pedal, have to be combined carefully as well, or the sound will very easily become wooly and unclear. Even though the wind always remain stables, they will still consume air, and that will be felt in the sound. I have experienced that one or two manual 16' stops will suffice to give weight even to a loud passage.

Manual and Pedal divisions

In the manual divisions, a few stops become very sharp in the higher region. Such sharpness is found mainly in the upper region of the Principals 4' and 2' in the Hauptwerk and Oberwerk divisions (German Baroque), and in the Quinte 2 $^{2}/_{3}$' and Nasard 2 $^{2}/_{3}$', which are mutation stops (also German Baroque). I found such sharpness to be only slightly out of proportion at present. These stops were audible even when combined with other stops. I recall that even with a full range of symphonic reeds in the Récit, Oberwerk, and Hauptwerk, the Octave 2' both in the Hauptwerk and in Oberwerk would surpass the rest of the sounds in the upper region. To achieve a broader, less penetrating Romantic sound, I usually opted for the 2' flute sounds in the higher regions, and generally omitted both Octave 2' stops as much as possible from my registrations. This is clearly a matter of personal taste.

The Pedal division overall sounds more discreet than the manual divisions. Although the flue stops in the Pedal seem to have enough body to support in the manuals, they are comparatively quieter, and more in the back. Taking the Pedal by itself, I found the German Baroque flue stops to be quieter than the symphonic ones. There is a discrepancy in loudness between these two aesthetics, which is expected, but I found the need for something in between. Generally, as I will demonstrate later in this chapter, it was challenging at times to find registrations with the right balance between the sharpness and clarity of the manuals and the stops available in the pedal.

Mixtures and reeds

There are three main mixture stops in the organ: the Groß Mixtur 6fach in the Hauptwerk (which includes the Mixtur 4fach in the Hauptwerk and the Mixtur 4–6fach in the Pedal), the Mixtur 4fach in the Oberwerk, and the Cymbale 3fach in the Récit. The first two are distinctively German Baroque—audible in Bach's Toccata in C—and they are voiced with a sharp sound. The mixtures in the Hauptwerk are full and powerful. The one in the Oberwerk is lighter, perhaps rounder. These stops only match the German Baroque aesthetics, and they sound stylistically out of place if used in any other context.

They are very dominating, and easily surpass most stops in the organ. The Cymbale in the Récit is exquisite, brilliant yet more reserved. This stop was of no use for the music recorded here.

The reeds are all very balanced and they blend well with most combinations of stops. The few challenges I found will be discussed below, and they mainly refer to issues directly related to voicing, namely attack and dynamic contrast. The distinction between German Baroque reeds and symphonic reeds is marked. It is, however, still possible to combine these different reeds in the right context. For example, in the Pedal, the German reed chorus 32-16-8 blends well with the French Trompette 8' and Clairon 4'. Combined with other flue stops, this produces a balanced sound for symphonic music. The Bombarde 16', on the other hand, is very loud, and nearly surpasses the rest of the sounds in the pedal. In fact, I have only used this Bombarde 16' (Pedal) in Kagel, to add a brutal effect to a passage.

I conclude these observations by stating that combining stops in Studio Acusticum should be done with great awareness: stylistic awareness, but even more so *sound awareness*. I found that in general, the organ requires only of few stops to sound balanced. The more stops are combined, the more overwhelming (overreaching) the sound will be, even within the same stylistic frame.

2. Franck's Fantaisie in C – track 25

As mentioned in chapter 6, the organ in Studio Acusticum is conceived to allow the performance of music from different periods and styles. The organ used as a reference for the French Romantic style is the 1859 Cavaillé-Coll organ in Ste. Clotilde, which was Franck's organ from its inauguration until his death in 1890. In his documents, Gerald Woehl describes how the specification of stops should be changed in Studio Acusticum in order to attain a specification similar to Ste. Clotilde. I have used Gerald Woehl's concept for registering Franck. The use of this concept, however, was occasionally troublesome. To use the French Romantic organ I had to make different types of adjustments: to couple stops, to double them, and then to decide whether the sound was suitable for any given passage. Eventually, I found that the specification offered by Gerald Woehl, and his suggestions for the use of this concept, did not always offer the best solutions. One of the suggestions I had the most problems with was to use the Principals, both in the Hauptwerk and Oberwerk, as Montres. These principals are very characteristically German Baroque, and they have a very distinctive attack, which is a feature that differs

from the French aesthetics. I avoided them in Franck, and as a result, the French *fonds*, in this recording, may lack body.

2.1 Poco lento

For this introductory section, Franck requests the following combination of stops:

R. Fonds de 8 pieds et Hautbois.
P. Fonds de 8 pieds.
G.O. Fonds de 8 pieds.
PED. Fonds de 8 et 16 pieds.
Claviers accouplés.
Tirasses

Figure 12.1

In the recording, the stops heard in the Récit are the Diapason 8', Flûte traversière 8', Viole de Gambe 8', Cor de Nuit 8', and the Basson Hautbois 8'. We hear the 8' *fonds* together with the Hautbois 8', mostly with closed swell.

The overall sound in this first section—played on the Récit—is balanced, even though I feel there is a very small discrepancy between the *fonds* and the Hautbois. The reed is less stable, more undulating, with a greater variety of tonal shades and vowels. The *fonds* produce a round fundamental tone that is much more stable. The Hautbois 8', by itself, is characteristically throaty. A French Hautbois can be built and voiced to produce a sound closer to the Trompette, to be more responsive, and have cleaner tones. Here, the tones are rather fragile, and we hear that the steady state is even slightly irregular, as we can hear minimal, uncontrollable variations of pitch within a tone that is held long enough. From the keys I felt that the attack was only a fraction slow, not because of the action, but indeed because of the attack produced by the reed. The Hautbois in Studio Acusticum felt warm, with an introverted character.

A tempo

The *a Tempo*, following the thematic presentation in *Poco lento*, makes use of all the divisions and combinations of stops described in Figure 12.1. For the Positif I coupled the Oberwerk Gedackt 8' to the Solo Bordun 8'. This combination produced a round background mantle (the best possible *fonds* for this section of the piece). Franck requests the *fonds* for the G.O., which would include the Montre, and which I did not

have in the Hauptwerk. With the balance produced by the Récit and Oberwerk coupled together, and without principals (except the Diapason 8' in the Récit), I found the Flûte harmonique 8' the best suitable option for this division. For the Pedal I mainly used the Gedackt 16' and 8' and the Octavabaß 8', which, all coupled to the Oberwerk and Récit, produced a round melodic sound. It is still possible to hear that characteristic spitting quality of the attack of the Gedackt in the Pedal. In this case, however, I was not so disturbed by it, since it is rather discreet. In the recording, this section is heard on the track 25, from around 0.55.

I must admit I was never completely satisfied with the sounds I achieved for this part. In fact, I envision the *a Tempo* differently from how it sounds on the recording. After the sweet presentation given on the introverted Récit (Poco lento), I see a first development here, and I can imagine a broader, fuller sound, following the registration in Figure 12.1. Such a sound should be produced by the *fonds* in the Positif and Grand-Orgue, as well as the Pedal. But I had to find a compromise, since I did not find the Principal stops in the Oberwerk and Hauptwerk suitable to the music. As I have mentioned, I was bothered by the very characteristic attack produced by those German stops. I left them aside, and chose to make this section more introverted.

The overall sound in this section is somewhat dark, murmured. The warmth of the Hautbois comes across, and the stop that takes the stage is the Flûte harmonique 8' in the Hauptwerk, acting as a solo. Gerald Woehl described the Flûte harmonique with the word *wehmütig*—nostalgic. The character of this stop is defined by its overblowing attack and weightless, sandy tone. The attack is shimmering, with an almost imperceptible appoggiatura hitting a higher overtone. The fundamental tone is light (overblowing, with the second partial felt as the fundamental), slightly airy, and with bright upper partials. The sound is loud enough to fill the room. It is not quiet or discreet, but present. It surrounds the listener sitting in the hall.

Another interesting feature of this particular stop is the dynamic contrast over the range. Tones become louder, brighter, and more penetrating in the higher region, and darker and more introverted in the lower region. This can be heard at 1:50-2:00 in the recording, corresponding to Figure 12.2. The G3, from the second beat of the first bar in the illustration, is quieter, and the crescendo up to C4 is audible. The motive is then repeated again, moving up to E4, with an even more accentuated crescendo.

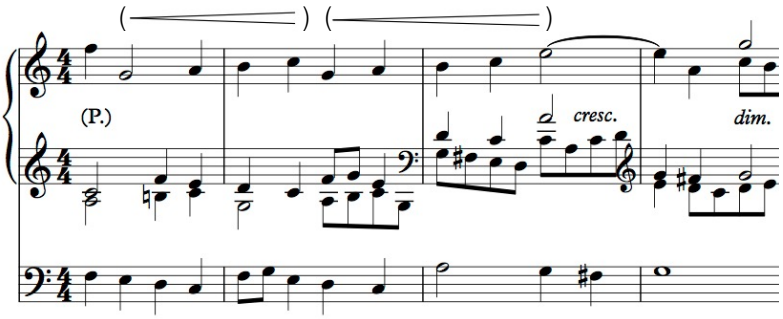


Figure 12.2

This is not a feature specific to the Flûte harmonique in Studio Acusticum, but rather a common feature of this type of stop in general. In fact, it is a common feature of many types of stops. What is interesting to consider here is not so much the fact that there is a dynamic crescendo, but rather the singing quality of that dynamic crescendo, which is something attained in voicing.[181]

Ajoutez les jeux d'Anches du R. et les Fonds de 16 pieds

The following section is a recapitulation of the thematic material from the opening of the piece—*Poco lento*. It is in Track 25, from around 2:05 until 2:55. The score reads: "Ajoutez les jeux d'Anches du R. et les Fonds de 16 pieds." For this section, in Studio Acusticum I chose to add the Bourdon 16', Flûte octaviante 4', Bombarde 16', Trompette harmonique 8', and the Clairon harmonique 4' in the Récit. To the Oberwerk (Positif), I added the Principal 8', which with the reeds from the Récit and the Bourdon 16' produced a good balance, with the attack becoming less transparent—in this case, leaving the Principal out was not an option, since otherwise the reeds from the Récit would have no support and the balance would be compromised.

The *Anches* of the Récit are now introduced in this section. Of interest here is the balance produced by the combination of this reed chorus (16'–8'–4'), and the range of expression attained with the swell. Overall, I consider the Bombarde 16' to be generally more textural than tonal. It has a rough surface and it is throaty. This is clearly audible when the swell opens, and can even be felt on long pedal notes (III-P). The Trompette harmonique 8' adds warmth to the Bombarde 16'. It produces a rounder tone with a cleaner texture and a wider overtone spectrum, adding some brilliance to the 16'. In this combination of reeds, it is the Trompette harmonique 8' that clearly defines the fundamental tone. The Clairon 4' has less fundamental and a wider overtone spectrum. It is

clearly lighter than the other reeds, with less fundamental in relationship to the more dominant upper partials. In this combination, together with the Bombarde 16' and Trompette 8', it adds brilliance, almost creating the feeling of a harmonic mixture. All together, these reeds produce a powerful, balanced, and complete tonal landscape.

In this part, we also hear the blending of the *fonds* with the combination of the *Anches*. The result achieves a balance between the more fundamental, rounder and darker *fonds* and the richer textures and greater brilliance of the harmonic reeds. It is also interesting to notice how clearly the upper voice, which sings the melody, comes out. The Flûte harmonique 8' in the Hauptwerk is still audible even in this combination, and it adds a nice singing character to the soprano line. The overall balance that can be heard here really pleased me. Note also that the opening and closing of the swell affects not only the loudness of the *Anches*, but also their character, specifically the tone and vowel type. This is a very interesting topic, and I will return to it briefly in a moment, in the *Allegretto cantando*, when the Trompette harmonique 8' takes the stage as a solo stop.

Animez beaucoup

The *Animez beaucoup* (and then *Retenez*) functions as a bridge to the next section (see Figure 12.3). It is still in track 25, from 2:55 to the end. We hear the decrescendo produced by the removal of the *Anches* in the Récit—*ôtez les Anches du R* together with the gradual rallentado suggested by Franck—*Retenez,* and at the very end: *Rall*.

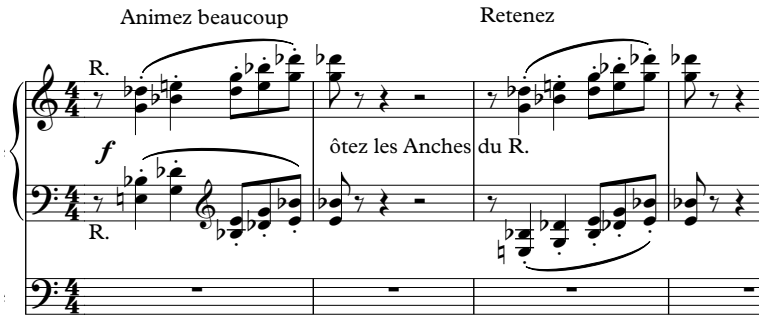


Figure 12.3

2.2 Allegretto cantando

The coming section, *Allegretto cantando*, is a playful melodic dialogue between Trompette and flutes. Franck requests the following registration:

R. Flûte et Bourdon de 8 pieds
Trompette
P. Flûte de 8 pieds.
G.O. Flûte de 8 pieds.
PED. Flûte de 8 et 16 pieds.
Claviers séparés

Figure 12.4

Given these guidelines, I found it difficult to find a flute in the Oberwerk that matched the style, or even matched another flute on the Hauptwerk. In the Hauptwerk, all considered, I had only one option anyway—the Flûte harmonique 8'. In fact, in Ste. Clotilde, that is also the only solo flute available in the Grand-Orgue. For the Positif, in Ste. Clotilde, Cavaillé-Coll included a Bourdon 8' and another Flûte harmonique 8'. In Studio Acusticum, I had only the Gedackt 8' alone, acting as a Bourdon 8'. The problem was that this Gedackt 8' was slightly weaker than the Flûte harmonique 8' in the Hauptwerk, and was overpowered by it. This was clearly not desirable. I tried to use the Doppelflöte 8' from the Solo (Manual IV), but that did not really work either. This stop is clearly symphonic, and it did not match the style; it did not even mix well with the Flûte harmonique 8' in the Haputwerk. It sounded much broader than everything else. The Konzertflöte 8' produced a sound similar to the Flûte harmonique 8', but with a very different character. The best solution was again to couple the Bordun 8' from the Solo to the Gedackt 8' in the Positif (IV-II). The Bordun 8' produced a dark tone, more introverted, in the back, and the Gedackt 8' sounded more nasal, slightly more open, and lighter in the fundamental. The combination of these two produced a good balance: the darker tones of the Bourdon 8' matched the warmer, lighter upper partials of the Gedackt 8'. This combination also balanced well with the Flûte harmonique in the G.O. The tone colors and loudness were nicely combined. The overall result can be heard in the dialogue of flutes performed in this section, on track 25.

The Trompette harmonique 8' in the Récit is the dominant solo voice in this section. This Trompette in Studio Acusticum is rich in upper partials, which is a general trait of this harmonic stop. I find, however, that in Studio Acusticum, the stop is slightly more brilliant, and that its fundamental has less presence than in other organs I have heard.

The tone is penetrating, nasal, and slightly irregular in pitch, similar to how I described the Hautbois 8', with fragile and uncontrollable variations of pitch and vowel. The attack is slow. Unlike flue stops, which may produce initial transients with dominant consonants, often spitting, this Trompette, being a harmonic stop, produces an attack more like that of the Flûte harmonique, described above. That initial appoggiatura is here more textural, like a throaty vowel. It is also this throaty attack that gives the Trompette its seductive character.

The tonal variations that occur in the Trompette with the movement of the swell boxes merits some comment. Note for instance the almost dramatic change of character happening between open swell and closed swell. This is audible throughout the entire section, but most clear around 4:00, in the recording. There is not only a dynamic change, but what seems like a tonal one. When the doors are open, the fundamental seems more present, and the whole spectrum of the tone is revealed. When the doors are closed, we hear more of the upper partials, and the fundamental becomes less present, resulting in a more nasal tone that is thinner, quieter, and generally more introverted.

The attack of the Trompette harmonique 8' in the Récit added a few challenges to the performance. The attack is not the same in the different regions; it is faster in the upper region and slower in the lower region. The challenge was to keep all the tones together, from the Récit, the Hauptwerk, and Oberwerk—all divisions play together and against each other in this section of the piece. There is one particular passage where this problem becomes more prominent. It can be heard on the recording starting around 6:05, when the Trompette plays a motive of descending sixteenth notes, starting in the treble and moving all the way down to the lowest octave. There, the slower attack of the Trompette asks for a slower tempo.

2.3 Quasi lento

The *Quasi lento* forms a monumental bridge to the concluding section. It makes use of the rhythmic patterns introduced in the very beginning of the piece as well as the main melodic motive of the previous *Allegretto cantando*, which now appears in the pedal. This section is heard from around 7:50. The registration requested by Franck, and the sounds resulting from it, are very similar to those already explored in the first section of the piece, after the indication “Ajoutez les jeux d’Anches du R. et les Fonds de 16 pieds” and discussed above. Franck’s registration indications for the *Quasi lento*, are illustrated in Figure 12.5.

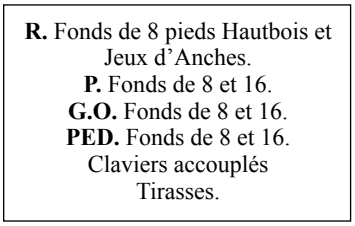


Figure 12.5

The monumental character of this brief section that is suggested by the larger registration, the reticent musical motives, the tempo indication, and the diminished harmonies would have gained much from a more reverberant room. I can certainly picture this section differently when I listen to Cavaillé-Coll's instruments in larger rooms. The feeling produced by the acoustics of the hall in Studio Acusticum is somewhat different, more contained. It sounds almost like a chamber instrument.

2.4 Adagio

The piece concludes with a melodic, expressive *Adagio*, heard on track 25, from around 9:00. For this last section, Franck requests the registration depicted in Figure 12.6.

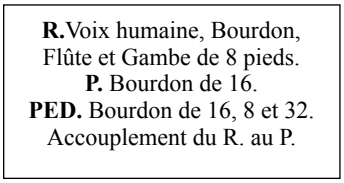


Figure 12.6

In Studio Acusticum I chose to combine the Voix Humaine 8' with the Diapason 8', Flûte traversiére 8', Viole de Gambe 8', Cor de Nuit 8', and Tremblant fort III. To the Positif I added the Bordun 16' from the Solo (IV-II), and coupled it to the Récit (III-II). The Pedal plays the Salicetbaß 32', the Gedacktbaß 16', and the Gedackt 8'.

The blending of sounds in the Récit in this particular example is truly fantastic. At first it is not easy to distinguish all the individual stops combined in the Récit, as they complement each other so well. When listening attentively though, it is possible to perceive at least two main types of sounds, or textures. The fundamental tones are brought out by the broad combination of flue stops. The Voix humaine 8', on top of the funda-

mental, provides the rugged, gargling texture, which together with the tremulant, produces the even more accentuated undulating feeling. The blending of these two textures works so well that even the characteristic attack of some of the harmonic flue stops matches the steady state of the reed. Listen for instance to the soprano line in the passage shown in Figure 12.7, at around 9:20 in the recording, track 25. The expressive harmonic appoggiatura produced by the Flûte traversière 8' comes out very clearly on the notes G4 and F4. That nostalgic, expressive attack, develops nicely into the rugged steady state of the Voix humaine 8'. It is an interesting 'attack-steady-state' combination.

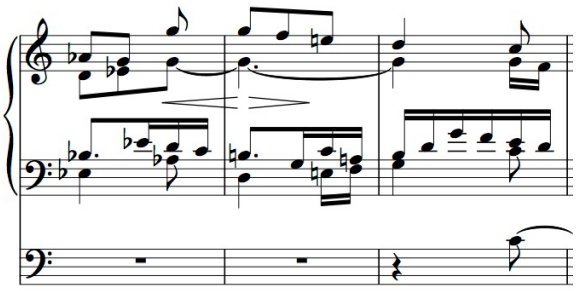


Figure 12.7

The Voix humaine 8' in Studio Acusticum, in itself is not very robust in the steady state, but rather fragile. It is not so broad in upper partials, and not so responsive in its attack either. It is also more introverted and chamber-like.

3. Reger's Tokkata, Op.59 – track 26

At an earlier stage of this study, I wondered whether a distinctively German Romantic sound could be achieved in Studio Acusticum. The organ has two typically German Romantic stops: the Konzertflöte 8' (Sauer), and the Trompete 8' (Walcker), both in the Oberwerk. The Cornet in the Solo along with other string stops might complement the sound palette and produce the sonority I was looking for. Once the organ was completed, and after trying out different combinations of colors and different registration, I realized that it was not really possible to achieve a German Romantic sound, which is characterized by the darker, mellower shades of sounds, with the possibility of creating smooth crescendi and diminuendi (using the Rollschweller), without any contrasting mixtures and reeds. When preparing the Reger for the recording, I had to adapt the

piece to the organ, and search for the best suitable sonority. I then noted of a few general registration principles.

I avoided using any principal stops over 4', as they sounded too sharp, too classical. The mixtures, with the exception of the string mixture in the Solo—the Viole de d'Orchestre 3fach—were not used; they did not match the symphonic core of the instrument either. For the 2' pitch, I mainly used flute stops, avoiding principal sounds. The Quint and Nasat were only used over the broader mantle of 16', 8', and 4', to provide harmonic richness.

The reeds were considered in terms of their dynamic range—how quiet or loud they were. The harmonic reeds in the Récit were the first group of reeds to be considered, starting with closed swell—***mf***. The Trompete 8' in the Oberwerk, and possibly the Fagott 16' and 8', served to balance the brilliance of the harmonic reeds in the Récit—***f***. The symphonic reeds in the Hauptwerk (Trompette 8', Clairon 4', and maybe Bombarde 16') introduced more clarity and energy as well as brilliance—***ff***. The Tuba Mirabilis 8', from the Solo, could also be used to further enlarge this combination (upon the Cornet Progressio), making the sound broader and more direct—***Org. Pl***. This was the concept I also used for the crescendi heard in many of the passages in the recording. All things considered, the approach to Reger, in this performance, is more symphonic than Romantic.

3.1 VIVACISSIMO

Reger's Tokkata is somehow unpredictable, built with interrupted ideas and motives upon a unfounded tonal center (notated in D minor), with a blurred distinction between instrumental (scales, trills, arpeggio) and polyphonic (contrapuntal) passages, and even rhythms that may or may not be taken literally. In my registrations, however, I tried to be consistent. I referred to the dynamics notated in the score, and I kept the overall sound concept the same throughout the piece.

The very first motive of the piece, indicated "***ff***" in the score, is played on the Oberwerk, with sounds coupled from the Récit. The Récit plays the Bourdon 16', Diapason 8', Flûte octaviante 4', Dulciane 4', Octavin 2', and Basson Hautbois 8'. The Oberwerk adds a combination of several 8' stops (Principal, Salicional, Gemshorn, Gedackt and Fagott), as well as the Hohlflöte 4' and the Nasard 2 $^{2}/_{3}$'. The use of any other 4' and 2' in the Oberwerk compromised the balance, as they were too sharp and penetrating. I wanted the sound to be round and broad, and not necessarily sharp or brilliant. This combination of 8' stops, coupled from both manuals, produced the darker

fundamental sound I wanted, and the 4' stops, together with the 2' and the 2 $^{2}/_{3}$', added the perfect amount of upper partials to that fundamental. The soft 8' reeds (Hautbois and Fagott) added texture, making it slightly harsher. The overall result is surprisingly weightless (given the number of 8' stops), like a dark and distant cornet sound.

The Hauptwerk is then coupled to the Oberwerk and Récit, adding the Principal 16' and Principal 8', Viola da Gamba 8', Octave 4', Quinte 2 $^{2}/_{3}$', Flöte 2', Trompette 8', and Clairon 4'. From the Récit I also added the harmonic reeds (16'-8'-4'). The Pedal, coupled to all manuals, plays the Groß Bordun 32', Subbaß 16', Cello 8', Octave 4', Posaune 16', and Trompete 8'. The overall balance achieved is good, even if the sharpness of the Clairon 4' and Trompette 8' in the Hauptwerk is overwhelming at times. Generally, the reeds do dominate, though they supported by 16'-8'-4'-2 $^{2}/_{3}$'-2' stops in all divisions.

The Pedal perhaps feels softer than the manuals. I did not have so many options there, even considering the large amount of stops in the panel. The addition of any remaining 8' reed stop—Trompette 8' or Tuba mirabilis 8'—would have overpowered the sounds in the manuals, and the Bombarde 16' was also too loud. Any more flue stops would have made the sound wooly. I found that my solution struck the best possible balance.

The issue of balance in this piece, however, does not only concern registration, but also its relation to voicing. In the beginning of the Tokkata, for example, Reger distributes similar motives throughout different regions of the keyboard—bass and treble. This first appearance of Manual I (***ff***), heard on the recording in track 26, from 0:10 to 0:25, proved to be the most problematic part of the piece to register. Figure 12.8 shows a motive of three quarter-note chords, written in the middle region of the keyboard, doubled in both hands.

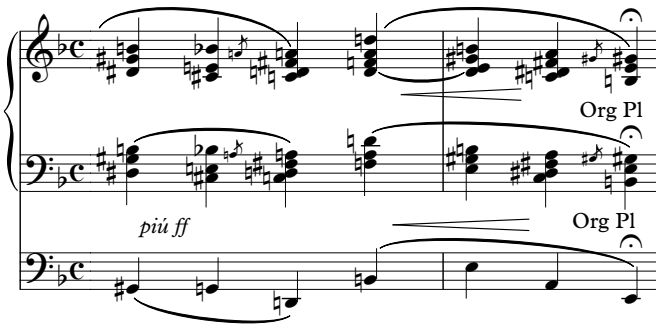


Figure 12.8

After a short fast passage in the Oberwerk, the same motive is repeated, transposed to a different key, and played on a higher region of the keyboard (Figure 12.9).

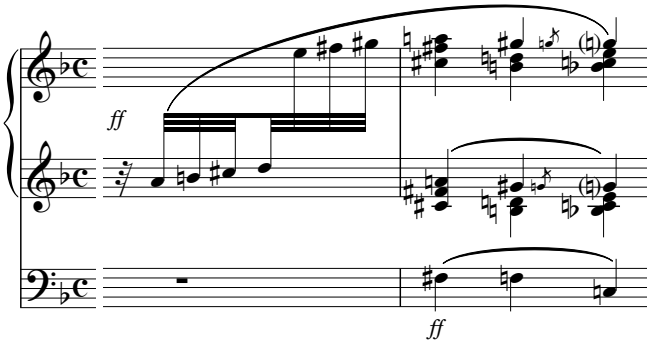


Figure 12.9

There are two interesting aspects to consider here. First, the fact that the same melodic/harmonic motive is placed so differently in the span of so few bars; and second, the fact that Reger requests ***Org Pl*** in such a low register (see last bar of Figure 12.8). The contrasts produced by this type of writing depend greatly on the way the instrument being played has been voiced, and cannot really be counterbalanced with registration. The greater the dynamic contrast of the organ is across the range of the keyboard, the more awkward this passage will sound. In Studio Acusticum, the dynamic contrast between bass and treble is rather marked, and in general, the bass is voiced quieter than the treble. This means that Reger's request for ***Org Pl*** in such a low region did not work very well. There, in the E major chord—the last chord in Figure 12.8—I heard mostly the upper G#3 and the E3 in the right hand. The rest of the notes, including the whole left hand, sounded deep and dark and weaker, less present. The chord sounded imbalanced. Interestingly, due to the characteristics of its voicing, the instrument was doing the complete opposite of what was written in the score. The upper region (as in the chords shown in Figure 12.9) sounded more present and brighter, even if fewer stops were added. Here, I found that the best way to counterbalance this contrast was to make use of the reeds in the Hauptwerk, specifically the Clairon 4', throughout the whole section. The use of the Clairon 4' balanced the lack of brightness and presence in the lower registers, even though it sounded almost too sharp up above. Eventually, I decided to ignore some of the crescendi marks and ***Org Pl*** requests in the score, and

adopted a more unified sound approach. I thought the music, and the organ, sounded better that way.

I found another challenge in the first half of the Tokkata, right before the *Un poco meno mosso*. Reger's polyphonic writing is inconsistent, and at this spot it contradicts his own dynamic indication. This passage (Figure 13) can be heard on the recording in track 26, from around 1:30 to 1:45.

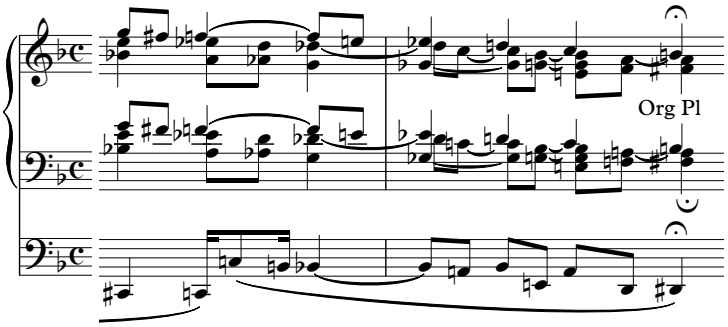


Figure 13

Figure 13 presents a chain of chords, each composed of four to five voices. Harmonic tension is suggested by the dissonances and by the mark ***Org Pl***, and, up until the third beat, by what I would expect to be a growing number of voices. But when the last chord is reached, the number of voices is reduced again to four, and Reger writes ***Org Pl***. The contradiction is not only in regards to the number of voices, but also to the rather naked disposition of the chord itself. In the manuals, the chord is essentially built of a major second and a minor third, and the D#1 in the pedal is left at a considerable distance from the manuals. The chord feels empty. Given these circumstances, I found it challenging to match that feeling of ***Org Pl***, even with the aid of registration. In Studio Acusticum, adding any other stop to that last chord would in fact emphasize that nakedness, rather than balancing it. I realized that the sounds of the organ were sensitive to the polyphony, and that Reger, in his writing, could have taken polyphonic coherence into consideration as well. Eventually, I decided to add the Bombarde 16' in the Hauptwerk in that particular chord, to try to give it more volume. The result is audible in the recording, but it is not very convincing. Interestingly, these issues sounded more accentuated at the organ in Studio Acusticum than at other organs where I have performed this piece.

