



Sound Studies

An Interdisciplinary Journal

ISSN: 2055-1940 (Print) 2055-1959 (Online) Journal homepage: <https://www.tandfonline.com/loi/rfso20>

A sounding monument: how a new organ became old

Peter Peters & Darryl Cressman

To cite this article: Peter Peters & Darryl Cressman (2016) A sounding monument: how a new organ became old, *Sound Studies*, 2:1, 21-35, DOI: [10.1080/20551940.2016.1214445](https://doi.org/10.1080/20551940.2016.1214445)

To link to this article: <https://doi.org/10.1080/20551940.2016.1214445>



© 2016 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group



Published online: 07 Sep 2016.



Submit your article to this journal [↗](#)



Article views: 374



View Crossmark data [↗](#)

A sounding monument: how a new organ became old

Peter Peters and Darryl Cressman

Faculty of Arts & Social Sciences, Maastricht University, Maastricht, the Netherlands

ABSTRACT

In 2012, a new pipe organ was unveiled in Amsterdam. This organ, the Van Straten organ, was designed and built as a replica of an organ originally built in 1479 by Peter Gerritsz. In this paper, we examine how the Gerritsz organ became the Van Straten organ by examining how contemporary organ builders were able to translate aspects of the original wind chest, pipes and keyboard into the new organ. By contextualising the meaning of the Van Straten organ within the Early Music movement and the desire for historically authentic instruments, we argue that the Van Straten organ is not simply a replica of a fifteenth-century organ, but rather an object through which knowledge about fifteenth-century musical culture is produced for twenty-first-century musicians, composers, researchers and listeners.

ARTICLE HISTORY

Received 3 September 2015
Accepted 8 July 2016

KEYWORDS

Organ; musical culture;
replica; early music;
authenticity

Introduction: the materiality of early music

In 2012, the Van Straten Organ was unveiled at the *Orgelpark* (Organ Park) in Amsterdam. This organ is unique in the sense that it was designed and built as a replica of an organ originally built in 1479 by Peter Gerritsz for the Nicolai Church in Utrecht. On a Sunday morning in May 1885, the Gerritsz organ produced its last sounds, a description of which was recorded by a member of the congregation:

During a Sunday morning service in the month of May 1885 it could still accompany the singing of the congregation, but it was impossible for the organist to continue; not even its usual shrieking and moaning sound the instrument was able to produce. (Van Dijk 2009, 73)¹

Thanks to the intervention of Victor de Stuers, who was an advocate for preserving and restoring old buildings and art works, it was arranged for the Gerritsz organ to be bought by the Dutch State in 1886 and transferred to the recently opened Rijksmuseum in Amsterdam. The organ would be silent from that moment on. The case and its interior parts, including the pipes, the wind chest on which they stand, and the key action that transfers the movement of the keys to the valves that lead wind to the pipe mouths were placed in the Rijksmuseum where they would be of interest for Dutch cultural historians, musicians, musicologists and organ experts. This marks an interesting point in the history of the Gerritsz organ. After it stopped being a musical instrument, that is, after it stopped being an object

that produced musical sounds, it became an important artefact and a document through which researchers could learn about fifteenth-century building techniques and musical culture. The period around 1500 was a time of astonishing innovations in the art of organ building, all of which assumed the creation and application of various kinds of knowledge, ranging from mathematics and natural history to knowledge of materials such as wood, leather and various alloys (Bormann 1966). As producers of these “mirrors of their time” (Snyder 2002), organ builders learned and transferred knowledge and insights from previous generations while also improvising with new ideas and material techniques.

In the 1950s, the Gerritsz organ’s case was transported to the *Koorkerk* in Middelburg (the Netherlands) where it was prominently displayed. In the 1980s, an initiative was undertaken within the context of the Early Music movement to return the Gerritsz organ to its original home in the Nicolai Church in Utrecht. For proponents of the Early Music movement, the Gerritsz organ would lend a degree of authenticity to the performance of compositions written between 1500 and 1800 while also allowing musicologists to better understand the characteristics of Medieval and Renaissance compositions.