3.2 Un poco meno mosso

After the *Vivacissimo*, Reger writes a quieter intermediary section, the *Un poco meno mosso*, where he uses the marking ***ppp***. The section is played on the Oberwerk, and the registration includes, from the start, the Unda Maris 8', the Salicional 8', and the Konzertflöte 8', together with the Tremulant II. The Pedal plays the Gedacktbaß 16' coupled to the Oberwerk (II-P). For the second phrase, the ***ppp*** section, I have simply removed the Salicional 8' and the Konzertflöte ', leaving the Unda Maris 8', without the Tremulant. The combination of the three 8' stops in the Oberwerk works very well. The harmonic balance is very pleasing. The Konzertflöte is dominant, both in tone and attack, and its fundamental is complemented by the stringy Salicional and the Unda Maris. The overall result is a sound with an expressive attack (the overblowing Konzertflöte) and a good balance between the upper partials of the string stops—very distant and narrow in character—and the rounder, more solistic tones of the Konzertflöte.

In the Konzertflöte by itself, we hear that the tones in the treble are slightly more sandy or smoky than those in the tenor, which are rounder and cleaner. This difference may relate to the fact that the stop overblows only in the upper region, influencing the attack and the harmonic structure of the steady state—it has a lighter fundamental. It is also interesting to note that, generally, the Konzertflöte is more lyrical than the French Flûte harmonique heard in the Franck, which is more nostalgic, introverted, and seductive.

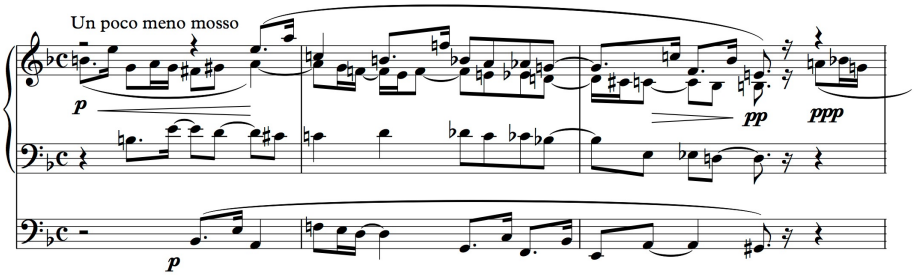


Figure 13.1

I should also make a brief note about the registration chosen for this passage in relationship to the dynamic changes written in the score (Figure 13.1). To underline the contrast ***p*** - ***pp*** - ***ppp***, I made use of both the swell boxes and the registration. Reger does not request specific stops or pitches, at least in this particular piece, only dynamics. The dynamic changes in the first phrase of this *Un poco meno mosso* are achieved by the gradual opening and closing of the swell boxes. The effect is convincing. For the next

phrase, the ***ppp*** is achieved by removing stops, leaving only what is perhaps the quietest stop in the organ, the Unda Maris. The contrast between ***pp*** and ***ppp*** is, in my view, also very convincing. The Unda Maris is even more distant, softer, and more introverted in character. Note that the decrescendo is done not only with the loudness, but also with the character of the stops involved.

3.3 Vivacissimo (II)

The second half of the Tokkata, *Vivacissimo*, is similar to the first half in sound concept and registration. It has a clear A-B-A form. I felt, however, that the second half posed fewer problems than the first, with regards to the relationship between what is intended in the score and the sounding result in performance. The writing in this section is perhaps more "organ-friendly," since it does not contradict the natural behavior of the instrument, at least the one in Studio Acusticum. The polyphony, and the registers in which the voices are written, are in accordance with the dynamic changes marked in the score, which overall also accord with the voicing of the organ. Note for instance the very last part of the Tokkata (Figure 13.2), heard in track 26, from 3:30 to the end.

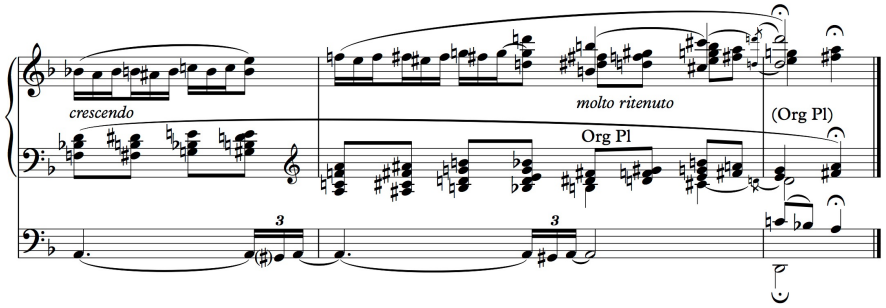


Figure 13.2

The parameters of pitch and polyphony are both moving gradually towards the same goal—*stringendo e sempre crescendo*, to ***Org Pl***. The voices are given an ascending line, which is ideal, since the upper regions of the stops are generally voiced louder. The number of voices is also growing naturally, which produces the feeling of added volume. The registration chosen emphasizes the intent of the music. The crescendo is done in five steps. These changes are not distinguishable in the recording, nor are they in the room. The crescendo is smooth and gradual, and the addition of stops is barely noticeable, as intended. The movement upwards, together with the growing number of voic-

es, also complies with the voicing of the instrument, and overall produces a good balance between musical intention and sound performance.

4. Reger's Fuge D-dur Op. 59 – track 27

The *Fuge D-dur* introduces another crescendo, this one even more gradual. It is achieved in 20 steps, distributed fairly equally throughout the score. The registration concept is rather simple. The first half of the piece starts on the quieter string stops, then gradually adds some of the quieter flutes, and moves then towards the broader principal stops, and then to the quieter reeds, still with closed swell boxes. The deeper flue stops, namely the 16' stops, and the more prominent and brilliant reeds are then added, and the swell boxes open fully. The louder symphonic reeds in the Hauptwerk, and other high-pitched stops including mutations, are then added. The piece concludes with the addition of the Tuba mirabilis 8' (***Org Pl***).

Undulating strings

The very beginning of the fugue is played on the Récit, on the Viole de Gambe 8' alone. The sound here is quiet, distant and slightly nasal. It is interesting to note that the steady state of the Viole de Gambe 8' is naturally undulating (no tremulants are added here) with an irregular and uncontrollable change of vowel, as if the wind pressure was fluctuating. This is heard as “wawoawowawawo….” Along with the undulation, a slight variation of pitch is also perceptible. This peculiar quality is clearly audible in the longer notes, when the first voices start singing the theme of the fugue in the manuals.

Flutes and Gedackt

Soon after this, around 1:00 in track 27, the manual part moves to the Oberwerk, where the Gedackt 8' is added to the Salicional 8', all coupled to the Récit. The swell box in the Oberwerk opens slightly to a broader, mellower sound, more present and active in the room. The characteristic attack of the Gedackt 8' is clearly audible in the combination, adding a slightly percussive quality to the tones, especially in the tenor region. This attack predominates even more with the addition of the Flûte traversiére 4' in the Récit (overblowing), from around 1:20. It recedes again when the Diapason 8' in the Récit is added along with the Konzertflöte 8' in the Oberwerk, around 1:35. The sound becomes broader, present, and almost velvet-like. The theme enters in the pedal around 2:03—Figure 13.3. The robust, stringy sound in the Pedal is the combination of the

Gedacktbaß 16', Violon 16', Gedackt 8', and Clarinette 16' (from the Solo, IV-P), coupled to the Récit and Oberwerk.

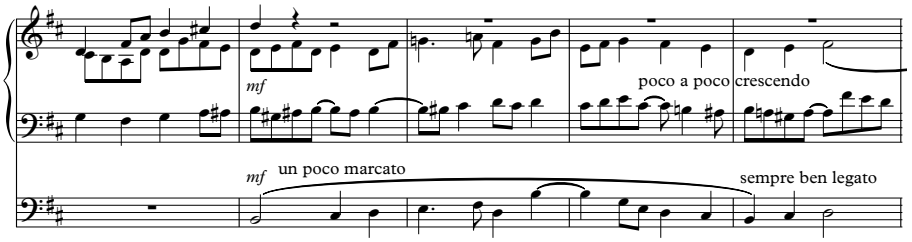


Figure 13.3

Reeds

After the entrance of the Hautbois 8' (around 2:35), and soon after the Fagott 8' (around 2:45), a succession of reed stops enters gradually the music. The Trompete 8' in the Oberwerk enters around 3:05. The Récit opens gradually from 3:20 to 3:30, and the Bombarde 16' is added to the Récit, almost imperceptibly. It adds body to the reed chorus already in place, and is more felt than heard. The piece heads towards the end as the theme appears in the pedal in longer note values, with the marking "*+32' **fff**, assai marcato,*" with the addition of the Posaune 16' and the Trompette 8' for the pedal, among other stops. The sound in the manuals becomes louder, more brilliant, and even more textural up until the end. It concludes with the addition of the large Tuba mirabilis 8' from the Solo and the Groß Posaune 32' in the Pedal. The overall final sound is full and massive.

One last remark on the clarity of the voices more or less throughout the Fugue. The upper voices are often clearly audible. The middle voices may sound unclear at some points, and the bass is the least prominent group of voices, which may be noted when listening attentively to the lower vocal lines, even those played in the Pedal.

5. Kagel's Rossignols enrhumés – track 29

Registering and performing Kagel's pieces in Studio Acusticum was a most rewarding experience. The sound possibilities are almost limitless there, and any stop can be combined with any other in this music. The approach to registration here is clearly different than with Franck and Reger. With Kagel, my aim was to explore freely the stops available, and to find exquisite sound colors and interesting textures as well as sound

effects. Whereas in Franck, Reger, or Bach, the choice of sounds was based on stylistic considerations, here, it was based on the characteristics of sounds themselves, especially on their color, attack, and texture. I also considered the effect the sounds produced within the musical flow of events, remembering the melodramatic character of the pieces. Of the two Kagel pieces recorded, I will focus exclusively on the Rossignols Enrhumés, since it explores a wider variety of sounds and musical resources. For practical reasons, and since the piece makes use of a complex combination of stops, changing rapidly through the music, I will not address registration in detail here. I will, however, discuss some of the most interesting sounds produced by that complex combination of stops, and their musical context.

Nervoso, molto rubato

The piece starts with the indication *Nervoso, molto rubato*. This is an introductory section composed of three short gestures. The first gesture (Figure 13.4) is played on the Oberwerk.

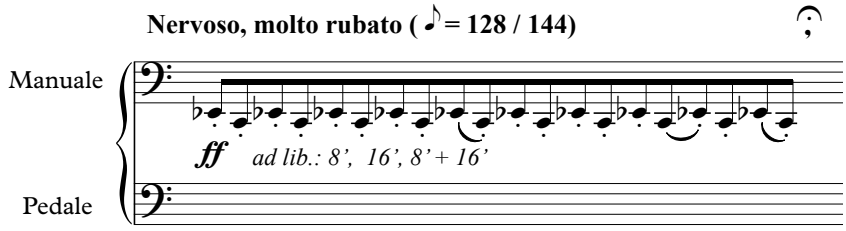


Figure 13.4

The rough sound of the reeds is complemented by the high-pitched Violin 2' and Sifflöte 1', as is clearly audible on the recording. The different attacks of these two groups of stops—reed and flue—are quite distinct. The spitting Sifflöte 1' adds some definition to the attack of the slow and clumsy reeds. The strings, although harder to hear, make the tones slightly sharper, and do not add much to the initial attack. The reeds are the most prominent group in the gesture, and they add texture. The overall result is a sound that evokes the growling of an animal, as it is desired here—a nightingale with a cold. The following two gestures are variations on this same idea.

It is also interesting to note that, even though the sound concept is similar for the three gestures, they offer slight variations of color and texture. Moreover, and due to the fact that the sounds are combined freely from all divisions, the three gestures have dif-

ferent locations in space. For example, the first and second gesture sound closer, more in the front (Hauptwerk and Oberwerk), and the third gesture is further back (Solo). The combination of some of the exquisite harmonic stops (Pedal and Récit) in the last gesture produces an interesting sound resembling a cornet, with very edgy upper partials and lack of fundamental.

(= ca. 84)

After the two quiet appoggiaturas played immediately after the third gesture—Clarinette 16' in the Solo—a new gesture is introduced (Figure 13.5), heard in track 29, from 0:30.

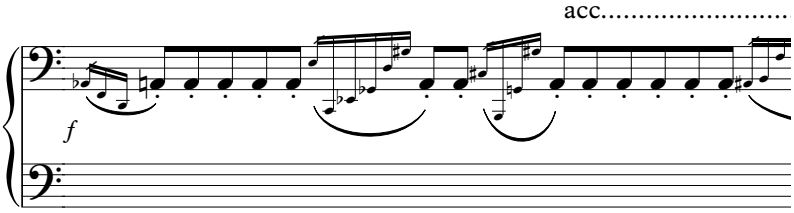


Figure 13.5

The solo line is played on the Récit, and it develops along with an *accelerando molto* and a crescendo sign. The stops combined are the Septième harmonique 1 1/7', None harmonique 8/9', Voix humaine 8', and the Clarinette 16' from the Solo (IV-III), with the Tremblant fort III. All swell boxes are closed from the start, and they open gradually as the accelerando develops.

The Clarinette 16' is barely audible in the combination, yet its dark and slow 'hum' is felt. The fundamental tones—that is, the notes written in the score—are only played by the Voix humaine 8', which itself does not have much of a fundamental. The sound is more textural and nasal, and rather weak in its steady state. Overall, the most striking feature of this passages is its brilliance. This is produced by the mutations, which emphasize the more unusual seventh and ninth harmonics. It is also interesting to note that even though the registration does not change—not until the Bombarde 16' is added—the fast figures produce a different sound effect than the repeated notes. When the fast figures are played, there is an explosion of bright overtones that is emphasized by the acoustics in the hall. The gesture concludes, abruptly, with the deeper Groß Posaune 32' in the Pedal.

p!

Another melodic line is introduced later in the music, this time played along with the pedal. The passage is in track 29, from 1:20 to 2:00.

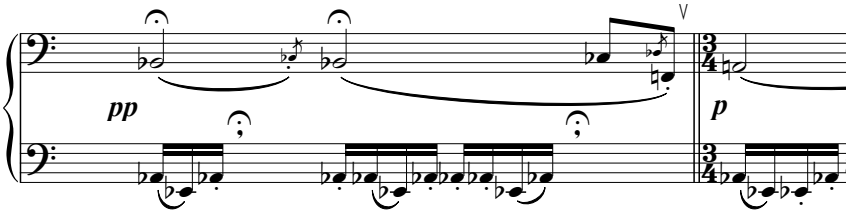


Figure 13.6

The melodic line, shown in Figure 13.6, is played in the Oberwerk, even though most sounds are coupled from the Récit. From there I have borrowed the None harmonique $^{8}/_{9}$', the Voix humaine 8', and the Tremblant fort III, coupled to the Sifflöte 1' and Tremulant II on the Oberwerk. The combination is a variation of the previous one—Figure 13.5, discussed above—the major difference being that here the swell box of the Récit is open. The sound of the Voix humaine 8' is therefore more dominant, and the upper partials further away. Since the passage is played in a low register, the attack of the Sifflöte 1' is easy to hear.

In the Pedal, the slow Violon 16', reinforced by the Groß Bordun 32' and a few other 8' flue stops, takes the stage. I chose this particular sound largely for the attack of the Violon. I enjoyed playing with the slow attack of that stop, which naturally produced a crescendo up to the steady state. It was possible to manipulate that crescendo from the pedal keys—the shorter the notes, the quieter the sound, and vice-versa. The figures written in the score alluded to this type of experimentation.

(♪ = ca. 84)

The crescendo in the Pedal (Figure 13.7), heard next, produces a very convincing effect. The crescendo starts with deeper flue stops, followed by the addition of softer reeds, then mutation and mixture stops, and finally the louder reeds, including the chamade. The overall crescendo develops in 18 steps. In the first bars, each step is added after each breathing mark (Figure 13.7). By the end of the passage, steps are added ever faster, while notes are held down in the pedal. The sensation produced by the crescen-

do of the brighter reeds at the end of the passage, played in such a low register, is like listening to a large tam-tam.

Figure 13.7

After this passage, one other short melodic line is presented, similar in registration and character to the ones already discussed (Figures 13.6 and 13.7). The piece then reaches its climax (track 29, from around 2:50) with percussive clusters played on full organ and fast passing notes in the pedal. After a brief pause (*lunga*), a calmer, quieter passage is introduced, the *Sehr ruhig* (from around 3:30–4:30).

Sehr ruhig

This section is composed of two contrasting musical gestures: the *legatissimo!* on the manuals, and the short staccato notes in the pedal (Figure 13.8).

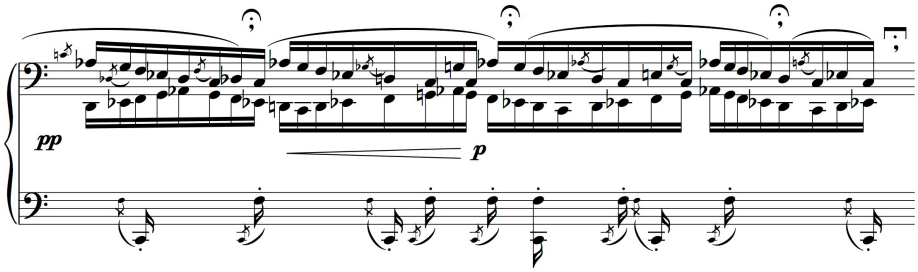


Figure 13.8

The sounds of the *legatissimo!* evoke something plain, broad, and dark, yet embracing. Almost all of the 8' flue stops are combined on the Oberwerk, where the passage is played, along with those on the Récit and including a soft 16'. Only one other stop is added to the combination on the manuals, the Nasard 2 $^{2}/_{3}$' in the Oberwerk. The fifth is in fact very prominent, not only because it is added alone to the fundamental, but also because it is played in such a low register. The Nasard would have been less present,

even with the same combination of stops, if played in a higher register. This happens because most fundamental tones (8'), like those heard in this passage, are voiced slightly quieter in the bass, while the Nasard is voiced with less dynamic contrast across its range. This is a classical stop, mostly used to build cornets, or complement mixtures, or even to give character to solo stops, something most often only done in the alto and soprano registers. In this particular example, therefore what is heard is something slightly different from what is written in the score. The audible fifth builds a texture of four voices, as demonstrated in Figure 13.9, or we may even consider it a texture of two voices, with very prominent fifths.

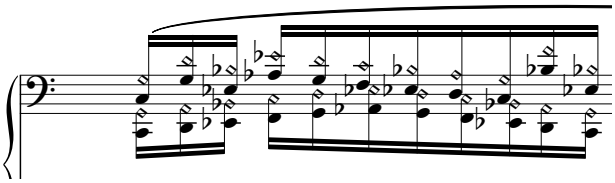


Figure 13.9

The boxes of both Récit and Oberwerk are fully closed at the start and open slightly towards the end.

piu lento

The very last gestures of the piece is played in the pedal (Figure 14). The sounds are coupled from different divisions, and the Voix humaine and the Fagott are clearly heard in the first note of the gesture. Reeds are then removed until the last note is played, sounding weightless, harmonic. It is also interesting to hear the Vibraphone coupled from the Solo division.

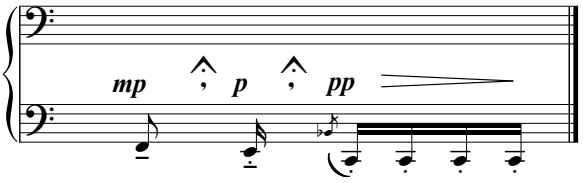


Figure 14

6. J. S. Bach's Toccata in C, BWV 564

The use of the German Baroque core (see Appendix A5, p. 218) posed no major practical issues, since all stops are placed accordingly at the stop-panel, in each respective division. It required no major changes, and ultimately left more time for playing and experimenting. Within this style, as I experienced it in Studio Acusticum, I would consider the most noticeable features to be the distinctive attack of stops, the penetrating high-pitched sounds, and the sharp, massive mixtures. The organ here sounds drier and edgier than in the other pieces, and it speaks much more to the front. The sensation of being in the front is produced by the accentuated distinctive attacks, with all syllables clearly articulated. The sensation of dryness develops from the combination of this spitting attack with the limited range of upper partials in the steady state of most stops. That reduction in upper partials produces the feeling of less harmonic space—hence it feels "dry." In general, flue sounds in this German Baroque concept are not so embracing, but rather penetrating, or compressed. The higher in pitch a flue stop goes, the louder it gets, and the louder it is, the sharper it feels. That was my experience in Studio Acusticum.

The mixtures are very present and massive, not to say loud. They sound compressed and sharp. I avoided using them in my registrations, since adding them often resulted in the loss of fundamental sound. In fact, even when added to the flue chorus 16'-8'-4'-2 $^{2}/_{3}$'-2' of each division, they still sounded too dominant. It should be noted though that this is a feature of German Baroque aesthetics, and not specific to the voicing of Gerald Woehl. These sounds will most likely change over the course of the years, and in a decade or so they will sound smoother and more blended. This may also explain why some sounds in the organ are voiced slightly sharper from the start. These mixtures in Studio Acusticum, at this point in time, sound almost unpleasantly sharp.

The contrast between the divisions is another very distinctive trait. As Woehl himself explains in some of his documents, the sounds from the Oberwerk should produce a direct and clear attack, both for the player and the audience. In contrast, the sounds from the Hauptwerk should project more freely into the room. The Pedal was planned to have a large massive section, with three 32' stops (flue and reed) and a smaller chamber-like section, which was designed to give the player good sound control from the console. It is interesting to compare this to Silbermann's remarks on his own sound concept—a "large and grave" Hauptwerk, a "sharp and penetrating" Oberwerk, and a "strong and penetrating" Pedal.[182] In Studio Acusticum, I experienced the Hauptwerk as sounding broad and present in the room, and the Oberwerk less in the front, more

rounded, not as loud as the Hauptwerk. The Pedal is not massive at all. In fact, it is softer than the remaining divisions. The flue stops are introverted, and the reeds are dark, with a slow attack. Comparing all the divisions, we have a Hauptwerk that is clearly in the front, with broad and massive sounds; an Oberwerk which is more distant—placed higher than the Hauptwerk—and less broad, almost chamber-like; and a Pedal that is heard in the back.

My performance challenges were mostly related to the character of the individual stops, and the difficulties of combining them. Each individual stop is voiced with accentuated features, namely the attack and the dynamic contrast over the range. These accentuated features also shaped the music and gave it a very marked, distinctive character. In some cases, for example, the prominence of attack influenced the tempo of the piece. Given such accentuated 'chiff', in most flue stops the level of control from the keys was minimal, and no matter how I pressed the key, the attack was completely determined by the pipe itself. That attack could even change within the same passage, when playing it repeatedly, in the same manner. I had no full control over the character of the attack.

The considerable dynamic contrast within most stops was another feature over which I had no control. As I will demonstrate in the *Toccata in C*, that dynamic contrast created some performance challenges, as it shaped some passages in a way that contradicted the melodic countor of the music—for example, the *Adagio*. On the other hand, in some other pieces—the *Fuga*, for example—the contrast gave the music a nice contour and made it more lively and interesting to listen to. The fact that all stops had a distinctive individual character, made it harder to find good combinations as well. As I mentioned at the beginning of this chapter, most stops in the organ were sensitive to blending.

6.1 Toccata – track 30

Manualiter

The manualiter section—heard on the recording from the start of track 30, up to 0:50—posed no great problems. The passage is played on the Oberwerk. The Plenum is composed of the Principal 8', Gedackt 8', Octave 4', Nasard 2 $^{2}/_{3}$', Octave 2', and Mixtur 4fach. The Mixtur is voiced equally loud throughout the different registers. The remaining stops—excluding the Nasard 2 $^{2}/_{3}$'—are quieter in the bass. Thus, when listening attentively to the passage, one can in fact hear the Mixtur 4fach more prominently in the bass. In the treble, the sound is more balanced, more complete. Over the whole

passage, the Mixtur is dominant, and the sound is nasal and penetrating with a prominent fifth. It is also interesting to note the behavior of the Mixtur, played on the classical wind. Immediately after the attack, the steady state undulates slightly until it stabilizes to the right pitch. The effect is reinforced by the slow attack of the flue stops as well. This is clearly audible at the very end of the manualiter passage, on the very last note.

Pedaliter

The Pedal solo passage is played on Principal 16', Octavbaß 8', Octave 4', Mixtur 4-6fach, Posaune 16', and Trompete 8'; on the recording, track 30, from 0:50. The sound concept is similar to the manualiter section. The Mixtur 4-6fach, a transmission from the Hauptwerk, is dominant here too, even though it is nicely complemented by the darker, textural reeds.

The heavier action in the Pedal, together with the prominent attack of most stops, made it challenging to achieve precision, and even to play rounder melodic lines. To attain a rounder sound, I generally had to play overlegato, otherwise the sound became unequal and edgy. The slow reeds also asked for that approach: to play with weight.

Another related feature worth mentioning is the 'tight' release. At the end of some of the gestures played in the Pedal, it is possible to hear a minimal descending glissando, produced by the slow closing of the valve, along with the release. The feeling, from the action at the keys, was that of force, as if the sounds were being choked. The slow release did not occur in response to my release from the key, but just naturally alongside the tight action in the Pedal, which is also sensitive. I found the combination of this heavier 'tight' action, with the sensitive attack and release, contradictory to the behavior of my body when performing. I would expect the sensitive attacks and releases to be the result of a lighter sensitive action. That is the logical parallel, as I see it.

Tutti

The polyphonic section of the Toccata is played on the Hauptwerk, with Principal 8', Rohrflöte 8', Octave 4', Quinte 2 $^{2}/_{3}$', Octave 2', and Mixtur 4fach. It is also coupled to the Oberwerk, with the Gedackt 8', Octave 4', Blockflöte 2', and Fagott 16'. The Pedal maintains the same registration from the previous solo section.

At first I wanted to use the Mixtur 4fach in the Oberwerk, coupled to the flue chorus in the Hauptwerk, and played from there. This was mainly because the Oberwerk mixture in the Oberwerk was lighter than the Hauptwerk mixture. The latter sounded too massive, and the Oberwerk mixture allowed me to play lighter and faster. Eventually, I

decided to use the Mixtur 4fach of the Hauptwerk, considering that the previous Pedaliter passage had been played on the Mixtur 4-6fach, and not wanting to create an imbalance between these two sections. In my view, the polyphonic section should add even more to the previous solo passages. Soundwise, I would point to the the dynamic contrast produced by the Mixtur 4fach in parallel with the polyphony. Note the fact that the more voices that are added to the musical texture, the louder it sounds. This produces a great effect when full chords are played quickly, in a low register, together with the Pedal. The effect produced is almost percussive. This is clearly audible throughout the entire section. I also enjoyed the textural sound of the Fagott 16', audible in the bass.

6.2 Adagio – track 31

Surprisingly, considering its rather simple texture—solo with accompaniment—the Adagio was one of the most challenging pieces in this style. Once again, the challenges were related to the peculiar sound characteristics of the stops given in voicing. I envisioned the registration for this piece to include the Rohrflöte 8' in the Hauptwerk, as accompaniment, and the Krummhorn 8' with the Gedackt 8' and Tremulant II from the Oberwerk as the solo. The pedal played the Gedacktbaß 16' and Gedackt 8'. The balance resulting from this combination of stops was good. The Rohrflöte 8', with the Gedackt stops in the pedal, produced a nicely dark and round accompaniment sound. The louder Krummhorn 8', with its rugged texture, along with the Tremulant II, added great expressivity to the solo line. But I had to abandon the idea of using the Krummhorn 8' for the solo voice, however, not because of its character or loudness, but because it had been voiced with such a great dynamic contrast over its range. Like many other stops in Studio Acusticum, in the Krummhorn 8', the bass, tenor, and treble regions are each voiced to have a different amplitude, even a different attack and color. The dynamic shades give a nice result when playing scales, or melodies that use ascending or descending motives without larger intervals. In the Adagio though, this voicing feature proved ineffective, and even worked against the melodic line.

Sound example 16, ca. 30 seconds – track 16

In sound example 16 (see also Figure 14.1) we hear that some of the notes in the tenor region sound louder than those played in the upper soprano. Note for instance that F#3 and G#3 sing out very prominently over the other notes. The dotted figure in the third bar of Figure 14.1, with the diminished fifth, is a good example.

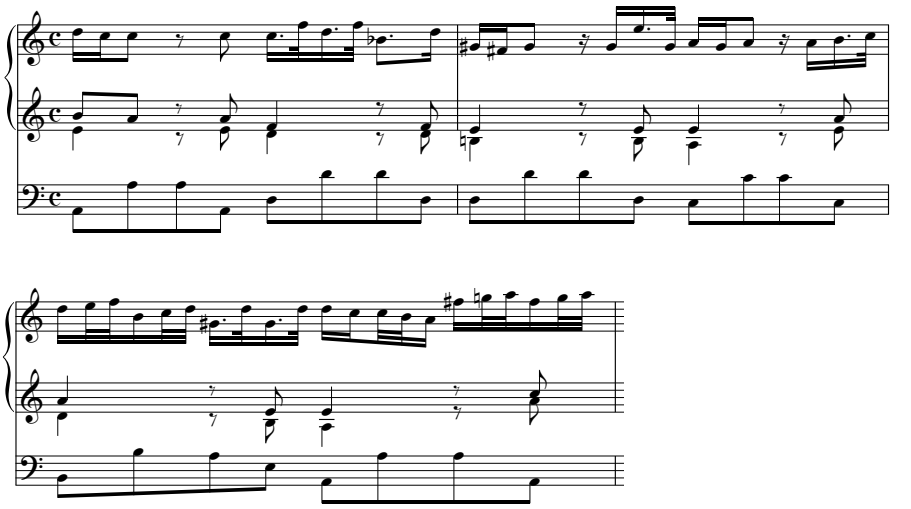


Figure 14.1

***Sound example 17, ca. 20 seconds* – track 17**

The marked dynamic contrast is no longer audible when the solo line plays an ascending motive of smaller diatonic intervals. Figure 14.2 illustrates the passage heard in sound example 17. Note the gradual dynamic decrescendo on the second bar in the Figure, where the notes F#3 and G#3 are also played (the same notes as in example 16). The fact that these notes have a different musical context, placed within a different melodic contour, produces a completely different result. In terms of loudness, the melody is smooth.

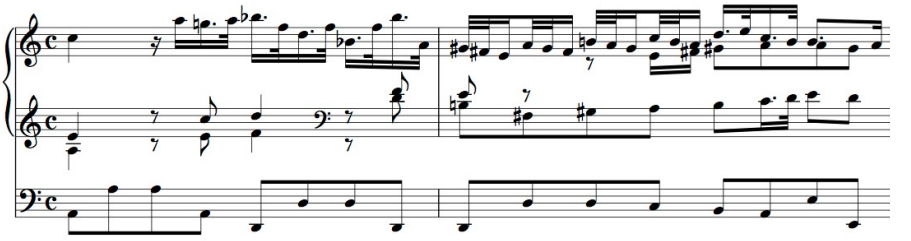


Figure 14.2

Finally, I decided to leave out the Krummhorn 8', opting for a smaller sound. The solo heard on the recording, in track 31, uses the Gedackt 8', Hohlflöte 4', Nasard 2 $^{2}/_{3}$', and Tremulant II, all in the Oberwerk. The sound is weaker in the fundamental and richer

in upper partials. The fundamental is introverted, also slightly smoky. The overall sound is more poetic, perhaps more sad, and chamber-like. It is clearly different from the passionate Krummhorn 8'.

Grave

The *Grave* is played on the Oberwerk. The sounds heard are the Salicional 8' and the Flauto douce 8', with Tremulant II. The Pedal, coupled to the Oberwerk, plays the Salicetbaß 32' and the Gedacktbaß 16'.

6.3 Fuga – track 32

Initially, I wanted to play the *Fuga* on the Mixtur 4fach in the Oberwerk, combined with an 8'-4'- 2 $^{2}/_{3}$' -2' flue chorus. However, the dominance of the Mixtur and the lack of fundamental that resulted from its use allowed the repetitions to become audible, which disfigured the melodic contour of each voice. Since this is obviously a contrapuntal piece, with clearly defined independent voices, I found the use of such a dominant mixture not ideal. I decided to search for a lighter, plainer sound. The result can be heard in track 32. The sound is balanced and light and gives the fugue a pleasant 'chamber-like' character. The manual part is played on the Hauptwerk, with the Oberwerk coupled (II-I), using the Gedackt 8', Hohlflöte 4', and Blockflöte 2' from that division. The Hauptwerk plays the Rohrflöte 8' and the Octave 4'. The Pedal plays the Gedacktbaß 16', the Octavbaß 8', and the Octave 4'.

In this piece, it is interesting to note the different shades of loudness and attack, when listening attentively to the different voices in the different registers. The higher region sounds more present, even more penetrating and nasal. When the lines are played in a lower register, in contrast, the tones become less present and more humming, yet with a more distinctive, spitting attack. This is audible in the sixteenth-note gestures, for instance, throughout the entire piece. The soprano is always more present. The very end of the fugue exemplifies all these features very well. On the recording, track 32, from 4:15 to the end, the descending motive played by one individual melodic line, covering nearly four octaves, sounds quieter and quieter towards the bass, almost fading away at the end (Figure 14.3). The attack, on the other hand, comes through more clearly in the lower tones. That initial transient sounds more like a 'tschk,' with a whistling 's'. This gives the sounds a distinctive percussive character.

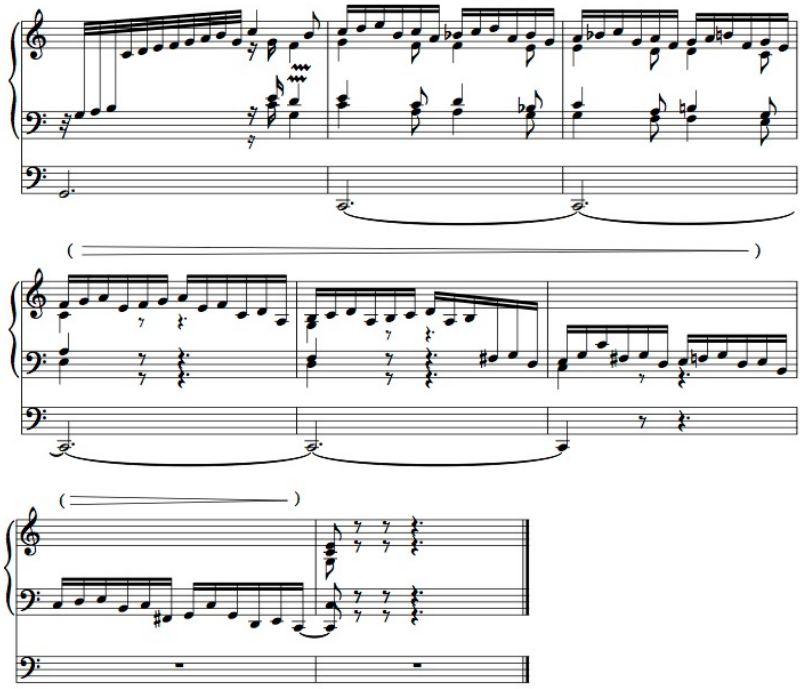


Figure 14.3

To finalize, I want to bring back here some of Woehl's perspectives laid out in the Premise. There, we heard Woehl say that "an organ has to have strong voices, weak voices, poetic voices, and even ugly voices," and that an organ "doesn't have to be beautiful, but everything has to be in it." Woehl also said that "the more extreme the organ is, the better." Now, with all things considered, I can say that my experience in Studio Acusticum resonates with Woehl's remarks. Clearly, the voices there are conceived to be *expressive*, not neutral, or flat, or simply pleasant. They bring much of their own to the music; they add contrasts and they explore the extremes. This is clearly audible in the musical examples discussed up until here. We heard the dynamic contrasts, the distinctive attacks, the textures and colors of the voices. We heard how these voices add interesting shades, moods, colors, and overall expression to the music. I think this all relates to Woehl's voicing practice and his aesthetic ideals, even more when he says that "a good voicer can fill out the whole artistic spectrum." I conceive the organ in Studio Acusticum as a powerful, expressive, *melodramatic* organ.

4

Conclusion

CONCLUSION

I have made a number of observations and drawn a number of conclusions throughout the various chapters of this dissertation, both in regards to the practice of voicing itself (see chapters 2, 7, 9, and 11), and in regards to voicing considered in relationship to the practice of music (chapters 3, 8, 10, 11, 12). I have also explored some of the issues discussed in the text through my own musical practice. The sounds I heard and my lived experiences have been important to this study and my overall artistic approach. My dialogues with the voicer have been essential to the discussion as a whole. In the present chapter I will offer a few brief concluding remarks to sum up the entire dissertation, including not only specific aspects of voicing and musical performance, but also aspects of the research.

1. ASPECTS OF THE RESEARCH

The collaboration

In this monograph we see my musical experimentation developing along with voicing, but we note almost no voicing experimentation developing along with music. For this project, we might possibly have expected both practices to engage (collaborate) in a joint technical exploration of music and voicing, for instance by exploring different ideas and techniques of voicing along with musical performance, aiming at more concrete, technical results. But we find a slightly different result here. Why? We might for instance consider the fact that the organ in Studio Acusticum was not purposely conceived as a "research platform" for experimenting with voicing, but rather, to be a finished organ. This means that my involvement in the process of voicing the organ was not really intended to influence the decisions of the voicer as he voiced, but mainly to observe and describe his practice, which followed the specific goals and schedules of that organ project, not those of this research. The voicer Gerald Woehl opened the doors to this research, but his work in Studio Acusticum remained chiefly focused on the conception of that organ. I see now that our meeting point (collaboration) was less in the technical exploration of practices, and more in the conversations and dialogues about voicing and organ sounds. As a result, we see the discussions and musical explorations laid out in this study emerging from the dialogues and personal perspectives we shared throughout these years, and less from the technical aspects of our practices.

Basic research vs applied research

It should be noted that this research cannot be narrowed down to one specific result or product; nor can it be viewed in terms of its applicability. This is simply because it is not applied research. I was not searching for a solution to a practical problem. Rather, I have highlighted some of the issues I found most relevant in voicing, with the intent of building up a general knowledge of the practices, the concerns, and the perspectives brought out in voicing. For the past four years or so, I have been examining that knowledge through a musical lens, and it is now laid out in the form of a dissertation. Thoughts, experiences, and observations related to voicing—both mine and the voicer's—are articulated verbally in this monograph; they are also enacted (and explored) in my musical performances. Thus, the result of this research is not a solution to a practical problem or the answer to an equation. The result *is* this very dissertation, considered as a whole. This means that a knowledge of voicing can be absorbed by reading and listening to the dissertation in full. We find in it a knowledge of the practices and perspectives of voicing and voicers, and we find discussions of some of those perspectives, as well as a definition of the practices. This knowledge is relevant because it brings forth an awareness of the most essential features of organ sounds, seen through the voicer-musician collaboration, and some of the implications of those features for the performance of organ music. Simply put: we tackled the implications of voicing for musical performance.

Musician in the field of research

This study explores the encounter between two practices. This means that I have dealt not only with issues related to my own artistic performance practice, but also with issues related to the practices of others. I must admit that at some points in time I felt as if I was exiting the borders of my artistic domain and entering unknown territory, without being sure that something rewarding would be found on the other side. This was not always easy. The unknown was not so much the field of organ building per se, which can also be accessed through reading and through direct (musical) contact with the instruments, but rather, perhaps, the actual world of builders and craftsmen, which I experienced not only as an interesting professional activity, but also as a different new environment, with its own perspectives on organs and sounds and materials, and perhaps even with its own approach to work and life in general. Eventually, that experience made me realize that organ building and musical performance are two distinct worlds. They have distinct perspectives, distinct practices, and different goals. In general I ob-

served that builders are very much connected to the materials and the tools of their craft. Their excellent technical skills are employed with the aim of transforming those materials—mostly woods and metals—into something of use, something that works and serves a purpose, which can be an aesthetic purpose. In contrast, I have experienced musicians—composers, performers in general—as generally concerned with other things; things like communication, language, performance, and time. Taking this personal perspective into consideration, I found my experience in Studio Acusticum to be perhaps similar to that of a culture shock—note the ethnographic model mentioned earlier in chapter 4. That culture shock included adaptation to the new environment, moments of information overload, even a language barrier, and an adaptation to unrelated skills and perspectives on life and working habits. Now, this is an honest account of my research experience in diving into that unknown field, considering the different practices and different professional areas, and I should underline that my relationship with the builders working in Studio Acusticum was one of good collaboration, even friendship.

The artistic outcome

As highlighted in the very first chapter of this dissertation, this research project had an artistic turn, and aimed at the creation of new artworks. This is a key element in artistic research, which essentially examines the processes—thoughts, feelings, interactions—that develop along with the creation of an artistic product. During the course of research, I asked myself the following question many times: whose artistic process am I researching here, mine or the voicer's? We understand the relevance of the question when we see the conclusions laid out here, especially those above. It was indeed difficult to come up with my own original artistic product, as a musician, based on a practice that I could mostly observe, but could not really influence. There was really no technical encounter, so to say. Furthermore, I also saw that I could not influence the voicing of the organ using my own musical resources. For a time, I feared I would eventually end up with a dissertation that would mainly describe the practice of the voicer and not much more. Perhaps that would have been fine in other areas of research, but not in artistic research, where the focus of the research is the researcher and his or her own artistic practice and related issues. Now, at the end of this study, I see my concerns, my observations, and my experiences articulated verbally in the text, along with the musical explorations done in the course of this research and attached to the monograph: an original composition and performances of repertoire (attached DVD).

The composition titled *The wind in the word* enacts my own experiences of voicing, and it is composed of the materials used in voicing—sounds. It is no surprise that the use of collage and some of the ideas of musique concrète inform the composition of that piece, since these resonate with my personal experience of the voicing and building of the organ, notably in the fact that voicing and building are practices that deal essentially with materials, as mentioned in the previous section. In addition, learning to listen and reflecting on sounds were also important to that experience. The recordings of *Franck, Reger, Kagel, and Bach*, explores the finished organ, and it serves to demonstrate the issues discussed in the text. The performance explores how the sounds of the organ (shaped by the voicer) influence my performance of those pieces. It ultimately shows that those sounds follow their own intentions to a great extent. We saw that at some points, my musical intentions (or the composer's) collided with the intentions found in the voices of the organ. Some of the implications of voicing to the practice of musical performance are highlighted there.

2. Voicing and Musical Performance

Voicing

Regarding voicing specifically, before briefly summarizing the observations made throughout this dissertation, I would like to recall our initial standpoint—a concise definition of organ voicing—from chapter 2:

> Organ voicing is the practice which consists of the manipulation of the physical components of organ pipes, as a means for gradually adjusting their sound, with the intent to achieve a desirable voice. A voice encompasses individual tones, organized by pitch, which are adjusted to suit the acoustic configuration of the room in which they are to be placed, a consideration which takes into account the characteristics of both the initial transient phase and the steady state of the tone, where the latter includes parameters such as harmonic spectrum and loudness. A voice emerges out of the relationship established between the tones and the different regions that constitute an organ stop. Ultimately, a voice is an idealized concept; a form of expression.

The ultimate goal of the voicer is therefore to create voices that can epitomize modes of expression. As in any other creative practice, the goal of voicing is achieved through a process that consists of the manipulation (shaping) of tools and materials, according to

the voicer's own personal taste, personal experiences, and aesthetic visions. For Gerald Woehl, those aesthetic visions are not bound to notions of beauty and pleasantness, but may in fact include a wider range of considerations: beautiful-ugly, pleasant-unpleasant, balanced-unbalanced, etc. Woehl says that a good organ must have everything in it, and it must explore the extremes. Those aesthetic ideals are not found in the physical components of the pipe; nor they are seen in the voicer's manual skills and voicing techniques. Rather, they are embodied in the sounds produced by the pipes. We saw that the most essential materials of voicing are the sounds: not the pipes, but *sounds themselves*. As Woehl says: "[to become a good voicer] one naturally has to be interested in sounds. This might not always be easy."

The voicer's relationship to sounds is indeed a complex one. We saw the importance of the body in the experience of sound in voicing. We explored the idea of the *inside* (embodied feel) and the *outside* (to listen [*entendre*] with the ear) of the tones, and we concluded that the most important decisions made in voicing relate precisely to the inside of the tone. There—on the inside—the tone must feel free; it must not be forced or tense, but must unfold freely, effortlessly, as if sung. Generally, the analogy with singing seems to be very important in voicing.

We also discussed the parameters found on the *outside*, notably: the attack of individual tones; their harmonic spectrum; their texture; their vowel type; their amplitude; their undulation. We observed the dynamic contrast over the range of the stop, emerging out of the relationship—in terms of amplitude—established between the individual tones. Moreover, we saw that this relationship is not only considered in terms of the amplitude of individual tones, but also in terms of their attack, color, vowel type, and even more. In fact, it is by gradually adjusting this overall contrast that the voicer creates the shape of the stop, and ultimately the shape of the voice.

We also observed that this shape is evaluated out in the room, not at a close distance. All the elements of the voice—materials and overall shape—are adjusted to suit the acoustic configuration of the room. Spatial concerns considered during voicing include parameters such as *distance* (near-far) and *direction* (omnidirectional-unidirectional). What is attained from all these considerations, all taken together, is something we may envision as a *sound sculpture*: an object hovering in the acoustic space. That object is the ultimate product of voicing. In it, the voicer deposits his aesthetic ideals (a singing voice, a dramatic voice, an organic voice, a shape, etc.) with intent to provoke an aesthetic experience in the listener sitting in the hall. That experience, however, cannot emerge out of the practice of voicing itself, but only out of the encounter between voice and musical performance. We saw that the voicer's voice is not a finished artistic product; it does not stand by itself.

Voicing and musical performance

We ended up by distinguishing a few important elements of voicing and their implications for musical performance, notably: (1) *The dynamic contrast over the range*, where voicing directly influences the melodic shape of the lines played in the treble region (melodic lines moving upwards are given a natural dynamic crescendo) and the balance between melody and accompaniment (the lower tones are deeper, with less tonal body, more humming, and in some cases with very distinctive attacks, while the upper regions are more brilliant, more tonal). (2) *The freedom of tones*, where voicing determines the clarity of tones in counterpoint, and all tones ought to be clearly and individually audible, and not forced or tense, but with a distinctive singing quality. (3) *The prominence of attacks*, where voicing defines the clarity of speech, in well articulated tones (even percussively), and in distance (presence). (4) *The overall character of the steady-state*, where voicing influences factors like harmonic spectrum, vowel type, texture, and undulation. We cannot pinpoint which specific musical aspects are influenced by these elements. The elements of the steady state, all together, result in the overall body of the sound. They provoke certain sensations in the listener, and they influence the overall character of the music played: they might add power, richness, stability, or other qualities, which might help emphasize the intentions in the music at many levels.

These traits, combined, make up the voice, and together they influence the music in significant ways. They make the music lively and contrasting, even extreme.

We may conclude by saying that voicing plays a truly important role in musical performance. That influence is not limited to the quality of the tones and sounds produced by the instrument, but it goes deeper into the music. We may say that voicing carves not only the sounds of the organ but the music as well. Voicing adds some sort of intention to what is heard in the music. That intention is rooted in aesthetic concerns and the ideals of the voicer, inbuilt in the materials and the shapes of the voices. Those intentions cannot be overcome by the resources available to the musician.

Personal note and the future

I find the idea of voicing fascinating. The idea of creating voices for a musical (artistic) purpose—it is indeed an interesting thought. I think it might even be possible to extend this thought further—beyond the techniques, the historical constraints, beyond the builder's materials, beyond the workshop and the closed hall—by using the knowledge gathered over the years of this study, and by exploring other mediums. Perhaps *voice* can actually be conceived as a finished artistic product, standing by itself. I don't know.

I know, however, that I have learned much about this interesting concept and practice, and I can now distinguish some of the essential traits that make up an organ voice. I also know that I cannot change those traits with my musical performance practice, viewed in the most traditional sense. This is why I see the exploration of the idea of voice through the technological medium as an interesting endeavor. Perhaps that might introduce the element of *choice* back into my artistic practice. Musical performance, in the traditional sense, also remains an interesting area for exploration in many different ways, as does direct contact with voicers and their visions, in a continuing search for the essence of organ voices and organ sounds.

Artistic exploration and self discovery may continue from here.

5

NOTES

NOTES

1. Online: http://acusticumorgel.se/?page_id=63&lang=en (accessed January 2014).
2. Organ building, in the broad sense, has been discussed thoroughly in a number of treatises and other writings throughout history. In this study, I have mainly considered two major treatises: Dom Bédos' *L' Art du facteur d'orgues* (1766-68/ed.1977), and Audsley's *The Art of Organ-Building* (1905). In contrast to the number of writings dealing with organ building, in a broad sense, there are only a few texts that deal exclusively with the practice of voicing specifically, even in those treatises to which I have just referred. For the concern organ voicing specifically. The main ones are J. Goebel's *Theorie und Praxis des Orgelpfeifenklanges* (1967), L. G. Monette's *The Art of Organ Voicing* (1992), or Vincent Rioux's *Sound Quality of Flue Organ Pipes* (2001). Other articles have also been useful; these include, for example, Castellengo (1999), P. Pelto (1995), and Yokota (2003). I have found nothing at all written on the subject of voicing and its implications for musical performance.
3. Jullander, ed. 2012:43.
4. See endnote 2.
5. Dom Bédos ed.1977:229.
6. In Goebel's foreword, however, we read a few interesting remarks, as for example: "Es ist bei der Intonation notwendig, mit der Pfeife zu denken… mitfühlen mit der Seele des Tones…" Meyer-Siat 1967:8. In English: "It is necessary, while voicing, to think with the pipe… to feel with the soul of the tone…" This is an interesting hint, but it does not really provide a clear explanation of the concept voice. I will examine this remark in chapter 9, when discussing the skill of listening.
7. Tiella 2010:610.
8 Bicknell 1998a:29.
9. "A voice means this: there is a living person, throat, chest, feelings, who sends into the air his voice, different from all other voices." Italo Calvino, cited in Carvarero 2012:520.
10. Dom Bédos ed.1977:229.
11. "In einer Orgel müssen starke Stimmen sein, leise Stimmen sein, poetische Stimmen sein, müssen auch hässliche Stimmen sein…Ich glaube, wichtig ist oder einen guten Intonateur macht aus, wenn er sozusagen das ganze künsterlische Spektrum irgendwie ausfüllt… Ich glaube, wichtig ist oder einen guten Intonateur macht aus, wenn sozusagen er das ganze künstlerische Spektrum irgendwie ausfüllt… Es gibt schöne Orgeln, die sind aber auch oft langweilig. Schön ist nicht unbedingt künstlerisch. Würde ich so sagen. Das ist, glaube ich, das Wichtigste, was einen Intonateur ausmacht, dass er… das ist eigentlich schon fast ein Abschlusswort, wenn man eine Harmonie in das ganze Instrument hineinbringt. Das muss jetzt nicht schön sein, es muss eben alles drin sein… Je extremer sie sein kann, umso besser ist sie, würde ich sagen. Das macht einen guten Intonateur aus. Wenn er extremste

Dinge in ein Ding hineinbringt." Gerald Woehl, interview of February 17th, 2014 Potsdam. Considering the English translation in the main text: note that the German term *Stimme* may also be employed to refer to organ stop, and not exclusively to voice; however, I find that such double-meaning does not at all present a problem when considering the perspective given here, in fact, the idea of voice is much related to that of the organ stop.

12. "Also z.B. extrem ist es z.B. bei flute harmonique. Also im Bass ist sie relativ durchsichtig und ja fast hell, wird dann immer dunkler und immer trauriger, würde ich es mal so sagen und im Diskant ist sie eigentlich ein bissel melancholisch. Ja, was eben so ein romantisches Stück haben muss. Also Melancholik, das ist ein wichtiges Element, in der Romantik eine Rolle spielt." Gerald Woehl, interview of February 2014. Potsdam.

13. Bicknell 1998a:29.

14. "Also mir hat mal jemand gesagt…: Gerald, es müssen in jeder Orgel Stimmen sein, wo mansich ausweinen kann. Das ist das Wichtigste. Aber wie schafft man das? Wo man sich ausweinen kann. Wie will man so einen Bachschen Choral, der so um das Thema geht, Trost oder wie auch immer, wie will man das klanglich darstellen, mit Tönen darstellen?" Gerald Woehl, interview of February 2014. Potsdam.

15. Benson 2003:6-7. Internal quotes from Husserl's *Experience and Judgement: Investigations in a Genealogy of Logic*. Ed.1973:260-261.

16. It should also be noted that there are many variations on these two types. Pipes—both flue and reed—may vary in size, shape, and materials. Metal pipes are not made of one single type of metal, but often a combination of metals, melt and cast together (these alloys contain variable percentages of different metals, mostly lead and tin, and more rarely other metals such as copper and zinc). The specific combination of shape and materials determines the quality of the tones produced by the pipes, along with other factors, such as voicing.

17. Drawings by João Segurado, based on the drawings of an organ-builder at *Jehmlich Orgelbau Dresden* (Zeichnung): Herr Lehmann, Spring 1984.

18. Timbre is a complex concept. Timbre differs from what is commonly referred to as sound--color, or tone-color. It includes the attack of the tone as well, whereas the color may refer to the harmonic spectrum of the steady state alone. A more specific reference to timbre is given in chapter 9.

19. "Wie Dr. Lottermoser in seinem hervorragenden Buch über Orgelakustik schreibt, sind die Anblasgeräusche wertvolle Bestandteile des Pfeifenklangs, sofern sie nicht zu stark sind." Goebel 1967:26.

20. *Scaling* is the term often used by builders to refer to the dimensions of the pipe, considering the proportions between the different components.

21. "Ich arbeite unwahrscheinlich mit dem Kern. Bei mir wird immer der Kern rauf und runtergeklopft und zwar nur winzigst. Wenn man nur einmal draufklopft, das ist schon zu viel. Mit dem Kern kann man verändern, wie sich der Ton äußert. Und das, meine ich, ist das Wichtigste." Gerald Woehl, interview of February 2014. Potsdam. In English: *I work a lot with the languid. With me the languid is positioned up and down, and only a tiny bit. If you hit it just once is already too much. With the languid you can change how the tone is expressing*

itself. And that, I think, is the most important. Gerald Woehl's remark is extracted from a larger explanation given by himself on the overall quality of the tones produced by the pipes, and how that quality can be attained in voicing. According to what is said in the remark, the languid is for Gerald the parameter that has a greater influence in the way the tone *expresses itself*.

22. The reed tone produced by an organ pipe also depends very much on the way the tongue is built: its materials (types of metal), its thickness, and its length. This, of course, like the choice of metals and proportions for flue pipes, has very little to do with voicing and more with pipe-building, which is not the topic here. For reed pipes specifically, the general rule is that if the tongue is made thicker, the tone will potentially be slower, and if the tongue is made thinner, the tone will most likely be softer. We may add that the overall quality of the sound produced by reed pipes depends on other parts of the pipe as well, the tongue, however, being the most relevant.

23. To refer to the stop, most often voicers tend to refer to two main regions: the bass region (low-pitched half of the stop), and the treble region (high-pitched half). I myself include here a tenor region as well (the middle part of the stop), since it makes the reference to sounds more accurate.

24. Cf. Goebel 1967:63.

25. "Daher errichte man zuerst die Grundsteinlegung des Fundaments, auf das man den Oberbau and die Pyramide setzen kann." Goebel 1967:63

26. Excerpt from chapter 8 of this dissertation.

27. Logbook, March 14, 2011.

28. Cf. Kim-Cohen 2009:9

29. Schaeffer's new aesthetics of music may be seen as a somewhat indirect consequence of the futuristic ideology that had emerged in Europe during the 1910s (my reading of Kim-Cohen 2009). The futurist movement, launched in Milan in 1909 by Marinetti and his *Futurist Manifesto*, praised the noise and speed and mechanical energy of the modern city, and insisted upon the emergence of a new art and a new aesthetics, opposed to that of the past. In Marinetti's manifesto we find the famous passage: "Burn the museums! Drain the canals of Venice! We declare that the splendor of the world has been increased by a new beauty: the beauty of speed. A screaming automobile that seems to run like a machine-gun is more beautiful than the Victory of Samothrace." (Marinetti, cited in Honour & Fleming 1984:790). The movement had immediate impact and influenced musicians and visual artists all over the world. In 1913, Italian painter and composer Luigi Russolo published *The Art of Noise*, the manifesto which became the chief reference for futuristic ideology in the field of music. Russolo saw the noises of the modern world and modern city as an integral part of human life, not something detached from it. For him, the noises of the modern world could become music themselves, and such music would represent more faithfully our place in that world. He wrote: "Every manifestation of our life is ac companied by noise. Noise, therefore, is familiar to our ear, and has the power to pull us into life itself." (Russolo, cited in Larson 2012:51).

30. "The reductive listening is a listening attitude that consists in listening to the sound itself, as

a sound object, while abstracting it from its real or supposed cause, as well as from the meaning it might carry. More precisely, it consists in turning this double curiosity for causes and meanings (both of which treat the sound as an intermediary between other objects towards which it directs the attention) towards the sound object itself." In Michel Chion's Guide to Sound Objects: Pierre Schaeffer and Musical Research.
Online: http://modisti.com/news/?p=14239 (accessed January 2014).

31. Cf. Kim-Cohen 2009:8.

32. "The new art of electronic music riveted Stockhausen from the start. His gurus were Werner Meyer-Eppler, an experimental physicist who specialized in the study of synthetic sound and speech, and the composer-theorist Herbert Eimert, who headed the nascent electronic studio in Cologne. Their vision of the musical future diverged from that of Pierre Schaeffer and Pierre Henry in Paris, and, not surprisingly, a familiar Franco-German cultural split defined the difference between the two electronical schools. Eimert deprecated French musique concrète as parasitical dilettantism, a facile rearrangement of familiar sonic objects. Instead, he said, electronic music must be generated entirely within the studio, thereby attaining a "pure" existence outside the known and the conventional. In 1951 and 1952, Eimert and Robert Beyer together created Sound in Unlimited Space, which is more or less the first work of synthesized music — a bubbling, moaning land scape of sine tones." Ross 2007:429.

33. Schaeffer 1966:262, cited in Kane 2007:15.

34. Cf. Kane 2007:4

35. In philosophy, the first uses of the term phenomenology may be traced back to the eighteenth-century, for instance in Kant's writings. (Cf. Moustakas 1994:26) Hegel defined it then more specifically as a field of study, as "knowledge as it appears to consciousness, the science of describing what one perceives, senses, and knows in one's immediate awareness and experience." (Moustakas 1994:26) It was later, with Edmund Husserl (1859-1938) that phenomenology took up its place as an important method of philosophical investigation— still later influencing Schaeffer's methods and general perspectives on music theory and aesthetics.

36. "One aspect of Husserl's anti-naturalism, then, is his rejection of the idea that logic can be understood psychologically; the doctrine commonly known as "psychologism" is ultimately self-refuting, and in so far as naturalism traffics in psychologism, it too totters on the brink of absurdity." Cerbone 2006:15. (Husserl's critique is evident in the first volume of his *Logical Investigations*, titled *The Prolegomena of Pure Logic* [1900]).

37. Savin-Baden & Major 2013:213.

38. "…transcendental because it moves beyond the everyday to the pure ego in which everything is perceived freshly, as if for the first time. It is called phenomenological because it transforms the world into mere phenomena." Moustakas 1994:34.

39. Moustakas 1994:41

40. Cf. Ihde 2007:28

41. "When I perform the reduction, I no longer attend to the wordly object of my experience;

instead, I focus my attention on the experience of those worldly objects. I pay attention to the presentation of the world around me (and myself), rather than to what is presented. The reduction is thus a kind of reflection: for Husserl, the realm of reflection is "the fundamental field of phenomenology."Cerbone 2006:23. Internal quote from Husserl's *Ideas: General Introduction to Pure Phenomenology.* Ed. 1965:50.

42. "For Schaeffer, working in the years after World War II, the new technologies of recording, telecommunications and radio were simply continuous with the ancient acousmatic traditionsof the Pythagoreans. Recording and playback through a loudspeaker immediately performs the acousmatic reduction: the recorded sound is stripped of its original causal basis, facilitating a re-direction of attention. Furthermore, recorded sounds can be endlessly repeated without fluctuations in their signal, which is physically impossible outside of mechanical reproduction. Thus, by removing sounds from the flux of causality, recording affords the possibility of studying sounds with a degree of specificity and detail heretofore unimagined." Kane 2007:3.

43. "Often surprised, often uncertain, we discover that much of what we thought we were hearing,was in reality only seen, and explained, by the context." Schaeffer 1966: 93, sited in Kane 2007.

44. "Husserl borrowed this idea from Brentano (1874), who defined intentionality as the idea that what makes the mind different from things is that mental acts are always directed at something beyond themselves." Savin-Baden & Major 2013:217.

45. Husserl 1931:243-244.

46. Schaeffer quoted in Kim-Cohen 2009:11.

47. Kim-Cohen 2009:12–13. Internal quotes from Schaeffer 1966.

48. Ferrari quoted in Kim-Cohen 2009:182.

49. Kim-Cohen 2008:177–178.

50. Kim-Cohen 2009:179.

51. Ferrari, cited in Kim-Cohen 2009:181.

52. Pierre Schaeffer viewed sound as a material, an object transformed in the laboratory (the studio), assembled, and presented on the merits of its own properties. The act of splicing and assembling tape was in fact a process of collage. The term and the idea of collage—still with specific reference to Schaeffer and his musique concrète—emerged in parallel with some of the theories of the Russian Constructivists from as early as the 1910's, in the visual arts. Schaeffer himself had established a parallel between musique concrète and abstract painting, even thinking at first of calling it musique plastique (or plastique sonore). It was Jerome Pignot who suggested the use of the term acousmatique (Cf. Battier 2007:193). One of the Russian theoretical protocols that may have influenced Schaeffer's musique concrète was the Faktura, which saw the creation of art objects as laboratory experiments, and ultimately aimed at exhibiting the material's own distinct properties, rather than suggesting other types of associations.The technique of collage had developed also outside the realm of musique concrète. Some of the very first musical experiments with collage are seen in the works of Charles Ives, performed and published between 1927 and 1937. Cf. Burkholder 2011:110–111.