The status of the Gerritsz organ was settled in 2009 when it was decided that the Dutch Department of Cultural Heritage would use the existing parts of the Gerritsz organ to build a replica. After this, the organ’s parts were collected and now reside as “sounding monuments” within the Cultural Heritage Agency (CHA) of the Dutch Ministry of Education, Culture and Science in Amersfoort. For the CHA, the parts of the Gerritsz organ are important artefacts of Dutch cultural heritage because, taken as a whole, they are the only example of a fifteenth-century organ in the Netherlands. Although a few parts of the original organ had deteriorated beyond repair (the bellows and few of the pipes), the shape, size and material constitution of most of the organ’s parts could be replicated so that an organ in the style of the fifteenth century could be built. This plan to replicate the Gerritsz organ culminated in the building of the Van Straten organ.²

What this brief history reveals is that the Gerritsz organ is not just a musical instrument, but rather an object that is meaningful in many different ways: it is a historical monument, it is an important part of Dutch cultural heritage, it is a rare example of the craft of organ building from the fifteenth and sixteenth centuries, it is an object that can bestow authenticity on early music performances and, perhaps most importantly, it is a model from which a replica organ can be built.

In this paper we examine this replication process by exploring the different ways that the Gerritsz organ became the Van Straten organ. Through this research, we discovered that the Van Straten organ problematises the separation between the sciences and the arts, and so it is more fruitful to think of this organ as an “experimental system,” a term introduced by the historian of science Hans-Jörg Rheinberger. Experimental systems “inextricably co-generate the phenomena or material entities and the concepts they come to embody. Practices and concepts thus ‘come packaged together’” (Rheinberger 1997, 28). The essence of this quotation is the assertion that in scientific experiments propositional knowledge cannot be separated from the material assemblage that is set up to produce this knowledge. It is precisely in and through creating this material assemblage that our understanding takes shape. From this perspective, there is no reason to treat the experimental process of building a new fifteenth-century organ any differently than, say, a biological experiment. The question then becomes: What kinds of understanding are made possible through building a replica of a fifteenth-century organ? Our argument throughout this paper is that the Van Straten Organ

is not simply a replica of the Gerritsz organ, but rather an object through which knowledge about fifteenth-century musical culture is produced for twenty-first-century musicians, composers, researchers and listeners.

From the Gerritsz organ to the Van Straten organ

Asking how a twenty-first-century organ came to produce knowledge about musical cultures that date back 500 years requires exploring in more detail the processes by which the Gerritsz organ became the Van Straten organ. Specifically, we will examine parts of the Gerritsz organ that were used as models for the design and construction of the Van Straten organ: the wind chest, the pipes and the keys. In building this new instrument, the goal was to go back to the earliest stage in the history of the Gerritsz organ, the situation in 1479. Reconstructing the sound of the organ at that time would make it possible for organists to recreate old repertoire, as well as to use to sound material of a renaissance organ to create new musical compositions.

Organ scholars were able to reconstruct the long history of the Gerritsz organ from various sources. These range from the descriptions of payments in old church accounts to a close reading of the characteristics of the remaining material, such as inscriptions and markings of pipes, or the traces of repairs and changes of the instrument.³ The instrument that Peter Gerritsz built in 1479 had two divisions ('hoofdwerk' and 'bovenwerk') and a pedal. The grandson of Peter Gerritsz, Cornelis Gerritsz, gave the organ a new hoofdwerk as well as a rugpositief (back positive) in 1547 (Diepenhorst 2009, 206). Additional pipes were added to the hoofdwerk and changes to the keyboard were made. In the early seventeenth century, the organ was given a major renovation. In later decades, the shutters of the main case and the positive were repainted, and stops were added or removed. This process of repairing, renovating and changing the organ continued in the eighteenth century. In 1733, the organ builder Christian Müller gave the organ two new keyboards. After Müller, Gideon Thomas Bältz conducted numerous repairs, however, without removing or changing the oldest parts of the organ (Diepenhorst 2009, 210). In the nineteenth century, the organ increasingly suffered from leakages in the wind channels and wind chests and there were defects in the pipework. From 1872 onwards, the organ was no longer maintained (Van Dijk 2009, 61).