53. Excerpt from chapter 10 of this dissertation.

54. The field of artistic research emerged along the changes made to the higher education sector in the last decades, not only in Europe (Sweden, Norway, U.K., Finland, and others) but also outside of it (namely Australia). By the 1970's, in some European countries (including Sweden), art schools were integrated into the higher education sector, inte grated into universities; others were left independent, but still subject to the regulations designed to fit mainstream universities or other research-based institutions. In this scenario, the traditional practice of universities—where research is the basis for teaching and training—became the educational practice of those art schools as well. In Sweden, around the 1970's, the parallel traced between traditional research and artistic practices resulted then on a new concept—artistic development, which aimed at developing experimentation within artistic forms of expression, as well as research. (Cf. Kälvemark 2011:4). Specifically in regards to the field of music, it was by the mid-eighties that a new type of doctoral education was first introduced in Sweden, and became successfully established; a new variant had been introduced within the doctoral program in musicology at the University of Gothenburg—called then artistic-creative. The first three doctoral dissertations that resulted from this new variant were presented in 1991, and other eleven doctoral projects had then been completed until 2007, within that same variant. But this merge between musicology and the so-called artistc-creative variant—with no parallel at another university in Sweden by then—would soon fall, and would then give rise to the present academic notion of *musikalisk gestaltning* (musical performance), under the umbrella of the new emerging field of artistic research, which itself developed to a more well defined, and perhaps less foreign field of research within academia. In Sweden, the step towards the present notion of artistic (musical) research was first taken in the year 2000, simultaneously by the University of Gothenburg (specifically at that University's School of Music, with a new doctoral program in music, named preciselymusikalisk gestaltning) and Lund University (a doctoral program within the Fine Arts, which included music among other areas of specialization). We see the first doctor in music graduating in 2007 (Gothenburg), followed then by seven others in 2010 (five in Gothenburg and two in Lund [Malmö Academy of Music]). More specifically, the research environment in which the present dissertation came to develop—during the period of my doctoral studies, between 2010 and 2014—was that of the Department of Arts, Communication and Education, Campus Piteå (under Luleå University of Technology). Luleå was the third University in Sweden—after Gothenburg and Lund—to launch a doctoral program in musical performance, starting in 2003. (Cf. Jullander 2010: 191-204).

55. Denzin & Lincoln 2005:3.

56. "The research thus takes an 'insider' perspective, reducing the distance or even blurring the borderline between researcher (subject) and researched (object)." Jullander 2010:192.

57. Cf. Merriam 2009:3.

58. Cf. Nkwy et al. 2001:1.

59. Cf. Routio 2004.

60. Cf. Hannula et al. 2005:67–68.

61. "A more adequate conception of research would define it as ongoing inquiry aiming at the transformation of a problematic situation into one that is more harmonious, fluid, expansive, and rich in meaning." (Johnson 2011:151).

62. Borgdorff 2011:45–46.

63. For an example of the debate, we may take Karlsson's paper (2003), on the topic of artistic research training in Sweden. He gives some examples: "The discussion in Norway, like that on occasion in Finland and Britain, addresses the question of whether an artistic/practical piece of work (an artefact) should be submittable as a "thesis", with or without accompanying text…The Nordic theses that have been delivered are grouped on a sliding scale from traditional texts that satisfy all the requirements of scientific standards ("the safe way") with greater or lesser elements of artistic production, via experimentation with formats (e.g. CD ROM), to artefacts as the main piece of work accompanied by short texts in the form of "documentation", "comments", or "reflections". To date, Sweden has approved no theses presented solely in the form of performance, concert or portfolio (while a defence in Tampere, Finland, of a drama performance failed)…As a "case study" to immerse the reader directly in media res, I refer to the mixed fortunes of a highly-publicised doctoral thesis by Finnish fine artist Riita Nelimarkka (2000). In addition to three exhibitions, her thesis included a written (scientific) paper entitled Self Portrait that was approved for printing and finally accepted after an appeal and re-evaluation on failing its initial defence. The object of the criticism was not the artefact as such but the literary-fictional nature of her text. Her thesis was itself presented as a work of art, which, although completely consistent with an aesthetic-artistic perspective, was considered dubious as a scientific report of the creative process. Self Portrait sparked off a heated debate about the concept of the artistic doctoral thesis in Finland…Norwegian fine artist Grete Refsum's struggle[d] with tutors and methods to have her thesis accepted (studies of the crucifix in relation to the church year). Her artistic report was not allowed to be included in her thesis and was relegated to an appendix. It was never evaluated." Online: http://www.oecd.org/edu/imhe/32997195.PDF (accessed November 2014).

64. Johnson refers to a variety of texts by American philosopher John Dewey (1859–1952).

65. Johnson 2011:146.

66. Johnson 2011:150.

67. Excerpt from chapter 10 of this dissertation.

68. Johnson 2011:147.

69. "…die Intonationskunst [wurde] seit Jahrhunderten vom Meister auf den Lehrling mündlich übertragen…der Meister intonierte eine Pfeife und sagte dem Lehrling: "So, jetzt ist sie gut; so muß sie klingen, höre dir die Sache an und mache es gleich;" und dazu gibt er ihm einige Handgriffe. Keine Erklärung kann das eigene Hören ersetzen. "Es handelt sich um so feine Dinge," sagt J. Goebel, "daß man sie nicht erklären kann." Meyer-Siat 1967:9

70. Aristotle, in Book VI of the Nichomacean Ethics, refers to two types of knowledge (of three): techne and episteme. Basically, these present the distinction between action knowledge and theoretical knowledge, with the first (techne) referring to technical, embodied forms of knowledge, and the second (episteme) referring to the knowledge of

facts. Roughly, the distinction is between skill and theory.

71. "Wenn man intoniert, dann dringt man in den Ton hinein, man hört sozusagen in den Ton hinein und wenn man dann zuhört, wenn einer spielt, dann ist es sozusagen genau umgekehrt: Was kommt aus dem Ton raus. Erst versucht man in den Ton hineinzukommen und dann schaut man, ja, was kommt jetzt, was man da drin gearbeitet hat, was k o m m t da jetzt raus. Das ist genau das Gegenteil sozusagen. Und dann schaut man eben und dann hört man natürlich genau, was muss jetzt noch gehen, ist der Druck zu stark oder was man im Gesamten machen muss. Ich würde sagen, das ist zwei völlig verschiedenes Hören." Gerald Woehl, interview of February 17, 2014. Potsdam.
72. Cf. Hislop 2005.
73. Polanyi 1966:4.
74. Koivunen 1997.
75. Cf. Hannula et al. 2005:67–68.
76. "Ethnography is the study of people, culture and values. It is an approach that aims to create an understanding of those being studied. […] In order to undertake such studies, ethnographers spend time, often years, in the culture, trying to understand its ways, customs and hierarchies. […] Key characteristics of the approach are as follows: focus on everyday life rather than the unusual or peculiar; immersion of the researcher in a particular field or setting; engagement in the setting for an extended period of time; use of participant observation as a primary method; in-depth and unstructured data-collection; and presentation of findings from the participant's point of view." (Savin-Baden & Major 2013: 196–197).
77. Denzin 1989.
78. Savin-Baden & Major, 2013:396.
79. "In active participation, the researcher claims a central place in the site or setting, by functioning within it as well as observing it…Complete participation means that the researcher is fully immersed and is an active participant; is also means that the researcher is an accepted member of the community at the research site." (Savin-Baden & Major 2013:396)
80. Unstructured observation is a type of observation where that which is observed is not structured a priori, and exhaustive observation is where the researcher observes anything and everything. (Cf. Savin-Baden & Major 2013:393)
81. Selective observation is that type of observation where the researcher focuses on particular aspects of phenomena, while in focused observation, that which is observed guides the researcher into decisions about future observations. (Cf. Savin-Baden & Major 2013:393)
82. For this project I conducted different types of interviews, mainly structured, semi-structured, unstructured, and informal. One major structured interview took place in Potsdam in early 2014. Excerpts from it have been transcribed in an appendix to this dissertation. Most of the unstructured and informal interviews were done in Studio Acusticum; often, questions arose spontaneously on site. Excerpts from those informal interviews will be also referred to here, throughout the text. I collected various types of documents over the course of the project, including some of Woehl's technical drawings and

specifications, and some of the correspondence between Woehl Orgelbauwerkstatt and the expert committee. Such documents were usually dated and archived in the logbook. I also make reference to them in this text, and have transcribed some of them in an appendix. I took photographs throughout the whole process of building and voicing the organ. The aim of the photos was to document some of the techniques used in voicing, as well as the physical settings in which voicing and building occurred. The photos were also dated and archived in the logbook, both in digital and hard format.

83. Field notes were taken on site and usually describe individual behaviors and general events. I made detailed descriptions of the methods and materials used by Woehl during voicing, as well as my musical practice while experimenting with the instrument, and I summarized descriptions of related events. Such notes were always sketched on site, and transcribed to digital format usually by the end of the day, or by the end of a working week. All notes were organized according to date, and compiled in both formats (hard and digital) into the logbook, to which I will refer throughout this dissertation. Sound recordings were made whenever a stop was being voiced or whenever I (or any other musician) played the instrument. The dialogues between Woehl and his assistants during voicing were also recorded. For this type of documentation, a microphone was placed in the room, in a central position, and left there almost permanently. The positioning and height of that microphone was kept unchanged, as was the hardware and the software used.For sound documentation I used one stereo microphone (Coincidence Stereo AKG, C552 ENG) positioned at a height of seven to eight meters. I also used an external sound-card (Audiobox USB, 24bit/48k) and recording software (Audacity 1.2.6).

84. John-Steiner 2000:197.

85. Savin-Baden & Major 2013:201.

86. "The pronoun I is performative; it is waiting to be used by the autobiographical subject. […] "I signifies the person who is uttering the present instance of the discourse containing I." Now, while any speaker or writer can use this empty sign, when it is used by the writer of a biographical or autobiographical text, its use signifies this person making this utterance, this claim, or this statement. Behind the pronoun stands a named person - a person with a biography. When, as a writer and a speaker, this person appropriates these words and this pronoun (I, you, he, she, me), he or she brings the full weight of his or her personal biography to bear on the utterance or statement in question (Schutz & Luckmann, 1973:114). The personal pronoun thus signifies this person making this utterance. It becomes a historical claim, a writing and speaking event. It is a performance that simultaneously embodies and makes theory and experience visible to others (Pelias, 1999:xi). Performative writing, as when I type these words that you are now reading, is embodied, evocative, always inconclusive and open-ended (Pollock, 1998, 2007)." Denzin 2014:10.

87. One important invention of this period—considering Europe as a whole, not Germany alone—was the Swell pedal, which appeared first in England during the 1710's (Jordan, St. Magnus the Martyr, London Bridge, 1712), and possibly simultaneously in Italy and Spain, later spreading to other European countries as well. Another important event was the publication in 1766–68 in Paris of the work of French Benedictine monk Dom Bédos de Celles, L'Art du facteur d'orgues (The Art of the Organ-Builder). This would become one of

the most iconic treatises in organ-building, and is still a reference used by organ builders today, including by Gerald Woehl himself.

88. Central Germany refers, geographically, to the region located in east central Germany, right next to the border with the Czech Republic, which is named Saxony. Major cities in Saxony are Dresden (its capital), Leipzig, and Freiberg. Although the geographical-political map of present-day Saxony was slightly different during the eighteenth century, the modern location still corresponds.

89. Cf. Wallman 2006:511.

90. Kassel 2006:486-487.

91. We find a historical record of that examination in the following remark, dated February 2, 1723: "…"von dem berühmten Fürstlich Anhaltischen-Cöthenischen Capellmeister und Directore Music: auch Cantore zu Leipzig, Herrn Johann Sebastian Bachen, übernommen, examiniret, und probiret, auch tüchtig und beständig erkannt, und gerühmet" wird." Cited in Dähnert 1983:258. Source of the quote unspecified.

92. Cf. Faulkner 2006:575.

93. That instrument was conceived based on original manuscripts found in the archive of the Georgenkirche in Eisenach, Germany—where J. S. Bach was baptized—with specifications noted by J. S. Bach's uncle, Johann Christoph Bach (1665–1703) for the building of a new organ in that church. That organ was built between 1698 and 1707 by Georg Christoph Stertzing (1659/60–1717), and it has not survived to the present day. The disposition of Woehl's Bach-Organ in Leipzig is, however, based on the descriptions found in the Georgenkirche. It is also interesting to note that most pipes in the Woehl organ in Leipzig were built using Silbermann's building concepts. The sizes and shapes, and the cut-ups of those pipes, as well as the alloys of tin and lead, are based on Silbermann's. The instrument is not considered to be a copy of any specific historical organ though, but it does intend to recreate an eighteenth-century German sound, close to what Bach may have had.

94. Perhaps the most important invention marking this turn of events was the pneumatic (or Barker) lever. The system was first used by Cavaillé-Coll, in his début organ for St. Denis (Paris, 1841). After this first successful experiment, within three decades the system was widely used in France, England, and Germany.

95. The system was developed by Charles S. Barker (1804-1879), an English inventor and organ builder who lived in France between 1837 and 1870. Cavaillé-Coll was the first to incorporate Barker's patented system (patented in 1839). The system consisted of pneumatic motors, located between key and pallet pull-down, assisting what was otherwise a complete tracker system, and enabling the builder to increase the number of chests and raise wind pressures.

96. Bicknell 1998a:19 states that horizontal bellows were first developed in England, in the early nineteenth century.

97. "Coined in about 1930 as a simplified form of Gurlitt's phrase *Orgel-Erneuerungsbewegung*, said to have been used at the 1926 Freiburg Conference for German Organ Art." Williams 1980:188.

98. Emil Rupp (1872-1948) was, with Schweitzer (or even before him), an important initiator of the Alsatian movement. The organbuilder Oscar Walcker (1869-1948) was another face of the Alsatian organ movement.

99. Williams 1980:188.

100. Schweitzer, cited in Phelps:1967.

101. Schweitzer regarded Cavaillé-Coll's organs as "the ideal so far as tone is concerned." (Schweitzer, cited in Phelps 1967:4). The Cavaillé-Coll workshop, which maintained the standards established by its founder until the First World War, was an artisan workshop, not a factory. The sixty or so staff employed gave a sense of great artistry compared to the one hundred or more employees working at a German or English organ factory at the same period. Cf. Bicknell 1998b:83.

102. Other important figures of the German Orgelbewegung include the musicologist Wilibald Gurlitt (1891-1963) and the dramatist and organ expert Hans Henny Jahnn (1894-1959).

103. That instrument was built with a series of compromises (with electro-pneumatic action and a stop-chanel windchest). After being destroyed in 1944, during the war, a second ex perimental instrument was built by Gurlitt and Walcker-Meyer between 1954 and 1955, and only then with mechanical action, with a design close to that given by Michael Praetorius in his Syntagma Musicum, with a slider-chest, three manuals, 27 stops, and meantone temperament.

104. Cf. Wallmann 2012:19.

105. Cf. Wallman 2012:22.

106. Wallmann 2012:25 writes that the first isolated examples of an historically informed approach appeared as early as the 1950s and 1960s, and that the movement did not blossom until the late 1970s and early 1980s. An important figure at the peak of the historically informed approach was German builder Jürgen Ahrend (b. 1930), considered the leading restorer of Schnitger's organs.

107. See Harlow 2011.

108. Organ in Köln, see online: http://www.youtube.com/watch?v=nt28HjJTVgU (accessed August 2014).

109. More can be read about this project in *Werkzeuge der Stille II. Die Orgeln für Neue Musik in Sankt Peter zu Köln*, (ed. Michael Gassmann et al. 2007).

110. Huygens (1629–1695) was not the first or only theorist writing about 31-tone tuning. By 1555, Nicola Vicentino had already experimented with the system, and invented a keyboard capable of playing with it: the 36-note Archicembalo. Cf. Harlow 2011.

111. See http://www.huygens-fokker.org/instruments/fokkerorgan.html (accessed August 2014).

112. There are early examples of microtonal writing in some late Baroque sources, including Charles de Luse's Air à la grecque and Fabio Colonna's Esempio della circolatione from 1618, the latter specifically conceived for a 31-tone keyboard. Cf. Harlow 2011.

113. Glaus 2006, referred in Harlow 2011:17.

114. See http://www.youtube.com/watch?v=JxhgZObqlLw (accessed August 2014).

115. See http://www.modulorgue.com (accessed August 2014).

116. http://acusticumorgel.se/?page_id=63&lang=en (accessed January 2014).

117. The hall was designed by Swedish architect Gunnar Grönlund.

118. "The Foundations are still the second largest shareholder of Holmen AB, and the annual distribution from the shares is aimed to promote the development of Northern Sweden. We contribute to research activities that we believe will draw resources to Northern Sweden." (www.kempe.com/index_english.html, accessed February 20, 2014.)

119. Cf. LTU 2008.

120. Cf. Woehl 2008.

121. In Woehl's vision, the organ planned for Studio Acusticum is intended for the music school, where it is also supposed to be used by students and teachers. In his perspective, the music of J. S. Bach is essential in that pedagogical context, thus explaining his concept.

122. Cf. Woehl 2008.

123. Cf. Woehl 2008.

124. Cf. Woehl 2008.

125. Information retrieved from a document from the expert committee, dated October 27, 2012, after a thorough examination of the organ made immediately after the inauguration.

126. Organ builder at Woehl Orgelbauwerkstatt.

127. Jullander ed. 2012:4.

128. Jullander ed. 2012:11.

129. Appendix B1 provides only an overview on the first voicing of each stop, and does not consider the revoicing of stops, as it was often the practice of the voicer Gerald Woehl to voice stops more than once. In appendix B1 we count 14 months on voicing, but in reality voicing happened over a period of 17 months.

130. Monette 1992:55.

131. This logarithmic grid was formed by two horizontal lines, one straight line across the bottom of the chart and another one at the centre, intersected by sixty vertical lines, at a proportionally decreasing distance from one another (from left to right). The intersection points of the horizontal with the vertical lines marked the tones, referring to the respective pipe, which were represented chromatically, organized from left to right, therefore relating the size of the pipe (from large to small) with the relative decreasing pattern of the vertical lines. Any particular component of a *Probeton*, for example the height of the cut-up, would be measured from the pipe and then marked in millimeters in the chart (transferred to the chart at a certain proportion), vertically from its respective point (C, c0, c1, etc), up or down along its corresponding vertical line. When at least two of the nearest reference notes had been marked (c0 and c1, for example), a straight line would be drawn in the chart connecting one reference note to the next one, and therefore resulting in the relative, proportional measurements of that component (i.e.: height of the cut-up) for the remaining eleven tones of the octave. A proportional divider was used to transfer the measurements

represented in the chart back to 1:1 scale. Subsequently, the 1:1 measurements were marked on the pipe, which was then cut or adjusted accordingly.

132. Audsley writes: "Before commencing his manipulations, the voicer should carefully examine all the pipes making the stop he has to treat, for it is useless to waste valuable time on any imperfectly-made pipes. He has to see that the lower and upper lips of every metal pipe are on the same plane and diametrically opposite each other…The languid of every pipe should be examined to see that its edge adjoining the wind-way is directly in line with the lower lip and perfectly straight…When the voicer is satisfied that all the pipes are properly made, and that the scale of the stop is suitable for the production of the tone required he can safely proceed with the voicing." Audsley 1905(II):627

133. Monette 1992:63.

134. More specifically, in the case of the reed pipes, the points of reference used for the voicing of the remaining pipes were: "Kehlen (außen)—Durchmesser" (shallot diameter), "Kehlen (außen) —Tiefe" (length of the shallot outside the block), "Schlitzbreite" (space between tongue and shallot, bottom end), "**Sichtbarer Teil**" (visible part of the tongue, length outside the block), "**Schwingender Teil**" (vibrating part of the tongue), "**Zungen-Stärke**" (tongue thickness), "Fußloch" (toe hole, bottom end of the boot), "**Zungenbreite**" (tongue width), and "**Becherlänge**" (resonater length). I should note a few things in connection with this list. As a reference I have used Gerald Woehl's table for the Probetöne for the Posaune 16' in the Pedal. The main reference tone there is the C1, but measurements are written for all eleven notes in the bass octave. The parameters marked in bold had measurements specified (in mm) on the voicer's table. The others had no further information displayed, only empty cells. Some of the parameters marked in bold, however, may refer only to aspects of building, and not specifically to voicing. Note for example the parameters "Zungen-Stärke" and "Zungenbreite". The shape of the tongue is something already specified at the time of building, and those parameters cannot really be changed during voicing. Remember that no stops were built in Studio Acusticum. I assume that the information displayed on the table concerns not only voicing but also aspects of building that ultimately are important to consider while adjusting the pipes. The tongue width and thickness influence, to a great extent, the overall quality of the sound produced by the reed pipe, and thus might have to be considered while voicing as well. The other parameters marked in bold do specify components which may be adjusted in voicing. Of the para meters not marked in bold, some could also be voicing-specific, such as "Fußloch" and "Schlitzbreite." However, no measurements were specified for those.

135. "Pipes of any style may have to be tuned by making adjustments both to the spring and to the top. The need is determined by the sound; if moving the spring puts the timbre out of regulation as the note comes in tune, then the regulation must be restored by compensating with the opposing motion of the roll at the top." Monette 1992:102.

136. "The voicing of reeds is not difficult to describe, but the techniques are not easy to acquire. Curving a reed tongue is somewhat like playing a complicated scale passage: if the player has spent many years working on technique and is in practice, it sounds easy, but if an amateur plays the same music, it sounds deplorable. Yet in a sense the task is really a simple one: to give a smooth curve to a thin strip of spring brass by burnishing it. The

curve may be described mathematically as a parabolic section." Monette 1992:95–96.

137. "Patterns of playing notes are used which expose the differences among the pipes efficiently and which direct the voicer's attention to those items that should next be taken up. These patterns enable the voicer to move quickly around the keyboard and to avoid hearing the notes in any particular musical key. It is important to remain detached from any sensation of tonality and to select notes seemingly at random…When playing the notes, the voicer should avoid connecting them; he should permit a brief moment of silence between each pair by using a detached touch. Each note should be dwelt on long enough for it to develop its full speech, and then there should be a pause between notes to permit all resonance to die out." Monette 1992:63-64.

138. Logbook, March 14, 2011.

139. "Aber zum Intonieren selber, würde ich sagen, muss man nicht Literatur spielen. Ein Organist, der nicht seine Musik spielt, sondern Musik für Töne, wenn ich es mal so nennen darf. […] Und es ist wichtig zu finden, wie sich die Töne in verschiedenen Lagen ver halten… also, dass man sie hört und dass sie auch frei sind. Also dass man sagen kann: Auf dem Ton, egal, was man drauf spielt, der ist immer hörbar. […] Ja… ich muss sagen, [man muss] so ganz, ganz sinnlich [spielen]." Gerald Woehl, in conversation. Potsdam, February 17, 2014.

140. "[Um Intonateur zu werden] müssen einen natürlich als Menschen Klänge interessieren. Es ist vielleicht oft nicht ganz einfach." Gerald Woehl, in conversation. Potsdam, February 17, 2014.

141. Logbook, March 8, 2011.

142. Logbook, July 26, 2011.

143. For the recording, my wish was to find a sound that reproduced the feeling of sitting in the hall. Gerald Woehl, when voicing, sat precisely in the center of the room, which gave him an overview over the sounds from the different divisions. I wanted the recording to reproduce that perspective—the sounds from the different divisions should mix well together, and that should include the feeling of being in the hall as well. During sound check, I asked both producer and sound engineer to spend less time in the control room and more time sitting in the center of the room, listening to me performing excerpts of the pieces. I wanted the sound in the recording to be as similar as possible to that heard in the room. Eventually, we found the right height and distance for the microphones. They were placed at a height between the Hauptwerk/Pedal and Oberwerk/Récit. With this height, the Solo sounded slightly higher, which seemed ideal, and more clarity was attained in the main divisions—Hauptwerk/Pedal, Oberwerk/Récit. They were placed near the first row of chairs in the audience. No rear microphones were necessary. I find the sound achieved in the recording to be similar to that in the room, and suitable for all the repertoire performed.

144. "The Other is not directly within me. Otherwise, Husserl (1977) asserts, the Other and I would be the same (p. 109). Thus my relationship to the Other is that of a copresence. I am aware that there is another body coexisting with my body and of similar appearance. This makes possible the analogizing apprehension "of that body as another animate organism." (Husserl, 1977, p. 111). Through analogy, I apprehend the other in a livingly

present sense…I must first explicate my own intentional consciousness through transcendental processes before I can understand someone or something that is not my own, someone or something that is apprehended analogically. My own perception is primary; it includes the perception of the other by analogy." Moustakas 1994:37.

145. Ihde 2007:49

146. Ihde 2007:17

147. Ihde 2007:28

148. Logbook, January 14, 2011.

149. Logbook, March 14, 2011.

150. "Erstens muss man relativ konzentriert sein beim Intonieren, weil man muss ja sozusagen die ganze Klaviatur im Ohr haben. Man muss wissen, wie klingt es unten, man kennt die Töne oben usw. Und, also, man muss schon, es braucht schon eine gewisse Konzentration, dass man alles erfasst, so ein ganzes Register. Wenn man intoniert, dann dringt man in den Ton hinein, man hört sozusagen in den Ton hinein und wenn man dann zuhört, wenn einer spielt, dann ist es sozusagen genau umgekehrt: Was kommt aus dem Ton raus. Erst versucht man in den Ton hineinzukommen und dann schaut man, ja, was kommt jetzt, was man da drin gearbeitet hat, was kommt da jetzt raus. Das ist genau das Gegenteil sozusagen. Und dann schaut man eben und dann hört man natürlich genau, was muss jetzt noch gehen, ist der Druck zu stark oder was man im Gesamten machen muss. Ich würde sagen, das ist zwei völlig verschiedenes Hören." Gerald Woehl, interview of February 17, 2014. Potsdam.

151. It is interesting to read Nancy's text, and find there certain parallels to this listening attitude described by Woehl. Nancy writes of the relationship between the experiencing body and the phenomenon sound, as something that is experienced spatially, as something which surrounds and penetrates the listener in a multitude of ways. He writes: "To listen is to enter that spatiality [inside-out] by which, at the same time, I am penetrated, for it opens up in me as well as around me, and from me as well as toward me: it opens me inside me as well as outside, and it is through such a double, quadruple, or sextuple opening that a "self" can take place. To be listening is to be at the same time outside and inside, to be open from without and from within, hence from one to the other and from one in the other." Nancy 2002 (ed. 2007):14..

152. "Es ist bei der Intonation notwendig, mit der Pfeife zu denken… mitfühlen mit der Seele des Tones…" Meyer-Siat 1967:8.

153. Ihde 2007:43.

154. "Also ich behaupte, dass man durch die Füße hört. […] Also wenn ich in die Oper gehe, ziehe ich mir die Schuhe aus. Dann höre ich besser." Gerald Woehl, interview of February 17th, 2014. Potsdam.

155. "Man kann ja einen Ton so gestalten, dass der in der Pfeife bleibt. Man kann ihn nach vorne bringen, man kann ihm so eine Kopfstimme machen." Gerald Woehl, interview of February 17th, 2014. Potsdam.

156. Nancy 2002 (ed. 2007):9.

157. “Wie müssen Klänge klingen, damit sie einen ansprechen. Damit es nicht ein Ton ist, den man halt so macht, sondern dass er einem in die Seele geht. Das ist das Entscheidende. Ich weiß es nicht genau. Man muss alles so aufnehmen.” Gerald Woehl, interview of February 17th, 2014. Potsdam.

158. Ihde 2007:3-4.

159. “Es gibt Intonateure, die nur von außen hören. Die hören sich das Register an, was kommt und handeln dann danach. Die hören gar nicht hinein, sondern die intonieren sozusagen von außen. Was kommt auf mich zu? Was muss ich eben dann noch, so wie wenn ich mich im Spiegel anschaue, das noch machen, jenes noch machen usw. Also das ist was anderes, wenn ich dann in den Ton hineinhöre…Ich glaube, das ist das Wesentliche, dass man das erkennt, dass der Ton wirklich, das, was da drin steckt, dass das wirklich rauskommt und nicht versucht, also sozusagen, die Fassade zu ändern. Sondern man kann die Fassade, man macht die Pfeifen irgendwie sprechen, so theoretisch und dann tut man das noch glätten oder schminken. Also das ist nicht das Wahre.” Gerald Woehl, interview of February 17th, 2014. Potsdam.

160. Audsley 1905:623-624.

161. “Erst versucht man in den Ton hineinzukommen und dann schaut man, was man da drin gearbeitet hat, was kommt da jetzt raus.” Gerald Woehl, interview of February 17th, 2014. Potsdam.

162. Ihde 2007:3-4.

163. “So, every sound phenomenon (like the words of a language) can be taken for its relative meaning or for its own substance. As long as meaning predominates, and is the main focus, we have literature and not music. But how can we forget meaning and isolate the in-itself- ness of the sound phenomenon? There are two preliminary steps: Distinguishing an element (hearing it in itself, for its texture, matter, color). Repeating it. Repeat the same sound fragment twice: there is no longer event, but music.” (Schaeffer 1952 [ed. 2012:13]).

164. Ihde 2007:3

165. Gerald Woehl, in conversation in Studio Acustium. April 30, 2011.

166. Gerald Woehl, interview of February 17, 2014. Potsdam.

167. “Sarah Vaughan in Hi-Fi.” Columbia Records, 1955.

168. Gerald Woehl, in conversation in Studio Acustium. October 20, 2010.

169. “Also z.B. extrem ist es z.B. bei flute harmonique. Also im Bass ist sie relativ durchsichtig und ja fast hell, wird dann immer dunkler und immer trauriger, würde ich es mal so sagen und im Diskant ist sie eigentlich ein bissel melancholisch. Ja, was eben so ein romantisches Stück haben muss. Also Melancholik, das ist ein wichtiges Element, in der Romantik eine Rolle spielt.” Gerald Woehl, interview of February 2014. Potsdam.

170. Gerald Woehl, interview of February 17, 2014. Potsdam.

171. LaBelle 2012:468–469.

172. Harald Vogel (2012) writes about the significance of the organ in Studio Acusticum; a text he titles “Sound Sculpture.” He writes: “The new Organ Acusticum represents a new type

of instrument: from the outside a *pipe sculpture*, from the inside a *sound sculpture*…The term 'sound sculpture' is intended to describe the correspondence between the idea of sound and the musical imagination." I think that by "the correspondence between the idea of sound and the musical imagination" Vogel means precisely the correspondence between the architecture of sound (the form of the voice, as idealized by the voicer) and the vision (conception) of that architectural space in the context of musical performance and musical language.

173. Monette 1992:114.

174. "[Als ich die Orgel plante, dachte ich:] wenn das eine Klangkirche ist, dann muss man im Klang sitzen, sozusagen, wenn man die Orgel hört. Man muss sozusagen im Klang sein, und selbst Klang sein. Das muss ich sagen, das hatte ich gleich, als ich rein kam. Das wird eine Orgel, wo man sozusagen drin sitzt." Gerald Woehl, interview of February 17, 2014. Potsdam.

175. Consider, for example, the Halberstadt Cage project, where Cage's ASLSP (1985) is to be performed over an extended period of 640 years. This may be only possible with the organ, as the type of mechanical instrument that it is.

176. LaBelle 2012:468-469.

177. Voegelin 2010:124-125.

178. Blanton 2012:25.

179. Blanton 2012:25.

180. Graham 1997 (ed.2005:149-150).

181. "Also z.B. extrem ist es z.B. bei flute harmonique. Also im Bass ist sie relativ durchsichtig und ja fast hell, wird dann immer dunkler und immer trauriger, würde ich es mal so sagen und im Diskant ist sie eigentlich ein bissel melancholisch." Gerald Woehl, interview of February 17, 2014. Potsdam.

182. Cf. Wallman 2006:511.

183. "Es muss ja so sein, in einer Orgel müssen starke Stimmen sein, leise Stimmen sein, poetische Stimmen sein, müssen auch hässliche Stimmen sein […] Auch so ein Krummhorn so in der tiefen Lage, das sind nicht gerade schöne Töne." Gerald Woehl, interview of February 17, 2014. Potsdam.

6

APPENDIXES

Appendixes A

Organ specifications

Appendix A1

Woehl's disposition – September 2008

I. Manual
Grand Choeur

Montre	16'
Principal	8'
Flûte harmonique	8'
Violoncello	8'
Bourdon	8'
Grosse Quinte	5 1/3'
Octave	4'
Flûte	4'
Cornet	5fach
Grosse Fourniture	6fach
Bombarde	16'
Trompette	8'
Clairon	4'

II. Manual
Hauptwerk

Bourdon	16'
Principal	8'
Rohrflöte	8'
Gambe	8'
Octave	4'
Quinte	2 2/3'
Octave	2'
Sesquialtera	3fach
Mixtur	4fach
Cimbel	3fach
Trompete	16'
Trompete	8'

III. Manual
Oberwerk (schwellbar)

Quintatön	16'
Principal	8'
Gemshorn	8'
Flauto douce	8'
Gedackt	8'
Octave	4'
Hohlflöte	4'
Nasard	2 2/3'
Octave	2'
Blockflöte	2'
Larigot	1 1/3'
Sifflöte	1'
Sesquialtera	2fach
Carillon	3fach
Mixtur	4fach
Fagott	16'
Krummhorn	8'

Tremulant schwach

Zimbelstern Dur
Zimbelstern Moll
Vogelgeschrei

umschaltbar zu einem
klassischen Oberwerk

IV. Manual
Récit

Bourdon	16'
Flûte traversiére	8'
Viola da Gamba	8'
Voix céleste	8'
Cor de nuit	8'
Flûte octaviante	4'
Dulciane	4'
Quinte	2 2/3'
Tierce	1 3/5'
Octavin	2'
Plein Jeux	4fach
Bombarde	16'
Trompette harmonique	8'
Clairon harmonique	4'
Basson Hautbois	8'
Vox humana	8'

Tremblant fort

V. Manual
Solo (z.T. schwellbar)

Violoncello	8'
Viole céleste	8'
Doppelflöte	8'
Quintadena	8'
Grand Cornet	6fach
Viole d'Orchestra	4fach
Klarinette	16'
Alphorn	8'
Saxophon	8'
Tuba Mirabilis	8'

Tremulant

Glocken 8'
Harfe
Celesta (metallisch)
Xylophon (hölzern)
Pauke
Trommel
Klangplatten
Triangel

Pedal (z.T. schwelbar)

Untersatz	32'
Grand Bourdon	32'
Principal	16'
Kontrabaß	16'
Subbaß	16'
Violon	16'
Gedacktbaß	16'
Quintabaß	10 2/3'
Violoncello	8'
Octavabaß	8'
Gedacktbaß	8'
Octave	4'
Flöte	4'
Mixtur	6fach
Groß Posaune	32'
Posaune	16'
Trompete	8'
Bombarde	16'
Trompette	8'
Clairon	4'
Tuba Mirabiles	8'
Corno	4'
Alphorn	8'
Saxophon	8'
Glocken	2'

Koppeln

II-I
III-I
IV-I
VI-I
I Baß Octavkoppel
IV-I Baß Octavkoppel
V-I Baß Octavkoppel
V-I Disk Octavkopppel
I-II
III-II
IV-II
V-II
IV-II Baß Octavkoppel
IV-III
V-III
IV-III Baß Octavkoppel
V-III Baß Octavkoppel
V-III Disk Octavkoppel
V-IV
V-IV Baß Octavkoppel
IV Baß Octavkoppel
V Baß Octavkoppel
V Diskant Octavkopppel
I-P
II-P
III-P
IV-P
V-P
V-P Diskant Octavkoppel

Appels

klassisches OW an
klassischer Wind an
Winddrossel an
Walze an
Synthesizer an
Lichtanlage an

Appendix A2

Woehl and committee's planned disposition – March 2009

I. Manual
Hauptwerk

1.	Principal	16'
2.	Bordun	32'
3.	Bordun	16'
4.	Principal	8'
5.	Flûte harmonique	8'
6.	Violoncelle	8'
7.	Viola da Gamba	8'
8.	Rohrflöte	8'
9.	Groß Quinte	5 1/3'
10.	Octave	4'
11.	Flöte	4'
12.	Groß Tierce	3 1/5'
13.	Quinte	2 2/3'
14.	Octave	2'
15	Flöte	2'
16.	Groß Cornet	8fach
17.	Cornet Progressio	5fach
18	Sesquialtera	3fach
19.	Groß Mixtur	6fach
20.	Mixtur	4fach
21.	Cimbel	3fach
22.	Bombarde	16'
23.	Trompette	8'
24.	Clairon	4'
25.	Trompete	16'
26.	Trompete	8'
27.	Tuba mirabilis	8'
28.	Trompette en ch.	8'
29.	Corno	4'
30.	Tremulant	

II. Manual
Positiv schwellbar

31.	Quintatön	16'
32.	Salicional	16'
33.	Principal	8'
34.	Gemshorn	8'
35.	Unda Maris	8'
36.	Konzertflöte	8'
37.	Salicional	8'
38.	Flauto douce	8'
39.	Gedackt	8'
40.	Quintade	8'
41.	Octave	4'
42.	Hohlflöte	4'
43.	Salicional	4'
44.	Nasard	2 2/3'
45.	Octave	2'
46.	Blockflöte	2'
47.	Violine	2'
48.	Terz	1 3/5'
49.	Larigot	1 1/3'
50.	Sifflöte	1'
51.	Carillon	3fach
52.	Sesquialtera	2fach
53.	Mixtur	4fach
54.	Cimbel	3fach
55.	Fagott	16'
56.	Trompete	8'
57.	Fagott	8'
58.	Krummhorn	8'
59.	Tremulant schwach	

III. Manual
Récit Expression

60.	Bourdon	16'
61.	Diapason	8'
62.	Flûte traversière	8'
63.	Viol de Gambe	8'
64.	Voix céleste	8'
65.	Cor de nuit	8'
66.	Flûte octaviante	4'
67.	Dulciane	4'
68.	Quinte	2 2/3'
69.	Octavin	2'
70.	Tierce harmonique	1 3/5'
71.	Septiéme harmonique	1 1/7'
72.	None harmonique	8/9'
73.	Cymbale	3fach
74.	Bombarde	16'
75.	Trompette harmonique	8'
76.	Clairon harmonique	4'
77.	Basson Hautbois	8'
78.	Voix humaine	8'
79.	Tremblant fort	

IV. Manual Solo
z.T. schwellbar

80.	Gambe	16'
81.	Violoncello	8'
82.	Voix céleste	8'
83.	Doppelflöte	8'
84.	Viola	4'
85.	Violine	2'
86.	Viole d'Orchestre	3fach
87.	Clarinette	16'
88.	Clarinette	8'
89.	Saxophone	8'
90.	Bordun	16'
91.	Bordun	8'
92.	Flöte	4'
93.	Flöte	2'
94.	Solo Cornet	6–10fach
95.	Solo Carillon	4fach
96.	Bombarde	16'
97.	Trompette	8'
98.	Tuba	16'
99.	Tuba mirabilis	8'
100.	Trompette en ch.	8'
101.	Corno	4'
102.	Tremulant stark	

Pedal (z.T. schwellbar)

103.	Infrabaß	64'
104.	Untersatz	32'
105.	Grand bourdon	32'
106.	Salicetbaß	32'
107.	Principal	16'
108.	Kontrabaß	16'
109.	Subbaß	16'
110.	Violon	16'
111.	Gedacktbaß	16'
112.	Quintabaß	10 2/3'
113.	Violoncello	8'
114.	Octavabaß	8'
115.	Flöte	8'
116.	Gedacktbaß	8'
117.	Terzbaß	6 2/5'
118.	Quinte	5 1/3'
119.	Octave	4'
120.	Viola	4'
121.	Flöte	4'
122.	Flûte douce	4'
123.	Terz	3 1/5'
124.	Violine	2'
125.	Violine	2'
126.	Terz	1 3/5'
127.	Quinte	1 3/5'
128.	Bauernflöte	1'
129.	Contracornet	11fach
130.	Baß-Cornet	8fach
131.	Mixtur	6fach
132.	Groß Posaune	32'
133.	Posaune	16'
134.	Trompete	8'
135.	Bombarde	16'
136.	Trompette	8'
137.	Clairon	4'
138.	Tuba mirabilis	8'
139.	Corno	4'
140.	Trompette en chamade	4'
141.	Trompette en chamade	2'
142.	*Basson	16'
143.	*Fagott	8'
144.	*Cornetto	4'
145.	Glocken	4'
146.	Baß Tremulant	

Obertonwerk

147.	Diapason	16'	C
148.	Subbass Quint	10 2/3'	G
149.	Diapason	8'	C
150.	Bass None	7 1/9'	D
151.	Bass Tierce	6 2/5'	E
152.	Fourth	5 9/11'	F
153.	Quint	5 1/3'	G
154.	Sixth	4 12/13'	A
155.	Bass Septième	4 4/7'	B flat
156.	Bass Seventh	4 4/15'	B
157.	Diapason	4'	C
158.	Flat Ninth	3 13/17'	D flat
159.	Double None	3 5/9'	D
160.	Bass Mollterz	3 7/19'	E flat
161.	Double Tierce	3 1/5'	E
162.	Eleventh	2 10/11'	F
163.	Sharp Eleventh	2 18/23'	F sharp
164.	Twelfth	2 2/3'	G
165.	Sharp Twelfth	2 14/25'	G sharp
166.	Thirteenth	2 6/13'	A
167.	Double Septième	2 2/7'	B flat
168.	Double Seventh	2 2/15'	B
169.	Diapason	2'	C
170.	Flat Sixteenth	1 15/17'	D flat
171.	None	1 7/9'	D
172.	Double Mollterz	1 13/19'	E flat
173.	Tierce	1 3/5'	E
174.	Eighteenth	1 5/11'	F
175.	Sharp Eighteenth	1 9/23'	F sharp
176.	Nineteenth	1 1/3'	G
177.	Sharp Nineteenth	1 7/25'	G sharp
178.	Twentieth	1 3/13'	A
179.	Septième	1 1/7'	B flat
180.	Seventh	1 1/15'	B
181.	Diapason	1'	C
182.	Flat Twenty-third	16/17'	D flat
183.	Octave None	8/9'	D
184.	Mollterz	16/19'	E flat
185.	Octave Tierce	4/5'	E
186.	Twenty-fifth	8/11'	F
187.	Sharp Twenty-fifth	16/23'	F sharp
188.	Twenty-sixth	2/3'	G
189.	Sharp Twenty-sixth	16/25'	G sharp
190.	Twenty-seventh	8/13'	A
191.	Octave Septième	4/7'	B flat
192.	Twenty-eighth	8/15'	B
193.	Diapason	1/2'	C
194.	Flat Thirtieth	8/17'	D flat
195.	Super Octave None	4/9'	D
196.	Octave Mollterz	8/19'	E flat
197.	Super Octave Tierce	2/5'	E
198.	Thirty-second	4/11'	F
199.	Dharp Thirty-second	8/23'	F sharp
200.	Thirty-third	1/3'	G
201.	Sharp Thirty-third	8/25'	G sharp
202.	Tremulant		

Nebenzüge

225.	Klangklappen Positiv öffen	
226.	Klassischer Wind an	
227.	Winddrossel an	
228.	Registerschweller an	
229.	Midi an	
230.	Lichtanlage an	
231.	Glocken	8'
232.	+Celesta	8'
233.	+Xylophon	8'
234.	+Harfe	8'
235.	+Gran Cassa	
236.	Trommelwirbel	
237.	Paukenwirbel	
238.	Klangplatten	
239.	Graals Glocken	
240.	Glockengeläute	
241.	Zimbelstern Dur stärker	
242.	Zimbelstern Moll leiser	
243.	Vogelgeschrei	

Koppeln

203.	II-I
204.	III-I
205.	IV-I
206.	I Baß Octavkoppel
207.	II-I Baß Octavkoppel
208.	III-I Baß Octavkoppel
209.	IV-I Baß Octavkoppel
210.	I-II
211.	III-II
212.	IV-II
213.	II Baß Octavkoppel
214.	IV-II Baß Octavkoppel
215.	IV-III
216.	III Baß Octavkoppel
217.	IV-III Baß Octavkoppel
218.	IV Baß Octavkoppel
219.	IV Diskant Oktavkoppel
220.	I-P
221.	II-P
222.	III-P
223.	IV-P
224.	III-P Diskant Octavkoppel

Appendix A3

Additions to the disposition of September 2008 – March 2009

This specification shows all the stops (excluding percussion, couplers, and tremulants) that were added to each division by March 2009, departing from Woehl's concept of September 2008. The stops numbered (1), (2), and (3) were not new additions, extensions, or transmissions; rather, their composition was adjusted. (1) was changed from a Plein Jeux 4fach to the present Cymbale 3fach, composed in the same manner as the homonym stop in the Cavaillé-Coll organ at the Trinité in Paris. (2) the Viole d'orchestre was reduced from 4 ranks to the present 3 ranks. (3) the Solo Cornet changed from a 6 rank composition to a 6-10 rank composition.

Hauptwerk: 6 new stops in specification

Bordun 32' (extension)
Groß Tierce 3 1/5' (addition)
Flöte 2' (transmission)
Groß Cornet 8fach (addition)
Tuba Mirabilis 8' (transmission)
Trompette en chamade 8' (transmission)

Oberwerk: 9 new stops in specification

Salicional 16' (addition)
Unda Maris 8' (addition)
Konzerflöte 8' (addition)
Salicional 8' (extension)
Quintade 8' (extension)
Salicional 4' (extension'
Violine 2' (transmission)
Terz 1 3/5' (addition)
Cimbel 3fach (addition)

Récit: 3 new stops in specification, 1 modified

Diapason 8' (addition)
Séptime harm. 1 1/7' (addition)
None harm. 8/9' (addition)
Cymbale 3fach (1)

Solo: 11 new stops in specification, 2 modified

Gambe 16' (extension)
Viola 4' (extension)
Violine 2' (extension)
Viole d'orchestre 3fach (2)
Clarinette 8' (extension)
Bordun 16' (transmission)
Bordun 8' (extension)
Flöte 4' (transmission)
Flöte 2' (extension)
Solo Cornet 6-10 fach (3)
Solo Carillon 4fach (new addition)
Bombarde 16' (transmission)
Trompette 8' (transmission)

Pedal: 16 new stops in specification

Infrabaß 64' (addition)
Salicetbaß 32' (addition)
Flöte 8' (addition)
Terzbaß 6 2/5' (transmission)
Quinte 5 1/3' (transmission)
Viola 4' (transmission)
Flûte douce 4' (transmission)
Terz 3 1/5' (transmission)
Violine 2' (transmission)
Terz 1 3/5' (transmission)
Quinte 1 1/3' (transmission)
Bauernflöte 1' (transmission)
Contracornet 11fach (addition)
Baß-Cornet 8 fach (addition)
Trompette en chamade 4' (transmission)
Trompette en chamade 2' (transmission)

Appendix A4

Present disposition (in February 2014)

Hauptwerk. Manual I

1. Bordun	32'	20. Mixtur	4fach
2. Principal	16'	21. Cimbel	3fach
3. Bordun	16'	22. Trompete	16'
4. Principal	8'	23. Trompete	8'
5. Flûtle harm.	8'	24. Bombarde	16'
6. Violoncelle	8'	25. Trompette	8'
7. Viola da Gamba	8'	26. Clairon	4'
8. Rohrflöte	8'	27. Tuba mirabilis	8'
9. Groß Quinte	5 1/3'	28. Corno	4'
10. Octave	4'	29. Trompette en ch.	8'
11. Flöte	4'	30. Tremulant I	
12. Gross Tierce	3 1/5'		
13. Quinte	2 2/3'	33. II-I	
14. Octave	2'	34. III-I	
15. Flöte	2'	35. IV-I	
16. Sesquialtera	2fach	36. I/16	
17. Cornet Progressio	5fach	37. II-I/16	
18. Cornet Progressio	8fach	38. III-I/16	
19. Groß Mixtur	6fach	39. IV-I/16	

Pedal

40. Infrabaß	64'	63. Violine	2'	87. I-P
41. Untersatz	32'	64. Terz	1 3/5'	88. II-P
42.Groß Bordun	32'	65. Quinte	1 1/3'	89. III-P
43. Salicetbaß	32'	66. Bauernflöte	1'	90. IV-P
44. Principal	16'	67. Contra Cornet	5fach	
45. Kontrabaß	16'	68. Bass Cornet	8fach	92. Trommelwirbel A
46. Subbass	16'	69. Mixtur	4-6fach	93. Trommelwirbel A#
47. Violon	16'	70. Groß Posaune	32'	94. Gran Cassa H
48. Gedacktbaß	16'	71. Posaune	16'	95. Klangplatten C-E
49. Quintabaß	10 2/3'	72. Trompete	8'	96. Winddrossel I Baß
50. Octavabaß	8'	73. Bombarde	16'	97. Winddrossel I Diskant
51. Flöte	8'	74. Trompette	8'	98. Winddrossel III Baß
52. Cello	8'	75. Clairon	4'	99. Winddrossel III Diskant
53. Gedackt	8'	76. Tuba mirabilis	8'	100. Winddrossel gesamt
54. Terzbaß	6 2/5'	77. Corno	4'	101. MIDI
55. Quinte	5 1/3'	78. Chamade	4'	102. Klassischer Wind
56. Octave	4'	79. Trompette en ch.	2'	103. Licht
57. Flöte	4'	80. Basson I	16'	104. Crescendo
58. Violine	4'	81. Fagott I	8'	
59. Flûte douce	8'	82. Cornetto I	4'	
60. Terz	3 1/5'			
61. Quinte	2 2/3'	84. Glocken	4'	
62. Flöte	2'			

Solo. Manual IV

105. Gambe 16'
106. Bordun 16'
107. Doppelflöte 8'
108. Violoncello 8'
109. Voix céleste 8'
110. Viole d'orchestre 3fach
111. Bordun 8'
112. Flöte 4'
113. Viola 4'
114. Flöte 2'
115. Violine 2'
116. Solo Cornet 8-10fach
117. Carillon 4fach
118. Bombarde 16'
119. Trompette 8'
120. Tuba mirabilis 16'
121. Tuba mirabilis 8'
122. Trompette en ch. 8'
123. Corno 4'
124. Clarinette 16'
125. Clarinette 8'

127. Tremulant stark

131. IV/16
132. IV/4

134. Glocken 8'
135. Celesta 8'
136. Vibraphon 8'

140. Glockengeläute
141. Zimbelstern stärker

143. Vogelgeschrei

Récit. Manual III

144. Bordun 16'
145. Diapason 8'
146. Flûte traversiére 8'
147. Viole de Gambe 8'
148. Voix céleste 8'
149. Cor de nuit 8'
150. Flûte octaviante 4'
151. Dulciane 4'
152. Quinte $2\ ^{2}/_{3}'$
153. Octavin 2'
154. Tierce harm. $1\ ^{3}/_{5}'$
155. Septiéme harm. $1\ ^{1}/_{7}'$
156. None harm. $^{8}/_{9}'$
157. IV-III
158. III/16
159. IV-III/16

161. Cymbale 3fach
162. Bombarde 16'
163. Trompette harm. 8'
164. Clairon harm. 4'
165. Basson Hautbois 8'
166. Voix humaine 8'
167. Tremblant fort III

Oberwerk. Manual II

170. Quintatön 16'
171. Salicional 16'
172. Principal 8'
1'3. Gemshorn 8'
174. Unda maris 8
175. Salicional 8'
176. Konzerflöte 8'
177. Flauto 8'
178. Flauto douce 8'
179. Quintatön 8'
180. Gedackt 8'
181. Octave 4'
182. Hohlflöte 4'
183. Viola Alto 4'
184. Nasard $2\ ^{2}/_{3}'$
185. Octave 2'
186. Blockflöte 2'
187. Violine 2'
188. Terz $1\ ^{3}/_{5}'$
189. Larigot $1\ ^{1}/_{3}'$
190. Sifflöte 1'
191. Carillon 3fach
192. Sesquialtera 2fach
193. Mixtur 4fach
194. Cimbel 3fach

196. I-II
197. III-II
198. IV-II
199. II/16
200. III-II/16
201. IV-II/16

203. Fagott 16'
204. Fagott 8'
205. Trompette 8'
206. Krummhorn 8'
207. Tremulant II
208. Klangklappen auf

Appendix A5

"Die klassische Mitteldeutsche Orgel"

Manual I
Hauptwerk

Bordun	16'
Principal	8'
Rohrflöte	8'
Gambe	8'
Groß Quinte	5 1/3'
Octave	4'
Quinte	2 2/3'
Octave	2'
Sesquialtera	3fach
Mixtur	4fach
Cimbel	3fach
Trompete	16'
Trompete	8'

Manual II
Oberwerk

Quintatön	16'
Principal	8'
Gemshorn	8'
Flauto douce	8'
Gedackt	8'
Octave	4'
Hohlflöte	4'
Nasard	2 2/3'
Octave	2'
Blockflöte	2'
Terz	1 3/5'
Quinte	1 1/3'
Sifflöte	1'
Sesquialtera	2fach
Mixtur	4fach
Fagott	16'
Krummhorn	8'
Tremulant	schwach

Manual III
Echo

Gedackt	8'
Quintade	8'
Salicional	4'
Flauto traverse	4'
Quinte	2 2/3'
Flöte	2'
Terz	1 3/5'
Cimbel	3fach
Vox humana	8'
Tremulant	
Glocken	

Pedal

Untersatz	32'
Principal	16'
Kontrabaß	16'
Subbass	16'
Violon	16'
Quintabaß	10 2/3'
Octave	8'
Gedacktbaß	8'
Super Octave	4'
Mixtur	6fach
Groß Posaune	32'
Posaune	16'
Trompete	8'
Cornet	2'
Glocken	

Koppeln

II-I
III-I
III-II
I-P
II-P
III-P

Nebenregister

Zimbelstern Dur
Zimbelstern Moll
Nachtigall
Pauke

Appendix A6

"Die klassische Französische Orgel"

Manual I Grand-Orgue		Manual II Positif		Manual III Récit		Manual IV Solo		Pedal	
Cornet	5fach	Larigot	1 2/3'	Trompette	8'	Grand Cornet	6fach	Bombarde	16'
Trompette	8'					Cornet	5fach	Trompette	8'
Clairon	4'					Trompette Chamade	4'-8'	Clairon	4'
						Trompette Chamade	2'-16'		

Appendix A7

"Église Sainte Clotilde, Paris. Cavaillé-Coll, 1859."

Clavier I
Grand-Orgue

Jeux de fonds

Montre	16'
Bourdon	16'
Montre	8'
Bourdon	8'
Flûte harmonique	8'
Viole de Gambe	8'
Prestant	4'

Jeux de combinaison

Octave	4'
Quinte	2 2/3'
Doublette	2'
Plein-Jeu	VII
Bombarde	16'
Trompette	8'
Clairon	4'

Clavier II
Positif

Jeux de fonds

Bourdon	16'
Montre	8'
Bourdon	8'
Flûte harmonique	8'
Viole de Gambe	8'
Unda Maris	8'
Prestant	4'

Jeux de combinaison

Flûte	4'
Quinte	2 2/3'
Doublette	2'
Plein-Jeu	IV
Trompette	8'
Cromorne	8'
Clairon	4'

Clavier III
Récit

Jeux de fonds

Flûte harmonique	8'
Bourdon	8'
Viole de Gambe	8'
Voix céleste	8'
Basson Hautbois	8'
Voix humaine	8'

Jeux de combinaison

Flûte octaviante	4'
Octavin	2'
Trompette harmonique	8'
Clairon harmonique	4'

Pédale

Jeux de fonds

Subasse	32'
Contrabasse	16'
Basse	8'
Octave	4'

Jeux de combinaison

Bombarde	16'
Trompette	8'
Clairon	4'

Pédales de combinaison

Effects d' Orgue
Tirasse Grand-Orgue
Tirasse Positif
Anches Pédale
Octaves Graves Grand-Orgue
Octaves Graves Positif
Octaves Graves Récit sur Positif
Anches Grand-Orgue
Anches Positif
Copula Positif sur Grand-Orgue
Copula Récit sur Positif
Tremblant du Récit

Appendixes B

Tables

Appendix B1

Voicing timeline – the first voicing of stops

August 2010				
Hauptwerk	**Oberwerk**	**Récit**	**Solo**	**Pedal**
Rohrflöte 8'		Diapason 8' Flute traversiére 8' Viole de Gambe 8' Voix céleste 8' Cor de Nuit 8' Flûte octaviante 4' Dulciane 4' Quinte 2 $^{2}/_{3}$' Octavin 2'		
September 2010				
Hauptwerk	**Oberwerk**	**Récit**	**Solo**	**Pedal**
	Hohlflöte 4'			
October 2010				
Hauptwerk	**Oberwerk**	**Récit**	**Solo**	**Pedal**
Flûte harm. 8' Viola da Gamba 8'	Principal 8' Gemshorn 8' Nasard 2 $^{2}/_{3}$'			
November & December 2010				

Woehl did not voice new stops.

January 2011

Hauptwerk	Oberwerk	Récit	Solo	Pedal
Octave 4'	Gedackt 8'	Tiérce harm. 1 $^{3}/_{5}$'		
Octave 2'	Octave 4'	Septiéme harm. 1 $^{1}/_{7}$'		
	Octave 2'	None harm. $^{8}/_{9}$'		
	Blockflöte 2'	Cymbale III		
	Terz 1 $^{3}/_{5}$'			
	Larigot 1 $^{1}/_{3}$'			
	Sifflöte 1'			

February & March 2011

Woehl did not voice new stops.

April 2011

Hauptwerk	Oberwerk	Récit	Solo	Pedal
	Unda Maris 8'			
	Konzertflöte 8'			
	Flauto douce 8'			

May & June 2011

Woehl did not voice new stops.

July 2011

Hauptwerk	Oberwerk	Récit	Solo	Pedal
Quinte 2 $^{2}/_{3}$'	Sesquialtera 2fach			Subbass 16'
Groß Mixtur 6fach	Cimbel 3 fach			Octavabaß 8'
Mixtur 4fach	Trompete 8'			Quinte 2 $^{2}/_{3}$'

August 2011

Hauptwerk	Oberwerk	Récit	Solo	Pedal
		Bombarde 16'		
		Trompette harm. 8'		
		Clairon harm. 8'		

Hauptwerk	Oberwerk	Récit	Solo	Pedal
September 2011				
Principal 16' Principal 8'				
October 2011				
		Basson Hautbois 8' Voix humaine 8'		
November & December 2011				
		Woehl did not voice new stops.		
January 2012				
Trompete 16' Trompete 8'	Cromorne 8'			Trompete 8'
February & March 2012				
		Woehl did not voice new stops.		
April 2012				
				Posaune 16' Bombarde 16' Trompette 8' Clairon 4'
May, June & July 2012				
		Woehl did not voice new stops.		

August 2012				
Hauptwerk	**Oberwerk**	**Récit**	**Solo**	**Pedal**
Bordun 16' Violoncelle 8' Flöte 4' Bombarde 16' Trompette 8' Clairon 4'	Quintatön 16' Salicional 16'		Violoncello 8' Doppelflöte 8' Viole d'Orchestre 3fach	Infrabaß 64'
September 2012				
Hauptwerk	**Oberwerk**	**Récit**	**Solo**	**Pedal**
			Solo Cornet 8-10fach Carillon 4fach	
October 2012				
Hauptwerk	**Oberwerk**	**Récit**	**Solo**	**Pedal**
			Clarinette 16' Tuba mirabilis 8' Trompette en ch. 8'	Kontrabaß 16'

Appendix B2

Table with voicing specifications

OW Principal 8	C	F	c0	f0	c1	f1	c2	f2	c3	f3
D				62.6	45.5		25.5		15	12.5
A				14.4	10.2		6.5		38	3.2
F				8	6		4.5		3	2.5
LB				48	35		19.5		11.3	9
LÄ				862	577		290		143	105
KST				16	9		9		9	5
KLA				+	+		+		+	+
KSP				mittelweit	mittelweit		mittel		mittelweit	mittel

In the leftmost column, D stands for Durchmesser (diameter), A for Aufschnitt (cut-up), F for Fussloch (toe-hole), LB for Labium (mouth and lips), LÄ for Länge (length), KST for Kernstiche (nicking), KLA for Kernlage (position of the languid), and KSP for Kernspalte (windway). The information regarding diameter, cut-up, toe-hole, labium and length is given in millimeters. The nicking figures indicate the number of nicks to be made along the languid. The symbols + and ++ tell the voicer how high or low to place the languid. Finally, the windway width is described as mittel (medium), mittelweit (medium-wide) and weit (wide).

Appendix B3

Musical requests made by Woehl

Stops played	Specific musical requests	Voicer's comments	Date
Récit Viole de Gambe 8' Cor de Nuit 8' Flûte traversiére 8' **Hauptwerk** Rohrflöte 8'	"Play a bit on these sounds."	*No comment registered in logbook.*	August 19, 2010
Récit Flûte traversiére 8' **Hauptwerk** Rohrflöte 8'	"Play a solo line on the Rohrflöte 8' with accompaniment on the Flûte traversiére 8'."	*No comment registered in logbook.*	August 20, 2010
Récit Octavin 2' with combination of 8'	"Play fast and short notes, and then the opposite as well. Play in the style of Franck."	*No comment registered in logbook.*	August 27, 2010
Récit Viole de Gambe 8' **Hauptwerk** Viola da Gambe 8'	"Play a baroque choral, interchangeably on these two manuals."	"The higher region should sound quieter."	October 20, 2010
Oberwerk Principal 8'	"Play a bit."	"The Principal should sound more lovely."	October 25' 2010

Stops played	Specific musical requests	Voicer's comments	Date
Oberwerk Octava 4' together with other stops in this division	"Play a bit on these sounds." "Play a fugue by Bach."	"I like the bass, it is clear. The treble is too dominant and sharp. I will voice it again."	January 12, 2011
Oberwerk Principal 8' Octave 4' Octave 2' Sifflöte 1' **Hauptwerk** Rohrflöte 8' Octave 4' Octave 2'	"Play a bit on these sounds."	"The wind supply for the classical style is good at the moment."	January 17, 2011
Récit Flûte traversiére 8' **Oberwerk** Konzertflöte 8' **Hauptwerk** Flûte harmonique 8'	"Play a lovely solo melody in one flute and the accompaniment on the other."	"I like the Flûte harmonique 8'."	April 21, 2011
Oberwerk Unda Maris 8' Gemshorn 8'	"Play a bit on these sounds."	*No comment registered in logbook.*	April 30, 2011
Récit Cor de Nuit 8' **Oberwerk** Gedackt 8' Hohlföte 4' Nasard 2 $^{2}/_{3}$' **Hauptwerk** Rohrflöte 8'	"Play a solo line on the Oberwerk, and play the accompaniment interchangeably on the Récit and the Hauptwerk."	"The higher region of the Hohlflöte is too sharp. I will voice it again."	June 3, 2011

Stops played	Specific musical requests	Voicer's comments	Date
Oberwerk a basis of 8', 4', 2' later adding Nazard 2 $^{2}/_{3}$' and later, over it, the Larigot 1 $^{1}/_{3}$'	"Improvise a Bach/Vivaldi concerto piece."	*No comment registered in logbook.*	June 4, 2011
Oberwerk Gemshorn 8' **Hauptwerk** Rohrflöte 8' **Pedal** Octavabaß 8'	"Play a trio by Bach."	*No comment registered in logbook.*	July 26, 2011
Récit Hautbois 8' Voix humaine 8' Tremblant fort **Oberwerk** *soft fonds*	"Play a melody on the Récit with the accompaniment on the Oberwerk. Play a choral in the style of Reger or Liszt on the Récit."	"I like the colors in the treble."	September 14, 2011

Appendixes C

Transcripts of conversations

Appendix C1

Transcript of the dialogue heard in sound example 2

voicer	Nimm die bitte noch mal raus.	Take this one out again, please.

Voicer blows into the pipe.

voicer	Mach mal die noch bisschen stärker.	Make this one a bit stronger.
	Und… [spielt einige Töne]… noch, noch stärker.	And… [plays some tones]… still, still stronger.
	Die is'… mach sie mal noch stärker.	This is… make it even stronger.
	Noch'n bisschen.	A bit more.
	Ich werd' schon ganz… [undeutlich]	I get already… [indistinct]
assistant	Hä?	Eh?
voicer	Äh… Geht die nicht stärker… [undeutlich]?	Isn't it possible to make this one stronger… [indistinct]?
assistant	Doch.	Sure.
voicer	Mach sie mal bisschen mehr stärker.	Make it a bit stronger.
assistant	Eine Sekunde.	Just a second.
voicer	Nimm noch mal die raus.	Take this one out again.

Indistinct dialogue.

voicer	Also, das c ist immer noch zu schwach. Damit müssen wir das Loch noch biss'l aufbohren.	The C is still too weak. We probably have to open up the hole a bit, there.
	Ja…	Yes.
assistant	Das ist zu [wenig] Wind?	This is too [less] wind?
voicer	Ähm.. schlecht dagegen.. da müssen wir mal 'nem langen Bohrer biss'l unten bohren.	Hm… bad in comparison… we have to drill it again with a long drill [down].
assistant	Hm…	Hm…

voicer	Ähm… [mach doch da mal mit'm Kern gerad'unten rein] … in das Loch.	Hm… [just go deeply with the tool]… into the hole.
	Vielleicht stecjt da was drin, auch.	Maybe there is something, also.
	Ist auch gut […] worden.	It was also […] well.
	Und… Mach mal da den Kern noch bissl tiefer.	And… Put the languid a bit lower there.
	Ich weiß nicht, was is'n… was is'n da für ein Loch drin?	I don't know which kind… which kind of hole is in there?
assistant	[Da muss ich mal hoch.]	[I have to go up.]
	Da müssen wir halt die… [undeutlich] … wieder raus nehmen,… [undeutlich]	Then we to take out the… [indistinct] …again, … [indistinct]
voicer	Probier mal, ob der da… zu dünn ist.	Try once, if this one… is too thin.
	Sonst können wir auch 'nen Schraubenzieher… [undeutlich] …lösen.	Otherwise we can… [indistinct] the screwdriver… [indistinct] …loosen.
	Guck mal da, ob das da rein geut. [undeutlich] …einfach durchbohren.	Check it out, if this goes in. [indistinct]… just drill trhough.
assistant	Der ist zu dick.	This one is too thick.
voicer	Ja, dann bohr doch mal da rein, ich halt mal den [an], gell?	Yes, then drill in here, I'll keep it on, right?
	Vielleicht müssen wir den Winddruck bissl erhöhen.	Maybe we have to increase the wind pressure a bit again.
assistant	Aber dann sind die ganzen anderen schwächer.	But then all the others are weaker.
voicer	Wie?	What?
assistant	… die ganzen anderen Pfeifen schwächer.	… all the other pipes are weaker.
voicer	Nee, nee. Die gehen ja da mit.	No, no, they go with it.
assistant	Aber [nicht] die ich noch brauche, also, ich kann die noch weiter aufmachen, die Pfeifen.	But [not] the one I still need, I mean, I can open them more, the pipes.
voicer	Zeig mir mal, wie wie is'n die auf?	Let me see, how is this one open?

Voicer walks to the assistant.

voicer	Nee, nee, also die is noch nich' [undeutlich].	No, no, I mean this one is not [indistinct].
	Musst schon gut bohren, mal. Ich halte den [undeutlich] mal, gell?	You have to drill well. I hold [indistinct], right?
	Du bisst biss'l vorsichtig, gell? Nicht dass du ganz runter gehst und… das musst du bisschen mit Gefühl machen, gell? Wenn du merkst, dass du, sozusagen, durch die Windlade, durch die oberen Schichten bist, dann auf… aufhören.	Be careful, right? Not that you go all the way down and… you have to do that with some feeling, right? When you are through the upper layer then stop.
	Gib mir einfach mal… Bist du denn jetzt durch?	Give me just… are you through now?
assistant	Ich kann noch weiter bohren.	I can drill further.
voicer	Nee, hm…	No, hm…
assistant	Ich galube nicht, dass ich schon durch bin.	I don't think so, that I'm already through.
voicer	Ich, ich… ich mach das mal selber. Zeig mal her.	I, I… I do that myself. Let me see.

Later in the same session

voicer	Mach mal den [zweiten] Kern ein klein wenig tiefer, wenig.	Lower the [second pipe] languid a bit, just a bit.
	Mach mal die ein klein wenig stärker.	Make this one a litlle bit stronger.
	Und die, nimm noch mal raus.	And take this one out again.
	Ja, tu die mal rein.	Yes, put this one back.
	Und nimm die noch mal raus.	And take this one out again.
	Mach mal da die Kernspalte noch viel enger, noch.	Make the windway much narrower here.
	Mach mal da noch, mal noch zwei Kernstiche mal rein.	Add here two nicks.

Later in the same session

voicer	Dann schaust du noch mal… äh… in die Pfeifen einmal rein, weißt du… bevor du gehst… ja… Weißt du was ich gemacht habe, vielleicht fällt die ja was auf. Wie gesagt, du musst eigentlich sehen, was… wie die, wie die Pfeife geht, weißt du.	Then you should look into… hm… the pipes again, you know… before you leave… yes… you know what I have done, maybe you realize something. Like I said, you actually have to see, what… how the, how the pipe works, you see.

Later in the same session

voicer	Mach mal biss'l noch… mach mal den Kern ein klein wenig höher.	Make a bit… raise the languid a little bit.
	Und nimm noch mal die raus.	And take this one out again.
	Aber… nur ganz wenig, ja? [Geht zu dem Assistenten.] Nur den Kern biss'l höher machen.	But… only a tiny bit, ok? [Goes to assistant.] Raise the languid only a bit.
assistant	Nur so'n [undeutlich]?	Just a [indistinct]?
voicer	Ja, wirklich nicht viel.	Yes, really not much.

Later in the same session

Voicer plays some chords and arpeggios.

voicer	Gib mir mal di noch mal her.	Give me this one again.
	Und mach die noch biss'l stärker.	And make this one a bit stronger.
	Und die auch noch klein wenig.	And this one as well, a little bit.
	Das is' biss'l viel, biss'l schwächer.	This is a bit too much, a bit weaker.
	Das ist ja nur noch so ein Hauch, weißte? Die stimmt ja shcon, ist nur biss'l wenig Energie noch.	This is just a tiny bit, you see? This one is already fine, just too less energy.

Later in the same session

Voicer plays some chords.

voicer	Ja, lassen wir das mal so. Und… ich stimme sie mal noch ein klein wenig, einfach noch mal durch. Und dann gehen wir an den 2 Fuß.	Let's leave it like that. And… I tune them a little bit, just through. And we will move on with the 2'.

Appendix C2

Transcript of the dialogue heard in sound example 3

voicer	Es ist immer noch zu leise.	It is still too quiet.
assistant	Gut, mach ich mehr.	Ok, I do more.
voicer	Ich weiß nicht, ob nicht da unten eventuell sogar so kleine Schieberchen sind.	I don't know, maybe there are even [possibly refering to a tool].
assistant	Ja, gibt es.	Yes, there are.
voicer	Weil dann machst Du das besser von außen. Kannst du einfach mit dem Hämmerchen ein bisschen hingehen.	Because in that case you better do it from outside. You can simply do it with a small hammer.
assistant	Ja, probier ich [undeutlich].	Ok, I'll try [indistinct].
voicer	Weißt du, es wird nichts bringen, den Fuß unten aufmachen.	You know, it wouldn't help the foot of the pipe.
assistant	Bitte?	Excuse me?
voicer	Es könnte sein, dass das gar nichts bringt, den Fuß unten aufmachen.	Maybe it doesn't help at all to open the foot of the pipe.
assistant	Ja. Aber ich komm an den Schieber [nicht ran].	Yes, but I can [not] reach the [slide?].
voicer	Du kannst, die untere Füllung kannst du aufmachen.	You can open the lower filling.
assistant	Ah ja, und dann den ganzen Arm… ja?	Ah yes, and then the whole arm… right?
voicer	Und dann mit diesem Hämmerchen kannst du an diesen Schieber ran.	And then you can reach this [slide?] with the small hammer.
	Es ist halt doch ein bisschen brav.	It's not as good as it could be.
	Ich schau mal.	I'll have a look.
	Nee, sie sind noch zu schwach.	No, they are still too weak.
assistant	Untere Füllung. Ich könnte das Schwellwerk aufmachen.	[Lower filling.] I could open the swell.
voicer	Wie?	How?
assistant	Hier kann man das…	Here you can…
voicer	Du kannst die äußeren Klappen aufmachen.	You can open the outer shutters.

assistant	Ja, die Füllung, genau. Die Klappen sind offen. Das ist…	Yeah, right, the filling. The shutters are open. That's…
voicer	Jaja, dann kannst du da reinfassen.	Yes, yes, then you can [put your hand] inside.
assistant	Ja, sie ist… eng, aber es geht.	Yes, the pipe is …narrow, but it works.
voicer	Ja, ja.	Yes.
	Der Ton muss hörbar sein, weißte? Ich höre ihn noch nicht.	This tone must be audible, you know? I can't still hear it.
	Der ist gut.	This one is ok.
assistant	Ja, so jetzt hier, kann man hier öffnen? Ja.	Yes, now, here, can I open here? Yes.
voicer	Bist du dran?	Are you there?
assistant	Jetzt.	Now.
voicer	Du musst einfach abzählen.	You only have to count.
assistant	Das ist das?	Is it this [tone]?
voicer	Das ist Gustav.	That is Gustav.
assistant	Gustav. Ein paar Pfeifen muss ich raus nehmen.	Gustav. I have to remove some of the pipes.
voicer	Wie?	Sorry?
assistant	Jetzt glaube ich falsche Richtung.	I think, that was the wrong direction.
voicer	Der ist schwächer.	It is weaker.
assistant	Warte mal.	Wait a second.
	Mit dem… wird's schlechter. Mach ich am Fuß mal Raum.	It gets worse with the… I'll make some space at the foot.
voicer	Könnte noch mehr sein.	Could be still more.
assistant	Ja, dann muss ich wieder an die Seite gehen.	Ok, but then I have to go back to the side.
	Ähm… zu verändern ist nicht mehr, am Schieber.	There can't be changed more at the…, at the [slide?].
voicer	Ah ja.	Ok.
	Joa, dann kannst du ja die Pfeife ein klein wenig hochheben und dann nochmals den Fuß ganz aufmachen.	Well, you can try to lift the pipe a little bit and then completely open the foot again.
assistant	Ja nee, das mach' ich wieder drinnen.	Ok, but that I'll do inside.

voicer	Also, bei dem Anton auch.	Well, do it also for Anton.
assistant	Ah ja, dann mach ich das jetzt.	Ok, I do this now.
voicer	Ist schwächer geworden.	It became weak.
assistant	Jaja, ich weiß.	Yeah, I know.
voicer	Könnte noch stärker sein.	Could be still stronger.
assistant	Wie ist denn das Anton, ist es gut?	How's the Anton now, is it ok?
voicer	Wie?	Sorry?
assistant	Ist das Anton jetzt gut?	Is the Anton ok now?
voicer	Nee, müsste noch wesentlich stärker sein.	Nope, it should be much more.
assistant	Dieser Schieber hat kein Loch das man anpacken kann. Der lässt sich ganz schlecht bewegen. Sehr schwierig.	That slide doesn't have a hole to grab it. It's very hard to move it. Very difficult.
voicer	Und kannst du nicht mit dem Hämmerchen draufklopfen?	You can't hit with the small hammer?
assistant	Man kommt hier so… man will. Jetzt mal.	You can… how you want to. Try it.
	Ist ja ganz prima, bringt alles nix. Egal wie ich ihn stelle, er ist immer schwach.	Oh my dear, that doesn't work at all. Doesn't matter how I move it, it remains weak.
voicer	Wie?	Sorry?
	Beide sind jetzt schwächer geworden.	Now, both became weak.
assistant	Jetzt ist er wieder schwächer, ja.	It bcame weak again, yes.
	Ich komm'nicht ran.	I can't reach it.
voicer	Kannst du jetzt eins machen?	Can just try another thing now?
assistant	Bitte?	Excuse me?
voicer	Dass du eins machst: Du stellst die Pfeife daneben.	That you just try this: You put the pipe aside.
assistant	Und erstmal oben rein?	And then from above?
voicer	Nee, und dann fühlst du mit dem Finger, ob das noch offen ist oder nicht.	No, and then you feel it with your finger, wheter it's open or not.
assistant	Ja.	Yes.
voicer	Wenn du da dran kommst.	If you are able to reach it.

assistant	Jetzt ist es noch offen. Ich such'nach einem Gegenstand kurz. Zu fühlen.	Now it's still open. I'm just looking for an object. To feel.
voicer	Also D [oder B] und H und Gis, die sind sehr gut, ja? Gerade das A un G, die sind schlecht.	So D [or B flat] and B and G sharp are very well. Just the A and G are bad.
assistant	So, jetzt ist das Loch offen.	Ok, now the hole is open.
	Moment.	Just a moment.
	Jetzt das A.	Now the A.
voicer	Klingt besser. Könnte noch, glaube ich, ein bisschen stärker sein.	Sounds better. But it still could be a little bit louder.
assistant	Ich geh nach… kurz.	I go to… for a moment.
voicer	Du müsstest die Pfeife noch aufmachen.	You'd have to open the pipe.
assistant	Ja, mach ich. Geh'n Schritt hier rauf.	Yes, I do. I just go one step up here.
voicer	Könnte noch mehr sein.	Could be still more.
assistant	Ja, das dauert ein bisschen, bis ich da dran bin.	I know, but it takes some time, until I can reach it.
voicer	Ah ja.	Ah, ok.
assistant	Das A jetzt einmal.	Now the A once.
voicer	Das ist G. Hast du das G jetzt auch gemacht?	That's G. Did you fix the G, too?
assistant	Das was?	The what?
voicer	Das Gustav?	The Gustav?
assistant	Nee, das mach 'ich jetzt als nächstes.	No, but that I'll do next.
voicer	Es ist besser geworden.	It's better now.
assistant	Bei G [außen] ist der Schieber auch auf. Und den Rest mache ich jetzt…	G has an open slide [outside]. And the rest I do now...
voicer	Das G ist schon recht gut.	The G is rather ok.
	Ehe du was machst, stell erstmal das A rein.	Put the A back before you do something.
	Schon mal hier nicht schlecht.	It's not bad now.
	Es könnte noch ein bisschen mehr sein.	It could still be a little bit more.
assistant	Ja.	Yes.

voicer	Ist grundsätzlich schon relativ gut. Aber das A ist noch ein bisschen schwach.	Basically, it's not that bad now. But the A is still a little bit weak.
assistant	Ja.	Yes.
voicer	Am besten, wenn du das mit dem Messer aufmachen würdest.	It would be best, if you open it with a knife.
assistant	Ja, das mache ich.	Yes, I do.
	So, steht wieder.	Ok, the pipe is back.
voicer	Also, überwältigend ist der Ton nicht.	Well, the tone is not very stunning.
	Das G ist gut jetzt aber.	But the G is ok now.
assistant	Dann mach' ich einfach noch mal.	So, I go on trying.
voicer	Äh, vielleicht kannst du mal eins machen: Dass du […] das Oberlabium rein machst und den Kern ein bisschen tiefer. Vielleicht, dass es ein wenig grundtöniger wird. Und so stark wie möglich halt. Also richtig unten aufschneiden.	Maybe you can try this: Put the […] Oberlabium inside and the core a litlle bit lower. Maybe this way it will be more sonorous. And as much as possible. Really cut it open [up?] at the bottom.
assistant	Ja.	Yes.
voicer	Das G finde ich doch ganz passabel.	I think, the G is rather ok.
assistant	So, die… sind rein.	Ok, the… are inside.
voicer	Wie?	Sorry?
	Da geht nicht noch mehr, gell?	You can't do more here, right?
	Also, mehr Wind kommt da nicht, gell?	So, more air isn't possible, right?
assistant	Also nicht durch den Schieber, und der Pfeifenfuß ist natürlich auch schon…	Well, not through the slide, and the foot of the pipe is also… too, of course.
	Geht auch nicht weiter.	Doesn't go more.
voicer	Also, das Pfeifenloch ist offen?	Well, the hole of the pipe is open?
assistant	Ja.	Yes.
voicer	Also, man müsste noch das Oberlabium einfach rein machen, sodass die Pfeife dunkler wird.	Well, one would just have to put in the upper lip, that the pipe [the sound] gets darker.
	Haßt du das Oberlabium jetzt rein gemacht?	Did you just put in the upper lip?
assistant	Ja. Den Kern ein bisschen tiefer.	Yes. The core a little bit down.

voicer	Joa, das ist ganz gut, aber das Oberlabium muss noch ein bisschen weiter rein.	Ok, that's pretty well, but the upper lip has to be a little bit more inside.
	Den Kern lässt du mal so.	You can leave the core like this.
assistant	Den Kern so lassen?	Leave the core like this?
voicer	Ja.	Yes.
assistant	Gut.	Ok.
voicer	Gut!	Good!
	Ich komme jetzt mal nach oben.	I'm coming upstairs now.
assistant	Ja.	Yes.
voicer	Aber, ich nehme an, das ist das Wichtigste jetzt gewesen. Schön, dass die in den Tiefen jetzt auch richtig gehen.	But I guess, that was more or less the most important thing now. Nice, that these low sounds now sound properly.
assistant	Dass was richtig geht?	What is working well?
voicer	Dass die richtig hörbar sind.	That they are really hearable now.
assistant	Ja.	Yes.

Appendix C3

Transcript of the dialogue heard in sound example 4

musician	Spielt schön.	It's nice to play.
voicer	Spiel doch mal was von Bach!	Play something by Bach!

The musician plays.

musician	Es hat… es hat eine schöne Brillianz, ne?	It has… it has a nice brilliance, doesn't it?
voicer	Ja, ja. Find ich auch. Ist im Bass schön klar…	Yes, yes. I think so, too. The bass is nicely clear…
musician	Ja.	Yes.
voicer	Also, bei dem Dupré… beziehungsweise bei dem… musste man als erstes ein 6-stimmiges Ricercar [undeutlich] spielen. Das war in [jeder] Stunde. [Lachen] 6-stimmig!	Well… with Dupré… or with… one had to play at first a 6-part Ricercar [indistinct]. That was in [every] lesson. [Laughter} 6-parts!
	Ist auch schön, wie es klingt hier.	It's nice, too, how it sounds here.
musician	Ja. Der Raum ist wunderbar.	Yes. The room is wonderful.
voicer	Sehr gut.	Very good.
musician	Find ich ganz toll.	I think it's awesome.
voicer	Also, die Oberlagen würde ich noch ein klein wenig… äh… dezenter machen.	Well, I would make the treble a little bit more… uh… discreet.
musician	Ja… hm…	Yes… hm…
voicer	Aber nicht viel.	But not much.
musician	Hm…	Hm…
voicer	Es muss schon eine gewisse… äh…	It needs a certain… hm…
musician	Es muss präsent sein.	It needs to be present.
voicer	… Firsche haben, auch, ja.	…freshness, also, yes.
musician	Ja.	Yes.

Appendix C4

Transcript of the dialogue heard in sound example 5

musician	Finde […] mit dem Schweller machen kann. … Hej!	I think […] what can be done with the swell. … Hey!
voicer	[…] Trompete vielleicht […] ganzen Oktave.	[…] Trumpet maybe […] whole octave.
musician	Wunderbar! Vor allem wenn geschlossen.	Wonderful! Especially with the closed.
voicer	Auch offen.	Open, as well.
musician	Ja, unglaublich. … Es klingt toll im Raum.	Yes, unbelievable. … It sounds great in the room.
voicer	Sollen wir dir mal das Pedal jetzt einmal… 16 und 8 geht jetzt.	Should we now the pedal… 16'and 8' working now.
musician	Das wär' natürlich toll, ja.	That would be great of course.
voicer	Claudius?	Claudius?
assistant	Ja?	Yes?
voicer	Kommst du mal?	Could you come?

The assistant goes upstairs.

musician	Die Trompete ist ausgebaut bis c4, oder?	The Trumpet reaches until C4, doesn't it?
voicer	Bist du… Nee, bis f.	Are you… No, until F.
musician	Nur bis f. Find ich aber…	Only until F. But I think…
voicer	Sonst ist es so, dass… die verstimmen sich zu schnell.	Otherwise it is like that… they get out of tune too fast.
musician	Naja, das g wäre schon gut, ne…	Well, the G would be good, right…
voicer	Ja gut, dann kann ich die ja dazu machen.	Yes, ok, then I can add that one.
musician	In […] ist das so.	In […] it is like that.
voicer	Also g geht noch.	Well, G is still possible.

The musician plays the pedal.

voicer	Es kann sein… Ähm, Hans-Ola, es kann sein, dass da jetzt zwei Pfeifen fehlen, da.	It could be… Uh, Hans-Ola, it could be that two pipes are missing.
musician	Ah ja. [spielt] Schön.	Ah, yes. [plays] Nice.

The musician plays.

voicer	Sollen wir den anderen […]? [Pause] Sag mal das Plenum…	Should we the other […]? [Break] say, the plenum…
musician	Welches Plenum?	Which plenum?
voicer	Im Oberwerk: … Mixtur und Cimbel. [Pause] Sag mal, Claudius, mit dem Prinzipal […] 4 Fuß, 2 Fuß, dann das Gedackt vielleicht dazu… und Mixtur. [Pause] Hans-Ola, rufst du ihm zu, so biss'l?	In the Oberwerk: … Mixture and Cimbel. Say, Claudius, with the principal […] 4', 2', then add the Gedackt maybe… and mixture. [Break] Hans-Ola, are you gonna tell him a bit?
musician	Wie bitte?	Excuse me?
voicer	Rufst du ihm zu?	Are you gonna tell him?
musician	Ja, ja. [Pause] Also, Trompete weg…	Yes, yes, [Break] So, Trumpet away…
assistant	Ja.	Yes.
musician	… und dann noch den [Prinzipal].	… and then the [Principal].
voicer	Vielleicht können wir… äh… Hans-Ola, vielleicht kan man im Schwellwerk mal den Diaposon…	Maybe we can… uh… Hans-Ola, maybe one can add the diaposon in the Swell…
musician	Ja, aber der ist schon drin.	Yes, but it is already there.
voicer	Ist der drin?	It's already there?

The musician plays.

musician	Klingt schön. Spricht sehr gut, da, ne?	Sounds nice. [Break] Speaks very well, there, doesn't it?
voicer	Ist ziemlich direkt. … man sollte mal, Claudius, mach doch jetzt mal oben die Kiste auf.	It's quite direct. … One should, Claudius, can you open the box up there?
assistant	Ok.	Ok.
musician	Meinst Du die Türen?	Do you mean the shutters?
assistant	Ja.	Yes.

voicer	Vielleicht kann man die Trompete jetzt mal rausnehmen. […] wie das klingt.	Maybe one can take out the trumpet for now […] how it sounds.
musician	Sind die Türen auf?	Are the doors open?
assistant	Ja, ich muss noch die Trompete rausnehmen.	Yes, I still have to take out the Trumpet.
voicer	Vielleicht kann man die Trompete jetzt mal rausnehmen. [Tür geht zu]	Maybe one can take the trumpet for now. [Door closes]
assistant	Ja.	Yes.

The musician plays.

voicer	Es bringt wirklich enorm.	It does really enormously.
musician	Ja… Aber es auch ein ganz anderer effekt. Man kann doch mit den Schwelltüren auch arbeiten.	Yes… But it also an totally different effect. One can work with the swell-doors.
voicer	Ja, da kann man noch was dazu machen.	Yes, one can add something.
musician	Ganz andere Schattierungen, ne?	Totally different shades, right?
voicer	Ja.	Yes.
musician	Mit den offenen Türen.	With the open doors.
voicer	Ja. [Pause] Willst du noch mal paar Flöten für den Hans?	Yes. [Break] Do you want some flutes for Hans [visiting musician]?
musician	Ja.	Yes.
voicer	Claudius? Vielleicht im Schwellwerk die Flute traversiére…	Claudius? Maybe the Flute traversiére in the Swell…
assistant	Ja.	Yes.
voicer	…und im Oberwerk die Konzertflöte… und im ersten Manual Flute harmonique. … Und vielleicht, wenn du oben wieder zumachst, das Oberwerk.	…and in the Oberwerk the Konzertflöte… and in the first manual Flute harmonique. … And maybe, if you close up there again, the Oberwerk.
musician	[Lacht]	[laughs]
voicer	Er ist beschäftigt. [Lacht]	He is busy. [Laughs]
musician	Sag Bescheid, wenn Du fertig bist.	Tell me, when you are done.
assistant	Ja. Auf der Stelle kannst du spielen… Ja.	Yes. You can play straightaway… Yes.

musician	Sehr schön. Die Konzertflöte ist wunderbar.	Very nice. The Konzertflöte is wonderful.

The musician plays.

voicer	Alle drei, so wie es zusammenpasst… Und mach jetzt nach mal im Schwellwerk Gambe und Voix celeste…	All three, how it matches together… And do now Gambe and Voix céleste in the swell…
assistant	Ok.	Ok.
musician	Hej! Fernbediehnung.	Hey! Remote!
assistant	Nee, das ist noch altmodisch. Wir arbeiten nicht elektronisch.	No, it's still old-fashioned. We don't work electronic.
musician	Also, ich finde wir machen kein Kombinationssystem. Es macht viel mehr Spaß…	Well, I think we don't put a combination system. It's much more fun…
voicer	Macht viel mehr Spaß! [Lacht]	It's much more fun! [laughs]
musician	Ja.	Yes.
voicer	Auf Zuruf! … Auf Zuruf… ist auch viel billiger! [Lacht]	On my call! … On my call… it's much cheaper, too! [laughs]
musician	Gemau. Viel billiger.	Exactly. Much cheaper
assistant	Hm.	Hm.

The musician plays.

Appendix C5

Transcript of the dialogue/interview with Gerald Woehl (excerpts).
Potsdam, 17 February 2014.

Vielleicht kann ich damit anfangen, zu Beginn unseres Gesprächs, dass ich an den Punkten der „Kunst des Intonierens“ interessiert bin. Das ist die Richtung, die ich gern mit Dir einschlagen möchte und das ist auch der Inhalt dieses Forschungsprojekts. Es gibt viele technische Details, aber ich wünsche mir, das wir über Aspekte Deiner Kunst reden können. [...] Was würdest Du selbst als künstlerisch bei der Intonation bezeichnen?

Man muss natürlich relativ genau wissen, was man möchte. Ähnlich, wie bei einem Stück: Wenn ich ein Stück spiele, kann ich natürlich Töne spielen, aber ich muss wissen, was das Wesentliche vom Stück ist. Genauso ist es bei der Orgel. Das erste, worüber man sich klar werden muss, ist, was soll die Orgel vom Wesen her können. Was ist die wichtigste Musik, die auf der Orgel gespielt werden soll. Da gibt es genaue Definitionen. Letztendlich kann man auf einer Orgel natürlich alles spielen. Aber sagen wir mal so: Eine Orgel ist von dem geprägt, was man in sie hineingibt. […] Man muss sozusagen, wenn man Klänge gestaltet, sich vorher [alles] ganz genau klar machen. Man muss aus den Pfeifen, welche man später reinstellt, etwas machen [Lachen]. Die klangliche Ausarbeitung mache ich immer hier in Potsdam. Die macht man genauso, wie Musiker es für sich machen. Wenn [man eine Oper aufführt], dann [ist man] Wochen vorher damit beschäftigt. […] Genauso ist es bei der Orgel. In diesem Fall ist es extrem, weil man schlecht etwas ändern kann. Wenn die Pfeife einmal gebaut ist, ist sie gebaut. Deswegen ist es sehr wichtig, dass das Klangkonzept sehr gut vorbereitet ist. Es geht es um wichtige Dinge, z.B. wie das Labium geformt ist, wie stark der Kern ist, wie schräg der Kern ist, wie dick die Materialstärke ist. Es gibt viele Dinge, bei denen man an der Pfeife etwas machen kann. Je näher man dran ist, desto besser wird das Ergebnis. Eigentlich muss es so sein: Wenn bei einer Pfeife der Windruck und alles weitere bestimmt ist, sprich, wenn man anfängt zu intonieren, muss alles ziemlich stimmen. […]

Bei uns mache ich für jede Orgel ein neues Klangkonzept. Das ist für andere Firmen, wie z.B. für die Firma Klais, schwieriger. Die kann nicht für jede Orgel ein eigenes Klangkonzept machen. So klingen diese relativ ähnlich. Eine Klais-Orgel klingt eben wie eine Klais-Orgel oder eine Jäger-Orgel klingt wie eine Jäger-Orgel. Aber ich denke unsere Orgeln sind doch sehr verschieden. Wenn man Oppenheim, Leipzig Thomaskirche, dann München Herz-Jesu, Piteå usw. vergleicht, dann ist jedes Instrument anders. […]

Hier [in Piteå] haben wir den Raum nochmal umgebaut, bevor wir angefangen haben. — so, dass wir alles wirklich gut platzieren konnten. Man muss schon sagen, das war toll! Man kommt und sagt: Die günstigsten Bedingungen sind, wenn es so und so ist. Die Antwort ist: Wir machen das. [Lachen] Normalerweise ist der Instrumentenbauer derjenige, der immer mit der Situation zurechtkommen muss. Genauso wie der Musiker. Er kann nicht sagen, ich spiele hier nicht, weil die Orgel so schlecht ist oder weil der Raum nicht

gut genug ist. Aber in Piteå war es schon ganz besonders, dass man noch sagen konnte, wie es am günstigsten ist.

Diese Aufstellung der Orgel [in Piteå] ist ideal: Wie das Hauptwerk steht, wie das Positiv oben steht – zur Decke hin, dass die Decke eine gewisse Abstrahlung hat, dass das Schwellwerk im Hintergrund ist und dass das Solo oben auf der ganzen Orgel aufliegt und nicht in den Ohren ist, sondern als große Stimme durchkommt. Und wie das Pedal aufgestellt ist. Das waren idealste Verhältnisse. […]

Gerald, du wurdest 1940 in Villach geboren. Dein Vater war Musiklehrer, ein Kapellmeister… und wie ich es verstanden habe, wurde viel Hausmusik in Deiner Kindheit gemacht. Du hast z.B. Viola gespielt. Doch zu irgendeinem Zeitpunkt in Deinem Leben, hast Du entschieden Orgeln zu bauen. Wie kannst Du diese beiden Dinge aus heutiger Sicht verbinden: Ein Musikinstrument zu spielen und dann eines zu bauen… bzw. von den technischen Aspekten eines Instruments fasziniert zu sein? Wie gingen diese Interessen überein?

Also Orgelbau hat mich schon immer fasziniert: Wenn mein Vater Orgel gespielt hat, wenn die Bälge so runter gingen – daran kann ich mich noch erinnern. Und die Traktur so gelaufen ist. Davon war ich fasziniert. Meine Mutter, wie soll ich sagen, das gibt es eigentlich nicht..., aber ich finde sie war unmusikalisch. [Lachen] Aber sie war technisch wahnsinnig begabt. Sie hat alle Möbel gemacht, mein Vater konnte gar nichts machen, der konnte keinen Nagel in die Wand schlagen, gar nichts. Handwerklich konnte er wirklich nichts. Meine Mutter war technisch wirklich sehr gut. Sie hat alle Arbeiten, die so im Haus zu erledigen sind, gemacht, hat alles renoviert, Schränke gebaut. Vielleicht bin ich eher meiner Mutter nach geraten. Ich war ihr Lieblingssohn – das war schlimm. Ich war meiner Mutter näher, mich hat mehr die Technik interessiert. Meine Brüder waren alle musikalischer als ich. […]

Mein Vater hatte Kontakt zu Orgelbauern, doch ein springender Punkt war, dass ich von zu Hause kam. Es war schön zu Hause, aber: Weg! Raus! Alles, was ich so hätte machen können, ich hatte verschiedene Dinge mal so überlegt, ich wollte mal Koch werden, hätte ich dann irgendwo in der Nähe machen müssen. Orgelbau, ach, da ist jemand ganz weit weg. Das war auch ein Gesichtspunkt, sich selbständig machen. Ich habe erst in Deutschland angefangen zu lernen, bin dann nach Frankreich gegangen – möglichst weit weg. Hin und wieder bin ich nach Hause gekommen, habe noch Musik gemacht und so. Aber eigentlich war mein Wunsch etwas Eigenes.

Deine ersten Erfahrungen im Orgelbau hattest Du in einer kleinen Werkstatt in Karlsruhe, südwestlich in Deutschland. 1960 bist Du nach Boulay gegangen, um mit Walter Haerpfer zu lernen. Dies war die wichtigste Zeit für Deine künstlerische Entwicklung. Du hast sogar Haerpfer erwähnt, als wir zusammen im Studio Acusticum gearbeitet haben. Kannst Du einige der Aspekte nennen, die für Dich zur Ausbildung als Intonateur am wichtigsten sind? Wie war es, mit Haerpfer das Intonieren zu lernen?

Sagen wir so, das war natürlich anders als in Deutschland. [kleine Pause] Erstens hat er mich nicht wie einen Lehrling behandelt, er hat mich wirklich als Menschen behandelt. Das war mir sehr wichtig. Ich war gleichberechtigt. Er hat zwar gesagt, wo es langgeht, aber

das war alles viel, viel lockerer als in Deutschland. Ich saß viel im Cafe [Lachen]; gutes Essen war das Wichtigste. [Lachen]

Das ist gut, ja… [Lachen]

Wenn das schon mal stimmt, ist es schon viel [wert]. Eins muss ich auch sagen – und das sage ich jetzt ganz bewusst: Ich würde nicht so gut Orgel bauen können, wenn ich nicht wüsste, wie gut Essen ist. Das ist genauso wichtig, das sinnliche Essen. Das bezieht sich ja nicht nur auf Musik. Essen und Trinken, also guter Wein usw., das ist schon eine wichtige Geschichte. […]

Es war eine große Firma. Wir waren ca. 40 Leute. Er [Haerpfer] hat mir alles gezeigt, wie man es macht. Wir hatten natürlich einen Dom Bédos, ein französisches Standardwerk über Orgelbau. Ein sehr gutes. Wir haben immer nach diesem Buch gearbeitet, auch wenn wir mal elektrische Orgeln gemacht haben. Das Bewusstsein war immer Cavaillé-Coll, aber dennoch der klassische Orgelbau. Er [Haerpfer] wusste sehr genau, wie man Mixturen baur und zeigte mir alles.

D.h., welche Punkte würdest Du für einen Orgelbauer als wesentlich bezeichnen, um ein guter Intonatuer zu werden? Was macht einen guten Intonateur aus, was macht ihn zu einem guten Künstler?

[…] Es ist so… es müssen einen als Menschen Klänge interessieren. Das ist vielleicht oft nicht ganz einfach. Ich liebe besonders Mahler. Vor 2 oder 3 Jahren sind in Berlin alle Mahlerkompositionen aufgeführt worden. Wenn man da als Intonateur hingeht, wenn ich mich jetzt mal so nennen darf, dann hört man die Musik sehr intensiv, weil man diese Klänge, egal ob es nun Orgel oder Orchester ist, extrem stark aufnimmt. Besonders bei Mahler würde ich sagen, denn da kommen diese exzellenten Soli in Streichern, Hörnern, Bläsern usw. Das ist für mich eine Situation, in der ich Ideen für Klänge bekomme. Wie müssen Klänge klingen, damit sie einen ansprechen? Damit es nicht ein Ton ist, den man eben so macht, sondern dass er einem in die Seele geht. Das ist das Entscheidende. Und… [kleine Pause] Ich weiß es nicht genau. [kleine Pause] Man muss alles aufnehmen. Ob es nun Geräusche sind oder sonst irgendetwas. Das sind ja auch Klänge. Vielleicht, wie man diese beiden Dinge in ein Gleichgewicht bringt. Es muss so sein, dass in einer Orgel starke Stimmen, leise Stimmen und poetische Stimmen, aber auch hässliche Stimmen vorhanden sind. So eine Bombarde [imitiert Geräusch], die haut einfach nur rein. Auch so ein Krummhorn, in der tiefen Lage, das sind nicht gerade schöne Töne – kann man nicht sagen. Ich glaube, wichtig ist – oder einen guten Intonateur macht aus – wenn er das ganze künstlerische Spektrum irgendwie ausfüllt. Egal, ob es schön ist. Es gibt schöne Orgeln, die sind aber auch oft langweilig. Schön ist nicht unbedingt künstlerisch – würde ich sagen. Das ist, glaube ich, das Wichtigste, was einen Intonateur ausmacht, dass er – das ist eigentlich schon fast ein Abschlusswort – eine Harmonie in das ganze Instrument hineinbringt. Das muss jetzt nicht schön sein, aber es muss eben alles dabei sein. Jeder Mensch soll sich in einer bestimmten Stimmung, in der er sich gerade befindet, wiederfinden. Das ist das Beste. Und es muss auch so sein, dass ein gutes Instrument bei jedem Organisten irgendwie anders klingt. Je extremer die Orgel sein kann,

umso besser ist sie. Das macht einen guten Intonateur aus: Wenn er extremste Dinge in eine Sache hineinbringt. Ist ja beim Spielen genauso. Gar nicht anders. [Lachen]

Aber als Intonateur hört man natürlich alles… Alle Klänge muss man filtern und die wichtigen muss man behalten. […]

Es gibt noch etwas, was man als Intonateur können sollte: Man muss sich ein Klanggerüst aufbauen – es in sich haben. Ein Kunsthistoriker muss die Jahreszahlen genau definieren können: Um 1770 hat das stattgefunden. Da war das und das und das. So ist es auch bei einem guten Intonateur. Er muss gute Klänge gespeichert haben. […] Was mir eben damals [in der Lehre in Frankreich] aufgefallen ist, das ist ja auch bei guter Musik so, bei Alain z.B., es gibt wunderbare Klänge, die auch hässlich sein können. Bei Messian ist das extrem. Für mich ist Messian bis jetzt das Beste. Er hat das Spektrum am weitesten ausgebreitet. Es kann nicht übertroffen werden.

Ich bin an einigen Punkten interessiert, die mit dem Bau und dem Intonieren einer Orgel im Zusammenhang stehen. Generell sollten die gewählten Maße, Proportionen der Pfeifen diejenigen sein, welche zu Raum und Standort der Orgel passen, damit es nicht zu laut oder schwach wird. Es gibt mit Sicherheit mathematische Wege diese Zusammenhänge zu berechnen, aber ich bin neugierig über deine ersten Gedanken als Intonateur, wenn Du zum ersten Mal den Raum betrittst, wo Du die Orgel bauen wirst. Wenn Du den Raum betrittst, hast Du dann schon eine Idee über den Klang, der zum Raum passt? Wie ist das?

[Stille, Seufzer] Oft geht es ganz schnell, ja. [Lachen] Man geht in die Kirche rein und weiß, was man zu tun hat. Oft ist es aber auch so, dass es länger dauern kann. Ich glaube, ich muss mal ein Beispiel [geben]: Der Hans-Ola hat letztes Jahr, oder vor zwei Jahren oder vor anderthalb Jahren, eine kleine Orgel eingeweiht, in Frankfurt, die finde ich sensationell. Und das war auch der richtige Mann, der das einweihen konnte. Da war es so: Es ist ein relativ kleiner Raum, auch eine kleine Orgel, eine meiner Lieblingsorgeln. Das hat nichts mit Größe zu tun, ob eine Orgel gut oder schlecht oder sehr gut ist. Das hat gar nichts mit der Größe zu tun. Dies ist eine gute Orgel, das kann ich sagen. Da war es so: Das ist in Frankfurt... eine Stadt, da müssen die Bäume von oben nach unten wachsen um überhaupt aufzufallen – und mit der Kirche ist es ähnlich. Die nennt sich nicht Kirche, sondern das ist eine Klangkirche. Keine Kirche sondern eine Klangkirche. Und ich hab gedacht, wenn das eine Klangkirche ist, dann muss man im Klang sitzen, wenn man die Orgel hört. Man muss sozusagen im Klang sein und selbst Klang sein. Das hatte ich gleich, als ich rein kam. Das wird eine Orgel, wo man sozusagen drin sitzt. Das ging ganz schnell. […]

Wenn Du eine neugebaute Orgel intonierst, wie diese in Studio Acusticum, ist die regelmäßige Anwesenheit eines Musikers etwas sehr wichtiges für die Intonation? Oder glaubst Du, dass die Intonation auch eine gute Chance hat erfolgreich zu sein, wenn gar kein Musiker oder Musik involviert ist? Einfach gesagt, worin liegt eigentlich die Bedeutung, dass Musik während des Intonationsprozesses einer Orgel gespielt wird?

Sagen wir mal so: Ich hatte irgendwie das Glück, dass immer gute Organisten da waren. [Lachen] Ich kenne keine Orgel, wo ich nicht einen guten Organisten hatte…

Hm… Lass mich etwas dazu ergänzen. Der für mich faszinierendste Punkt, als Musiker, war, in einem Prozess involviert sein, bei dem ich nicht wusste, was Du eigentlich in den Klängen hören möchtest. Wenn ich am Spieltisch gesessen habe und z.B. mit dem Prinzipal 8 gespielt habe, sagtest Du nur: „Spiel ein bisschen". Für mich stellte sich dann die Frage: Was möchte Gerald hören? Möchte er wissen, wie das Register in einem bestimmten Bereich klingt? Möchte er irgendetwas anderes bestimmtes hören? Möchte er die Ansprache hören? Möchte er die Farbe hören? Wie soll ich das angehen als Musiker? Wonach suchst Du, wenn Du nach Musik fragst?

> […] Es geht ja nicht darum, dass man in dieser Situation Literatur hört. […] Das geht ja sowieso nicht. Also einen Bach, einen großen Bach kann man sowieso nicht auf einem Prinzipal 8' spielen […]. Es muss einfach so gespielt werden, meine ich, dass man in die Töne hinein hören kann. Das ist das Wichtige. Das kann improvisiert sein. […] Ich spiele ja auch so ein klein wenig Orgel. Ganz wenig. [Lachen] Aber für mich ist es wichtig, dass ich immer das gleiche Stück spiele. Weil ich dann genau höre, wie es sein muss. Es ist so eine Richtschnur. Weswegen ich auch sage, ein Orgelbauer muss nicht Orgel spielen können. Er muss ein paar Stücke können, doch muss er diese genau analys[ieren] können. Er muss klanglich hören, was da drin passiert. Ich behaupte sogar, vielleicht gibt es ein paar Ausnahmen, die Orgelbauer, die gut Orgel spielen können, bauen meist schlechte Instrumente. Die Erfahrung habe ich gemacht. Die spielen sich ihre Musik zurecht, ihre Orgel zurecht und es wird nicht individuell genug. Die bauen sich ihre Orgel, aber niemand anders kann da drauf spielen. Es hilft nichts. Die Orgel muss so gemacht werden, dass sie bei 100 Organisten 100 Mal verschieden klingt. Das ist die beste Orgel. Und auch der Simon Buser spielt eigentlich immer das Gleiche, wenn er mir vorspielt. [Lachen] Ich hab jetzt noch gar nicht so drüber nachgedacht. Aber wenn ich so nachdenke, was er spielt, oder auch der Jinsuk [Song], mit dem hab ich jetzt viel intoniert, haben sie immer das Gleiche gespielt. Das fand ich toll [Lachen]. So, dass ein bisschen Harmonik ist und das man spüren kann. Also wichtig ist ja, wenn man hier oben einen Ton hat, dass dieser hörbar wird. Also nicht nur, dass er lauter ist oder so, aber dass der besonders klingt. Wenn man so eng spielt, klingt es gleich. Aber in dem Moment, wenn man dann in verschiedenen Lagen oder abwärts spielt… – das ist es eigentlich! Man muss eigentlich nur so spielen, dass man Töne besonders hören kann. Natürlich ist es schön, wenn man mal was Richtiges hört. Ein Plenumstück. Das ist klar, das muss man natürlich auch. Aber zum Intonieren selber, würde ich sagen, muss man nicht Literatur spielen. Eigentlich so: Man braucht einen Organisten, der nicht seine Musik spielt, sondern Musik für Töne.

Was meinst Du mit „Musik für Töne"? Würdest Du sagen, dass es am besten ist vokal zu spielen? Möchtest Du die Klänge in einem, sagen wir, mehr vokalen Zusammenhang hören?

> Ja… Ich muss sagen, der Jinsuk, er kann das sehr gut spielen. Er ist Asiate und spielt so ganz, ganz sinnlich. Er kann wirklich sehr gut vorspielen. […] Man muss hören, wodurch der [Ton] hörbar ist. Ist er in der Stärke richtig? Einen Ton kann man verschieden gestalten: Man kann ihn hier unten gestalten, dass er in sich klingt [Geste: Hände vor dem Bauch]. Man kann ihn so gestalten, dass er frei klingt [Geste: offene Hände unter dem Kinn], man

kann ihn so gestalten, dass er wie eine Kopfstimme ist [Geste: Hände über dem Kopf]. Das ist alles möglich. Es ist wichtig herauszufinden, wie sich die Töne in verschiedenen Lagen verhalten… also, dass man sie hört und dass sie frei sind. Dass man sagen kann: Der Ton, egal, was man spielt, ist immer hörbar. […]

Das Wichtigste ist vielleicht, dass ein Intonateur singen kann. Ich empfehle jedem, der irgendwie intonieren will, eine Gesangsausbildung zu machen. Er muss nicht Profisingen, nur wissen, was mache ich… was mache ich, damit die Stimme nach vorn kommt oder ob sie hinten bleibt. Das braucht man. Man braucht eine Stimme, die durchaus mehr im Körper sing In den verschiedenen Lagen ist es wichtig, dass sich der Ton ändert. Bei der Orgel um 1900 hat man versucht, jeden Ton irgendwie gleich zu machen. Das ist der Tod. […] Je gleichmäßiger man es hinkriegt, je schlimmer ist es.

Was glaubst Du ist der Unterschied zwischen dem Zuhören während des Intonations-Prozesses – wenn Du eigentlich intonierst – und dem Zuhören, wenn ein Musiker die eben intonierten Töne/Klänge spielt? Hörst Du in diesen beiden Situationen unterschiedlich zu? Suchst Du nach verschiedenen Sachen in diesen beiden verschiedenen Situationen?

[…] Wie sagt man? Erstens muss man konzentriert sein beim Intonieren, denn man muss die ganze Klaviatur im Ohr haben. Man muss wissen, wie klingt es unten, man kennt die Töne oben usw. Es braucht eine gewisse Konzentration, ein ganzes Register zu erfassen. Wenn man intoniert, dann dringt man in den Ton hinein, man hört in den Ton hinein und wenn man zuhört, wenn einer spielt, ist es genau umgekehrt: Was kommt aus dem Ton raus. Erst versucht man in den Ton hineinzukommen und dann schaut man, was man da drin gearbeitet hat, was da jetzt rauskommt. Das ist genau das Gegenteil. Und schließlich schaut und hört man, was jetzt noch geschehen muss: Ist der Druck zu stark? Oder was man im Gesamten machen muss. Ich meine, das ist völlig verschiedenes Hören.

Hm… das ist interessant. Kann ich kurz fragen: Worauf konzentrierst Du Dich tatsächlich in dem Ton? Was heißt es, im Ton zu sein? Wonach suchst Du… im Ton?

[Lachen] Oh… Das ist schwer…

Ok, sagen wir es so: Was glaubst Du, was einen guten Ton ausmacht?

[Pause] Ich fange von außen her an: Es gibt Intonateure, die nur von außen hören. Die hören sich das Register an und handeln dann danach. Die hören gar nicht hinein, sondern die intonieren von außen. Was kommt auf mich zu? Was muss ich noch machen? So, wie wenn ich mich im Spiegel anschaue – das noch machen, jenes noch machen usw. Es ist etwas anderes, wenn ich in den Ton hineinhöre… tja… [Lange Pause] Also ich hab ja schon vorhin gesagt, man kann einen Ton so gestalten, dass er in der Pfeife bleibt. Man kann ihn nach vorn bringen, man kann ihm eine Kopfstimme machen. Das kann man alles mit dem Ton machen, also mit Intonation. […]

Ich glaube, das kann auch der Claudius bestätigen, dass ich unwahrscheinlich viel mit dem Kern arbeite. Bei mir wird immer der Kern rauf und runter geklopft und zwar nur winzigst! Wenn man einmal draufklopft, ist es schon zu viel. Mit dem Kern verändert man, wie sich der Ton äußert. Und ich meine, das ist das Wichtigste. Also für mich ist es das

Wichtigste, dass der Ton wie gesungen ist. Er darf nicht gepresst sein, er muss sich völlig frei entfalten können. Wie bei einem Sänger, wenn er presst oder wenn er völlig frei singt. Ich glaube, das ist das Wesentliche, dass man das erkennt. Dass wirklich das rauskommt, was in dem Ton steckt und nicht versucht die Fassade zu ändern. Man kann die Fassade ändern, macht die Pfeifen irgendwie sprechend und glättet und schminkt sie nachträglich. Also das ist nicht das Wahre. Man muss doch tiefer gehen. Mir kommt es nicht auf die Lautstärke an; da ist ein Ton mal ein bisschen stärker. Das ist ja beim Chor auch so: […] da singt einer ein bisschen lauter, einer ein bisschen leiser, das ist ganz natürlich. Einer hat eine tolle Stimme, einer hat eine magere Stimme usw. Aber was wirklich auffällt, ist, wenn einer presst. Wenn einer so… hier… [Hände vorm Bauch} presst und die Stimme ist fest, das fällt aus dem ganzen Chor raus. Ob einer laut singt oder leise, das ist nicht das Entscheidende. Und das versuche ich auch. Das ist das Wesentliche, woran ich immer arbeite. Ich würde sagen, je besser die Orgel ist, umso leichter spricht sie. Zum Beispiel [Gustav] Leonhardt, ist dir vielleicht ein Begriff, so der Guru unter den Cembalospielern, den hab ich mal gefragt, wie er beurteilt, was ein gutes Instrument ist. Und da hat er geantwortet: Das muss alleine spielen. Da hat er recht. Es ist ein Unterschied, ob ich an eine Orgel komme und ich muss da dran arbeiten. Es gibt Orgeln, da muss man richtig arbeiten und es gibt Orgeln, da fasst man drauf, da ist alles da. Das ist, glaube ich, die Sache mit dem In-den-Ton-hineinhören. Wenn ich nur an einer Fassade arbeite, dann habe ich die Leute die pressen, nicht abgefangen. Dann mache ich es nur eben. Aber wenn man es so macht, dass jeder Ton frei spricht, dann spielt es keine Rolle, ob einer bisschen lauter oder leiser ist. Ich arbeite nicht so sehr an der Lautstärke – da gibt es immer Töne, die ein bisschen lauter sind. Das stört mich gar nicht. Und jemand anderen fällt es auch nicht auf, weil das nicht das Kriterium ist. Das Kriterium ist, dass der Ton so leicht wie möglich und so frei wie möglich anspricht.

Ich verstehe… eine andere Frage: Nehmen wir zum Beispiel einmal den Prinzipal 8. Gibt es eine bestimmte Art und Weise, wie sich die Klänge innerhalb eines Register entwickeln, also von Bass, Tenor, bis Sopran. Da gibt es Veränderungen im Vokal, bestimmte crescendi, kleinste Unterschiede in der Beschaffenheit. Du verstehst, was ich meine? [Singt ein Beispiel] Hast Du einen standardisierten Weg dafür oder hängt das sehr von Orgel und Raum ab?

Ich würde es nicht standardisiert nennen, aber es gibt einfach Register, bei denen man sagt, das muss so sein, damit die Musik danach klingt. Extrem ist es z.B. bei der flute harmonique. Im Bass ist sie relativ durchsichtig und fast hell, wird dann immer dunkler und immer trauriger und im Diskant ist sie ein bisschen melancholisch. Ja, was eben so ein romantisches Stück haben muss. Melancholik ist ein wichtiges Element, das in der Romantik eine Rolle spielt.

Oder z.B. die flute traversier, sie ist ganz anders: Sie muss im Bass relativ hell sein, aber im Diskant eine Soloflöte sein. Da gibt es natürlich Register, wo ungefähr das rauskommen muss, was drauf steht, wenn der Organist sie zieht. Man kann jetzt nicht irgendwie einen Prinzipal haben und dann klingt es völlig anders. Da gibt es schon eine gewisse Regeln. Aber für diese Regeln gibt es natürlich viele Unregelmäßigkeiten. Das ist ja gerade das Spannende: Wenn bei jedem Stück das Register anders klingt oder wenn jemand anderes auf dem Register spielt, klingt es nochmal anders. Darin sehe ich den

Reiz. Natürlich sind die Register nach einem bestimmten Schema ange[legt]. Aber sie müssen intonell ausgearbeitet sein. Das ist klar. Doch sagen wir so, die Tendenz ist immer vorgegeben. Auch bei den Prinzipalen. Als ich begonnen habe Orgeln zu bauen, also selber Orgeln zu bauen, da hab ich mir immer eine Grafik gemacht, wie so ein Klang auszuschauen hat. Das kann man sich aufzeichnen. Man sagt so schön, es gibt eine Normalmensur. Sprich, eine Standardmensur. Durch die Abweichungen zur Standardmensur kann man sehen, was man haben will: Ob die Register in einer bestimmten Lage mehr vokal oder in einer höheren \lage flötiger sein sollen – das, was du sagtest. Das gestaltet man immer von sich aus. Aber es muss immer ein Prinzipal bleiben. Ganz logisch. Es ist also ganz bewusst. Heute muss ich das nicht mehr aufzeichnen, weil ich das jetzt verinnerlicht habe. Doch wenn man anfängt, [Lachen] muss man sich das irgendwann klar machen. Wo will ich eine Stelle vokal haben, wo will ich sie gesanglich haben und wo will ich sie ein bisschen kernig haben. Sich diese Dinge aufzuzeichnen ist eine große Hilfe.

Da gibt es also ein Konzept, einen Ausgangspunkt , von dem aus der Intonateur es ein wenig nach seinem Geschmack gestaltet. […] Jetzt eine sehr, sehr interessante Frage [Lachen]… Ich habe bemerkt, dass Du Deine Schuhe beim Intonieren ausziehst, vor allem wenn Du aus dem Raum intonierst. Möchtest Du etwas mehr darüber verraten? Nun, es gibt einige Spekulationen, aber ich bin neugierig, was Du dazu sagst.

[Lachen] […] Also ich behaupte, dass man durch die Füße hört. Ich habe einen liebe Freundin, Bekannte, sie ist Pfarrerin, sie zieht sich immer bei der Predigt die Schuhe aus.

Ah! Das ist interessant…

Jetzt hab ich es nicht gemacht, weil du dabei bist [Lachen]. Aber wenn ich in die Oper gehe, ziehe ich mir immer die Schuhe aus. Dann höre ich besser. [Stille]

Du sagtest mal, eines der Geheimnisse des Intonierens sei zu wissen, wann man aufhören muss: Einige Töne in einem Register sind in höchster Qualität intoniert, andere weniger. Dabei hast Du Dich auf die französischen Orgelbauer bezogen, was sie in der Vergangenheit gemacht haben, im letzten Jahrhundert vielleicht… Im Vergleich dazu, haben die deutschen Orgelbauer durch das gesamte Register allen Tönen die gleiche Qualität verliehen. Wann weißt Du, dass Du aufhören musst ein Register zu intonieren? Berücksichtigst Du dabei etwas… wie, z.B., das etwas unfertig bleibt?

Das ist schwer zu sagen. Aber ich glaube schon, das Wichtigste ist, dass man weiß, wann man aufhören muss. Das ist ja beim Bild genau so. Da weiß man, dass es fertig ist, obwohl der Außenstehende es schwerlich irgendwie feststellen kann, ob das Bild fertig ist oder nicht. Es ist so, dass sich nach einigen Jahren die Orgel nicht mehr verändert. Gut, da kann man vielleicht noch Verbesserungen in der Ansprache machen oder rein technische Sachen. Aber richtig verändern kann man das nicht. Ich habe jetzt ein wirklich großes Problem in dem letzten Jahr gehabt. Das war bei einer großen Orgel: Da wurde die Kirche grundlegend saniert, es kam ein neuer Anstrich an die Wände, neuer Fußboden rein und der Fußboden wurde tiefer gelegt. Also es war eine völlig andere Akustik und ich muss

sagen, ich hab mich noch nie so schwer getan, wie an dieser Orgel. Ich bin auch jetzt immer noch nicht ganz fertig. Also einen Klang zu verändern, das ist schwierig muss ich sagen. Ich hab einfach gemerkt, dass es jetzt einfach völlig anders ist. Vorher war es so, die Kirche hatte einen Holzboden drin, das hat relativ schlecht getragen, da waren so große Bänke drin… Man kann sagen, es war alles schlecht. Jetzt ist es so, dass es natürlich erheblich besser ist, man kann sagen: gut. Die Orgel steht nicht in der allergünstigen Ecke, aber es ging da nicht anders und ich bin mit dem Orgelsachverständigen im Streit. Das ist so ein älterer Orgelsachverständiger und er will mich zwingen, die Orgel gleichmäßiger zu machen. Also wirklich vom Charakter her zu ändern, was ich gar nicht vertreten kann. Also das ist ein großer Raum, der auch eine gewisse Sprache braucht. Da bin ich jetzt gespannt, wie das ausgeht. [Lachen]. […] Doch ich hab gesagt, wenn ich jetzt mehr mache, wird die Orgel tot. Und das kann ich gar nicht verantworten. […]

Wann hört man auf, das muss man gut im Gefühl haben. Ich mache es immer so, dass ich die ersten Jahre selber noch zu der Inspektion fahre. Also jetzt war ich nochmal so drei Wochen in Piteå zum Beispiel. Habe alle Register noch mal bearbeitet, doch nicht geändert. Ich habe einfach nur, wo sich die Pfeifen verändert haben, diese wieder so hergestellt, dass sie wieder in der richtigen Reihe stehen. Aber geändert habe ich gar nichts. Wenn die Orgel nicht so weit weg ist, gehe ich auch meistens zu allen Konzerten, höre mir die Konzerte an, die verschiedenen Organisten usw. Höre mir an, ob sie auch vielfältig genug ist und ob wirklich noch Bedarf ist. Ich gehe meistens drei Jahre mindestens noch selbst zu den Wartungen und schaue, dass das, was der Raum braucht, auch da ist. Weil sich die Pfeifen verändern und nicht, weil man mit irgendetwas unzufrieden war.

Die Franzosen, die haben völlig andere Vorstellungen – da habe ich mich immer angeschlossen. Wenn die Franzosen einen guten Ton hören, bleibt dieser unangetastet. Man versucht nur, die schlechten besser zu machen, aber niemals einen gute Ton schlechter zu machen. In Deutschland macht man es so – weil man so korrekt ist, das ist das richtige Wort, glaube ich: Die guten Töne macht man bisschen schlechter und die schlechten macht man ein bisschen besser. Dann hat man so eine Grauzone [Lachen], einen Grauschleier über allem. Also das ist nicht meine Art. Die französische Art mögen manche Leute, manche Leute mögen das nicht so. Aber ich habe festgestellt, dass das die richtige Art und Weise ist. Als ich da die Thomaskirche intoniert habe, ein relativ prominentes Instrument, wo man auch irgendwie aufpassen muss, wusste natürlich jeder, wie Bach geklungen hat! [Lachen] Ich habe von vornherein gesagt: Wenn 50 % aller Stimmen negativ sind, dann stimmt irgendwas nicht. [Lachen]. Wenn alle sagen, es ist gut, dann taugt die Orgel auch nichts. Die muss Gegenstimmen haben. Es war wirklich so: Am Anfang war die Orgel vielleicht – ich will nicht sagen scharf. Aber die Orgel hat sich ja jetzt so wahnsinnig verändert — was man einkalkulieren muss. Wer die Thomaskirchen-Orgel am Anfang gehört hat und jetzt hört, der wird nicht glauben, dass ich nichts verändert habe. Ich hab nie etwas an der Orgel gemacht. Nie. Sie ist jetzt 14 Jahre alt und man sagt, nach 15 Jahren hat sich der Klang eingepegelt, so bleibt er dann. Die Orgel wird eben milder und das muss man mit bedenken.

D.h. es gibt keine schlechten Töne in dem Sinne. Da sind nur einige die sind besser als andere, richtig?

[Gerald nickt zustimmend]

Ja, ok.

[Laughter] / [Lachen] Aber, es macht so viel aus, wenn man einen Akkord hält und es sind zwei gute Töne dabei… Das klingt gleich ganz anders. Es macht wirklich einen Unterschied… Ja, das ist im Chor genauso: Zwei gute Stimmen und pfhhhhh… [geht mit Händen von innen nach außen hoch]

Weißt Du, die Orgel in Studio Acusticum auszuprobieren als sie noch unfertig war und mit ihren unfertigen Klängen zu experimentieren, war für mich eine künstlerische Erforschung. Genau genommen, waren diese unfertigen Klänge am Ende das interessanteste und ausdrucksstärkste Material für mich. Als ich das Projekt anfing, hatte ich zuerst das Ziel den Intonationsprozess vom rohen bis zum fertigen Klang zu verfolgen und zu analysieren… inzwischen habe ich gemerkt, dass die unfertigen Klänge, die rohen, schon damals gut waren. Eine Orgel, die standardisiert und eben klingt ist vielleicht nicht die interessanteste Sache. Aber wenn man hier und dort kleine Unregelmäßigkeiten findet … Ja! ich würde gern noch weiter die Extreme erfahren… alles was unfertig ist. Man kann verschiedene Sachen von den beiden Situationen bekommen und ist etwas, womit ich gern in diesem Prozess gearbeitet habe. Und! … Vielleicht trifft sich die Vision auf halbem Wege. Am Ende geht es nicht darum alles flach zu machen. Es geht darum, hier und dort diverse Unregelmäßigkeiten zu behalten, natürlich nicht zu extrem. Dann hat man vielleicht einige sehr gute, kostbare Dinge dazwischen. Das macht es spannend…

Ja. Ja, also, ich sag mal so, es muss sich ja nicht richtig unterscheiden, das darf es natürlich nicht. Aber… an manchen Tönen, arbeitet man zwanzig, dreißig Mal. Es geht nicht anders. Wenn man ein Zeitlimit hat, das man nur fünf mal die Pfeife raus nehmen kann, dann geht es schneller, wenn man die guten Töne etwas schlechter macht. Dann fällt das gar nicht auf.

Wenn Du sagst die „Pfeife 20 bis 30 mal raus nehmen" – ich habe auch bemerkt, dass Du im Intonationsprozess die meisten Register noch einmal intonierst. Du intonierst ein Register das erste Mal, dann lässt Du es für eine Weile stehen, Du machst andere Dinge, Du intonierst andere Register und später intonierst Du noch einmal die Register, die schon intoniert sind. Du kannst ein Register bis zu zehn mal intonieren innerhalb des Prozesses. Was sind die Hauptgründe dafür?

Also ich kann mich an eine Situation erinnern: Da hab ich jeden Tag… bestimmt 30 Mal die Rohrflöte intoniert. Das erste Register, was ich intoniert habe, war die Rohrflöte im Hauptwerk. Und bei der Stimme ist es wirklich so, das es unwahrscheinlich hörbar ist, ob diese optische Pfeife frei klingt. Und ich muss sagen, ich hab niemals mehr so eine Stimme erreicht. Aber da hab ich bestimmt, wie gesagt, mindestens 30 Tage intoniert, jeden Tag zwei Stunden. Da hab ich vielleicht zwei Töne bisschen besser gemacht oder den Vokal

besser higeformt, wollte ich so auf „ü,ü,ü“ stimmen, also intonieren. Wo ich weniger intoniere ist meistens am Prinzipal 8. Eine von den wichtigsten Stimmen finde ich, ist der Oktav 4, den man eigentlich nie solistisch spielt, aber der natürlich die Orgel unwahrscheinlich stimmt. So wie die Bratsche. Oben die Geigen, Mixturen und unten die Bässe. Doch so eine Mittelstimme. Mit dem 4-Fuß fange ich meistens an. Den Prinzipal mache ich meistens ganz am Schluss, wenn alles gemacht ist. Und dann eben die Flöten. Gedackte und so weiter – das ist sozusagen das Intime einer Orgel. Das bedarf einer unwahrscheinlichen Konzentration und auch Ausdauer. […] Wie kann man sich Intim vorstellen? Also mir hat mal jemand gesagt […]: Gerald, es müssen in jeder Orgel Stimmen sein, wo man sich ausweinen kann. Das ist das Wichtigste. Aber wie schafft man das? Wo man sich ausweinen kann. Wie will man so einen Bachschen Choral, der um das Thema Trost geht, wie will man das klanglich darstellen, mit Tönen darstellen?

Eine letzte Frage, welche vielleicht mehr eine Reflektion ist… Es geht um die Idee von „Ton“ und „Stimme“, was zwei verschiedene Dinge sind, und das Problem, das der Begriff im Deutschen „Intonateur“, im Englischen aber „voicer“ (=„Stimmer“) ist, was einen Unterschied macht: Einen Ton zu geben oder eine Stimme zu geben, wie schon vorher angesprochen. Ich fand ein literarisches Zitat, welches ich Dir gern vorlesen würde:
Sie stiegen eine schmale Treppe hinauf und kamen hinauf in einen dunklen Gang. Marie hielt sich an der Mutter. „Gelt, dir kommt's dunkel vor?“ sagte die Mutter. „Aber ich find' gut meinen Weg, ich bin ja da aufgewachsen, und wie ich so alt war wie du, bin ich durch den Gang gesprungen, wie wenn's heller Tag wär.“ Sie kamen an einer Türe vorbei, man hörte sprechen. „Das ist noch nicht die rechte Stub', da wohnt ein Stimmacher; weißt so einer, der den Puppen die Stimme einsetzt, daß sie Papa und Mama sagen können. [Lachen] Nun, die Orgel ist kein Mensch, richtig? Sie ist ein Objekt wie die Puppen. Zu sagen die Orgel hat eine Stimme, wie Du über die Seele der Klänge gesprochen hast… Dieser Unterschied ist schwierig. Im Deutschen der Unterschied zwischen Intonateur und Stimmacher. Das Objekt kommt nah daran, was ein Mensch ist… wenn es eine Stimme hat. Ist im Deutschen ein „voicer“ vielleicht ein Stimmacher? Was würdest Du sagen? Verbindet sich das irgendwie mit dem, was Du machst?

Und wie sagt man im Französischen? Harmonizateur! Und das finde ich das beste Wort.

Oh, Du denkst es ist ein besseres Wort? Hm… Harmonizatuer…

Harmonizateur…ja, er muss sozusagen eine Harmonie herstellen. Zwischen Technik und Klang. Er muss eine Harmonie in diesem ganzen „Haus“ Orgel mit Wind und allem drum und dran herstellen. Es geht ja nicht nur darum, dass man die Stimme gibt, sondern es muss der Wind genau gerichtet werden, es muss die Traktur genau gehen, damit die Stimme richtig anspricht und so weiter. Es ist schon mehr.

Ich verstehe… Du meinst die Harmonie zwischen den technischen Aspekten und den Ergebnissen. Die Harmonie zwischen allen Dingen zusammen. Das ist auch sehr interessant, ja.

Es ist so: Die Orgel ist aufgestellt, alle haben was gemacht, alles ist perfekt, tja, aber es kann ja sein, dass der Winddruck zu hoch ist, oder die Tasten laufen nicht richtig und man

kann gar nicht richtig spielen und so weiter. Wir machen es so, dass wir erstmal die Orgel so lassen und erst wenn viele Register spielen, dann machen wir die Traktur, weil wir gar nicht wissen, welche Töne kommen uns da entgegen. Muss das jetzt schnell laufen oder muss es etwas griffiger sein für diesen Klang. Ein Intonateur ist nicht nur am Stimmen richten. Sondern, das ist mehr. Ich finde das französische Wort genau passend.

Ja, ich verstehe. Harmonie macht Sinn, … harmonizateur… auf den Prozess bezugnehmend. Am Ende ist ein Prozess bei dem alles harmonisch miteinander funktionieren muss. Aber der präzise Punkt „Stimme". Wir können sagen, dass ein Register, z.B. eine Flöte, spricht. Sprechen ist schon der Weg etwas zu sagen. Die Orgel spricht mit Klängen. Zum Beispiel… die flute harmonique ist nostalgisch. Das ist poetisch! Oder das Gemshorn, wie Du es beschrieben hast: „Es sollte singen wie ein Kind vom Lande". Das ist ebenfalls poetisch – das ist dann vielleicht die Stimme… Aber ich denke, ich habe verstanden, was Du mit harmonizateur meinst.

[Pause] Ja. … Oder die Vox humana: Das fand ich so herrlich, der Harald [Vogel] sagt: „Eine Vox humana muss klingen wie ein Chor alter Weiber." [Lachen] Aber es kommt genau hin! Das kommt genau hin. Bei Cesar Franck, gell, bei dem Schlusschoral und dann kommt die … [singt]

Das stimmt.

Das darf gar nicht schön klingen. Diese Vox humana muss so klingen, weißt du, als wären es Stimmen, die völlig daneben sind – alle. Da ist keine einzige super Stimme dabei. [Pause]

Nun… das war es. Ich danke von Herzen… Intonieren ist etwas faszinierendes und es ist wirklich wunderbar, dass Du die Türen geöffnet hast und das Projekt sich entwickeln konnte. Ich hoffe diese Arbeit bringt einige Ausblicke.

Denn es ist ganz wichtig, wie die Fragen gestellt werden. Da wollte ich Dir noch einmal ganz herzlich danken: Deine Fragen waren wirklich super, das war wirklich sehr gut. Du hast genau das getroffen, was eigentlich wichtig ist.

Danke Dir.

Appendix D

Content of the DVD

DVD Content

Sound examples

01. Sound example 1
02. Sound example 2
03. Sound example 3
04. Sound example 4
05. Sound example 5
06. Sound example 6
07. Sound example 7
08. Sound example 8
09. Sound example 9
10. Sound example 10
11. Sound example 11
12. Sound example 12
13. Sound example 13
14. Sound example 14
15. Sound example 15
16. Sound example 16
17. Sound example 17

Franck, Reger, Kagel, and J. S. Bach

César Franck (1822-1890)
Six Piéces:
25. *Fantaisie in C*

Max Reger (1873-1916)
Zwölf Stücke op. 59:
26. *5. Tokkata d-moll*
27. *6. Fuge D-dur*

Mauricio Kagel (1931-2008)
Rrrrrrr… Acht Orgelstücke:
28. *1. Raga*
29. *8. Rossignols enrhumés*

Johann Sebastian Bach (1685-1750)
30-32. *Toccata, Adagio und Fuga C-Dur, BWV564*

The wind in the word
—memorized sounds of voicing

João Segurado (2015)

18. *Étude I*
19. *Intermezzo I*
20. *Étude II*
21. *Intermezzo II*
22. *Étude III*
23. *Intermezzo III*
24. *Étude IV*

Recorded in Studio Acusticum, Piteå.

Recording date: 27, 28 August 2014.
Production: Katharina Schröder
Co-production: João Segurado, Johannes Oscarsson
Sound engineer: Johannes Oscarsson
Organ maintenance: Claudius May

7

REFERENCES

REFERENCES

AUDSLEY, George Ashdown

1905 *The Art of Organ-Building*, Volume Second. New York: Dover Publications. 1965.

BATTIER, Marc

2007 "What the GRM Brought to Music: From Musique Concrète to Acousmatic Music." In: *Organised Sound.* Volume 12. Issue 03. December 2007, pp. 189-202.

BENSON, Bruce Ellis

2003 *The Improvisation of Musical Dialogue. A Phenomenology of Music.* Cambridge: Cambridge University Press.

BICKNELL, Stephen

1998a "Organ Construction." In: Thistlethwaite and Webber (Eds.) *The Cambridge Companion to the Organ.* Cambridge: Cambridge University Press.

BICKNELL, Stephen

1998b "Organ Building Today." In: Nicholas Thistlethwaite and Geoffrey Webber (Eds.) *The Cambridge Companion to the Organ.* Cambridge: Cambridge University Press.

BLANTON, Robin

2012 *Johann Andreas Stein's 1781 Claviorganum and the Construction of Art in Eighteenth-century Augsburg.* Doctoral dissertation in musicology. Gothenburg: University of Gothenburg.

BORGDORFF, Henk

2011 "The Production of Knowledge in Artistic Research." In: Biggs and Karlsson (Eds.) *The Routledge Companion to Research in the Arts.* Abingdon: Routledge.

BURKHOLDER, J. Peter

2001 "Collage." In: Stanley, Sadie (Ed.) *The New Grove Dictionary of Music and Musicians.* London: Oxford University Press.Volume 6. Second Edition.

CARVAREO, Adriana

2012 "Multiple Voices." In: Jonathan Sterne (Ed.) *The Sound Studies Reader.* New York: Routledge.

CASTELLENGO, Michèle

1999 "Acoustical analysis of Initial Transients in Flute-like Instruments." In: *Acta Acustica*, 85 (3), 387-400.

CERBONE, David R.

2006 *Understanding Phenomenology.* Durham: Acumen.

DENZIN, N., & LINCOLN, Y. (Eds.).

2005 *Handbook of Qualitative Research* (3rd ed.). Thousand Oaks, CA: Sage.

DENZIN, Norman K.

1989 *The research act* (3rd ed.). Englewood Cliffi, NJ: Prentice Hall.

DENZIN, Norman K.
2014 *Interpretive Autoethnography.* Second Edition. California: Sage Publications.

DISLEY, A. C.
2004 *An Exploration of Timbral Semantics Related to the Pipe Organ.* PhD Dissertation. University of York.

DOM BÉDOS DE CELLE
1766-68 *The Organ-Builder.* Translated by Charles Ferguson. Raleigh: Sunbury. 1977.

DÄNHERT, Ulrich
1983 *Historische Orgeln in Schasen.* Leipzig: VEB Deutsche Veralg für Musik Leipzig.

ERICSSON, Hans-Ola
2012 "A dream comes true." In: Jullander, Sverker (Ed.) *Pitea Organ Festival & Symposium.* Piteå: RC tryck.

FAULKNER, Quentin
2006 "Trost, Tobias Heinrich Gottfried (ca. 1680-1759)." In: Douglas E. Bush and Richard Kassel (Ed.) *The Organ: An Encyclopedia.* New York: Routledge.

GOEBEL, Joseph
1967 *Theorie und Praxis des Orgelpfeifenklanges,* Frankfurt: Verlag das Musikinstrument.

GRAHAM, Gordon
1997 *Philosophy of the Arts: An Introduction to Aesthetics* (3rd. edition). New York: Routledge.

GREY, John M.
1975 *An Exploration of Musical Timbre.* Standford, CA: Department of Music, Stanford University.

HANNULA, Suorant, and Vadén
2005 In: *Artistic Research: Theories, Methods and Practices*. Helsinki: Academy of Fine Arts, and Gothenburg: University of Gothenburg. 2005.

HELMHOLTZ, Hermann L. F.
1885 *On the Sensations of Tone as a Physiological Basis for the Theory of Music.* New York: Dover Publications. 1954.

HERTZ, Eva
1937 *Johann Andreas Stein (1728-1792): eine Beitrag zur Geschichte des Klavierbaus.* PhD dissertation. Albert-Ludwigs Universität zu Freiburg.

HESSE, Hermann
1943 *The Glass Bead Game.* London: Vintage. 2000.

HISLOP, Donald
2005 *Knowledge Management in Organizations: A Critical Introduction.* Oxford: Oxford University Press. 2013.

HONOUR, Hugh, & John Fleming
1984 *A World History of Art.* Revised Seventh Edition. London: Laurence King Publishing. 2009.

HUSSERL, Edmund
1931 *Ideas.* Translated by W. R. Boyce Gibson. London: George Allen & Unwin.

IHDE, Don
2007 *Listening and Voice: Phenomenologies of Sound.* Albany: State University of New York.

JOHNSON, Mark
2011 "Embodied Knowing Through Art." In: Biggs and Karlsson (Ed.) *The Routledge Companion ot Research in the Arts.* Abingdon: Routledge. 2011.

JULLANDER, Sverker
2010 "The Development of Musical Performance as a Research Subject at Luleå University of Technology." In: Thorgersen, C. & Karlsen, S. (Eds.) *Music, Education and Innovation. Festschrift for Sture Brändström.* Luleå: Luleå University Press.

JULLANDER, Sverker
2012 "Welcome to Piteå Organ Festival and Symposium 2012: A Unique Event around a Unique Instrument." In: Jullander, Sverker (Ed.) *Pitea Organ Festival & Symposium.* Piteå: RC tryck.

KANE, Brian
2007 "L'Objet Sonore Maintenant: Pierre Schaeffer, Sound Objects and Phenomenological Reduction." In: *Organised Sound*. Volume 12. Issue 01. April 2007, pp. 15-24.

KASSEL, Richard
2006 "Saxony." In: Douglas E. Bush and Richard Kassel (Ed.) *The Organ: An Encyclopedia.* New York: Routledge.

KIM-COHEN, Seth
2009 *In the Blink of an Ear. Toward a Non-cochlear Sonic Art.* New York: Continuum. 1997.

KÄLVEMARK, Torsten
2011 "University Politics and Practice-Based Research." In: Biggs and Karlsson (Ed.) *The Routledge Companion to Research in the Arts.* Abingdon: Routledge.

LABELLE, Brandon
2012 "Auditory Relations." In: Jonathan Sterne (Ed.) *The Sound Studies Reader.* New York: Routledge.

LARSON, Kay
2009 *Where the Heart Beats. John Cage, Zen Buddhism, and the Inner Life of Artists.* New York: Penguin Press.

LULEÅ University of Technology
2008 *Description of the Organ in Studio Acusticum - Artistic and Technical Requirements and Specifications.* Appendix 5. Luleå: LTU.

MERRIAM S.
2009 *Qualitative Research: A Guide to Design and Implementation.* San Francisco: Jossey-Bass.

MEYER-SIAT
1967 "Zum Geleit." In: Goebel, Joseph (1967) *Theorie und Praxis des Orgelpfeifenklanges,* Frankfurt: Verlag das Musikinstrument.

MONETTE, Louis G.
1992 *The Art of Organ Voicing*. Kalamazoo, MI: New Issues, Western Michigan University.

MOUSTAKAS, Clark
1994 *Phenomenological Research Methods.* California: Sage Publication.

NANCY, Jean-Luc
2002 *Listening.* Translated by Charlotte Mandell. New York: Fordham University Press. 2007.

NKWI, P., Nyamongo, I., & Ryan, G.
2001 *Field research into socio-cultural issues: Methodological guidelines.* Yaounde, Cameroon, Africa: International Center for Applied Social Sciences, Research, and Training/UNFPA.

PELTO, Penti
1995 *Four Voicing Techniques*. The Organ Yearbook (Vol. XXV).

PHELPS, Lawrence
1967 *A Short History of the Organ Revival.* St. Louis: Concordia Publishing House.

POLANYI, M.
1958 *Personal Knowledge. Towards a Post-Critical Philosophy.* Routledge & Kegan Paul Ltd. London: University of Chicago Press.

POLANYI, M.
1966 *The Tacit Dimension*. Chicago: University of Chicago Press. 2009.

RIOUX, Vincent
2001 *Sound Quality of Flue Organ Pipes. An Interdisciplinary Study on the Art of Voicing.* Doctoral Thesis. Chalmers University.

ROSS, Alex
2007 *The Rest is Noise. Listening to the Twentieth Century.* New York: Farrar, Straus and Giroux.

SAVIN-BADEN, Maggi & Claire Howell Major
2013 *Qualitative Research. The Essential Guide to Theory and Practice.* Oxon: Routledge.

SCHAEFFER, Pierre
1952 *In search of a Concrete Music.* Translated by Christine North and John Dack. Berkely, Los Angeles: University of California Press. 2012.

SCHAEFFER, Pierre
1966 *Traité Des Objets Musicaux: Essai Interdisciplines.* Paris: Éditions Du Seuil. 1966.

SMALLEY, Denis
1997 "Spectromorphology: Explaining Sound-shapes." In: *Organised Sound.* Volume 2. Issue 02. August 1997, pp. 107-126.

JOHN-STEINER, Vera
2000 *Creative Collaboration.*Oxford University Press: Oxford.

TIELLA, Marco
2006 "Voicing." In: Bush and Kassel. (Ed.) *The Organ: An Encyclopedia.* New York: Routledge.

VOEGELIN, Salomé
2010 *Listening to Noise and Silence: Towards a Philosophy of Sound Art.* New York: Continuum.

VOGEL, Harald
2012 "Sound Sculpture." In: Jullander, Sverker (Ed.) *Pitea Organ Festival & Symposium.* Piteå: RC tryck.

WALLMAN, James L.
2006 "Silbermann." In: Bush and Kassel. (Ed.) *The Organ: An Encyclopedia.* New York: Routledge.

WALLMAN, James L.
2012 "The Organ in the Twentieth Century." In: Anderson, Christopher S. (ed.) *Twentieth-Century Organ Music.* New York: Routledge.

WILLIAMS, Peter
1980 *A New History of the Organ: From the Greeks to the Present Day.* London: Faber and Faber.

WOEHL, Gerald
2008 *Orgel-Projekt für das Acusticum in Pitea der Universität LULEA.* Unpublished document. 2008.

WOEHL, Gerald
2009 *Orgelprojekte, Gerald Woehl.* Unpublished document. 2009.

YOKOTA, Munetaka
2003 "Reconstructing and Voicing the Pipes." In: Joel Speerstra (Ed.) *The North German Organ Research Project at Göteborg University.* Pp 263-276. Göteborg Organ Art Center.

SECONDARY REFERENCES

ARISTOTLE
"Nichomacena Ethics: Book VI." In: *The Complete Works of Aristotle: Revised Oxford Translation, edited by Jonathan Barnes.* Oxford: Oxford University Press. 1984.

BRENTANO, Franz
1874 *Psychology from an Empirical Standpoint.* London: Routledge. 2014.

CALVINO, Italo
1977 "A King Listens." In: *Under the Jaguar Sun,* Translated by William Weaver. London: Penguin Books. 2009.

DEWEY, John
1930 "Qualitative Thought." In: Boydstone, J. (ed.) *The Later Works 1925-1953.* Carbondale, IL: Southern Illinois University Press.

DEWEY, John
1931 "The Practical Character of Reality." In: *Philosophy and Civilization.* New York: Capricorn Books. 1973.

GLAUS, Daniel
2006 "From Wish to Reality: Experience and Performance." In: *Fresh Wind: The Research Organs of Bern University of the Arts.* Staarbrücken, Germany: Pfau.

HUSSERL, Edmund
1900 *Logical Investigation* [2 vols]. Translated by J. N. Findlay. London: Routledge & Kegan Paul. 1970.

HUSSERL, Edmund
1939 *Experience and Judgement: Investigations in a Genealogy of Logic.* Translators: James S. Chruchill and Karl Ameriks. Evanston: Northwestern University Press. 1973.

HUSSERL, Edmund
1977 *Cartesian Meditations: An Introduction to Metaphysics.* Translated by D. Cairns. The Hague: Martinus Nijhoff.

MARINETTI, Filippo Tommaso
1909 "Futurist Manifesto." In: *Speed Destruction Noise War.* Elektron Ebooks. 2013.

MERLEAU-PONTY, Maurice
n.d. "The Primacy of Perception and Its Philosophical Consequences." In: Dermot Moran and Timothy Mooney (eds.) *The Phenomenology Reader.* London: Routledge. 2002.

PELIAS, R. J.
1999 *Writing Performance: Poeticizing the Researcher's Body.* Carbondale. Southern Illinois University.

POLLOCK, D.
2007 "The Performative "I." In: *Cultural Studies—Critical Methodologies*, 7 (3), 239-255.

RUSSOLO, Luigi
1913 "The Art of Noise." In: *Speed Destruction Noise War.* Elektron Ebooks. 2013.

GASSMANN, Michael (ed.)
2007 *Werkzeuge der Stille II. Die Orgeln für Neue Musik in Sankt Peter zu Köln.* Kunst-Station.

SCHWEITZER, Albert
1906 *Deutsche und Französiche Orgelbaukunst und Orgelkunst.* Breitkop & Härtel. 2002.

ONLINE REFERENCES

CHION, Michel
2009 *Michel Chion's "Guide to Sound Objects: Pierre Schaeffer and Musical Research"*. Online: http://modisti.com/news/?p=14239 (accessed January 2014).

HARLOW, Randall
2011 *Recent Organ Design Innovations and the 21st-century "Hyperorgan".* Online: http://www.huygens-fokker.org/docs/Harlow%20-%20Recent%20Organ%20Design%20Innovations%20and%20the%2021st%20Century%20Hyperorgan.pdf (accessed August 2014).

KARLSSON, Henrik
2003 *Research Training in Swedish Arts Education: Handshake, hug, pat or kiss?* Proceedings of the OECD seminar Managing Art Schools Today, Paris, 28-29 August 2003, pp. 55-61. Online: http://www.oecd.org/edu/imhe/32997195.PDF (accessed November 2014).

KOIVUNEN, H.
1997 *From Tacit Knowledge to Cultural Industry.* Online: http://www..lib.hel.fi/ulkkirja/birstonas/koivunen.htm (accessed August 2014).

ROUTIO, Pentti
2004 *What is Artistic Research.* Online: http://www.uiah.fi/projects/metodi/133.htm (accessed January 2012).

"Fokker Organ"
n.d. Online: http://www.huygens-fokker.org/instruments/fokkerorgan.html (accessed August 2014).

"KMH i Sankt Peter Köln"
2012 Online: http://www.youtube.com/watch?v=nt28HjJTVgU (accessed August 2014).

"Modulorgue"
n.d. Online: http://www.modulorgue.com (accessed August 2014)

"Presentation of Variable Wind Organ - Zurich 2011"
2011 Online: http://www.youtube.com/watch?v=JxhgZObqlLw (accessed August 2014).

"The Kempe Foundations"
n.d. Online: http://www.kempe.com/index_english.html (accessed February 20, 2014).

"The Organ"
2013 Online: http://acusticumorgel.se/?page_id=63&lang=en (accessed January 2014).

SCORES

BACH, Johann Sebastian
"Toccata in C BWV 564." In: Kilian, Dietrich (Ed.) *Orgelwerke. Band 6. Präludien, Toccaten, Fantasien und Fugen II.* Kassel: Bärenreiter-Verlag (BA 5025). 1964.

FRANCK, César
"Six Piéces: Fantaisie in C major." In: *Organ Works.* New York: Dover Publications. 1987.

KAGEL, Mauricio
"1. Raga." "8. Rossignols Enrhumés." In: *Rrrrrrr… Acht Orgelstücke.* Frankfurt/M: Henry Litolff's Verlag/C. F. Peters (Nr. 8529). 1984.

REGER, Max
"5. Tokkata d-moll." "6. Fuge D-Dur." In: *Sämtliche Orgelwerke. Band 3. Freie Orgelstücke I.* Wiesbaden: Breitkopf & Härtel (Edition Breitkopf 8493). 1987.

RECORDINGS

VAUGHAN, Sarah

1955 *Sarah Vaughan in Hi-Fi.* Columbia Records. 1955. Sony Music Entertainment. 2010.

"An organ has to have strong voices, weak voices, poetic voices, and even ugly voices…The more extreme the organ is, the better. It doesn't have to be beautiful but everything has to be in it…A good voicer can fill out the whole artistic spectrum."

Gerald Woehl

Pipe organ sounds are shaped by a practitioner called a voicer, in a process that is essentially one of gradual transformation of sound; that process is called voicing. The task of voicing demands excellent manual dexterity, solid theoretical knowledge, and a keen sense of hearing. The name voicing also suggests an approach to sounds that seems to transcend those aspects of the craft. Voicing means to give voice, and to give voice means to give life. The sounds of the organ are thus shaped with the intent to epitomize forms of human expression, and those forms of expression will be heard in the context of a musical practice.

This piece of artistic research seeks to describe precisely the role those sounds play in the context of musical performance. More broadly, it examines the visions and artistic perspectives of those who create the sounds and those who use them in performance—voicers and musicians. Research questions were investigated in the context of a collaboration between a voicer and an organist (the author), over a period of roughly two years, while an organ was being built for the concert hall Studio Acusticum at Piteå, in northern Sweden. Since the author of the study is a musician, the questions were naturally approached from a musical stance. In the end, the results of the research are not only articulated verbally, but also, and just as importantly, enacted through artistic content; through the creation of new artworks, and through the exploration of organ repertoire and musical interpretation. The text is almost always presented in autobiographical, narrative fashion, and it deals mostly with examination of documents, dialogues, sounds, events, and the perspectives of different people.

The title of the book—*Never Heard Before*—serves to express the idea that the voicer-musician encounter has not previously been the subject of research, and that the materials presented in the dissertation—both the dialogues and the sounds collected during the process of voicing—were things never heard before.

This doctoral dissertation in Musical Performance and Interpretation has been conducted within the framework of the Konstnärliga forskarskolan (the Swedish national research school in the arts), in a collaboration between Luleå University of Technology and the University of Gothenburg.

9 789198 171266