We will examine the process of replicating the earliest stages of the Gerritsz organ against the context of the Early Music movement, and in particular this movement's interest in performing music on historically accurate instruments. The Early Music movement is dedicated to re-creating Western musical practices prior to 1800 (Lawson and Stowell 1999). This movement, though, is not simply an exercise in replicating what had existed; the originators and proponents of the Early Music movement were constructing an idea of early music from the perspective of the twentieth century. It is impossible to truly know how music sounded or to accurately recreate the contexts through which early music became meaningful or how it was performed and listened to, and so the proponents of the Early Music movement are not replicating early music, but rather attempting to construct a definitive version of what early musical culture is, centuries after this culture had disappeared. In the context of the Early Music movement, the Gerritsz organ provides clues as to what early compositions sounded like and how they were played. Once replicated through the Van Straten organ, the Gerritsz organ, in a roundabout way, produces knowledge about its origins and the musical culture it was a part of through the materiality of a twenty-first-century organ.

In the conclusion of this paper, we return to this question concerning the relationship between instruments and early music by suggesting that within the aims and ambitions of the Early Music movement, instruments like the Van Straten organ are, a priori, experimental systems. To arrive at this conclusion, in the following section we address why different actors felt it was necessary to build a replica of a fifteenth-century organ. If the Van Straten organ was intended to be a museum piece, it would have made more sense to simply place the original in a museum. After all, deterioration may have rendered the Gerritsz organ musically useless, but in a museum its function and meaning would be as a historical object; it would not be intended to produce sounds, but rather it would be known as the oldest organ in the Netherlands and as an example of the relationship between musical culture and fifteenth-century Dutch craft production. The goal of the replication process, however, was the construction of a working organ, one that could be played regularly. We situate the desire to build this replica as, first, a way to recover organ-building techniques, and second, as a response to the Early Music movement and the demand for historically authentic instruments. Following this, we describe the material relationship between the Gerritsz organ and its replica by focusing on three moments where the Gerritsz organ served, in different ways, as a model for the Van Straten organ: the design and construction of the wind chest, the casting of the pipes, and the building of the keyboard. Through interviews with Dutch organ experts and the organ builders who built the Van Straten, we reveal in detail how the Gerritsz organ became the Van Straten organ.

The aim of this paper is not to challenge the claims of authenticity made by proponents of the Early Music movement in regards to historically informed instrument restoration. Rather, we find that this movement opens up very interesting questions regarding the relationship between materiality and musical culture. How are old organs translated into new organs? How is musical knowledge materialised, how are these materials read as forms of musical knowledge, and how is this material knowledge translated into new material forms that produce new forms of knowledge? By examining how parts of the Gerritsz organ were used as models for the Van Straten, we hope to open up discussions about what it means to design historically accurate replicas and how these replicas, and the originals upon which they are modelled, contribute to our knowledge about musical culture.

Why build a replica? Building techniques, early music and authenticity

The Swedish organist and organ teacher Hans Davidsson writes that replicating antique organs became desirable in the twentieth century as a reaction against modern organs produced by industrial methods. He writes that when organs became subjected to industrial production techniques, the “main aim was no longer to attain the highest quality possible; instead factors such as capacity and profit became predominant ... piece by piece, the accumulated experience of the skilled craftsmen disappeared. Thus the end result came to be determined more by the production process itself than by aesthetical or stylistic aims” (Davidsson 1993, 9; see also Owen 2002). The complaint raised by Davidsson is that from the perspective of modern building techniques these objects are simply mass-produced technologies: indistinguishable units, not distinctly *musical* technologies. Replicating organs from the fifteenth, sixteenth and seventeenth centuries is an attempt to recover the musical dimensions that have been lost through modern production techniques that have efficiently rationalised what was craft production by decontextualising these objects from musical

culture – following Davidsson, what were formerly musical instruments designed for specific locations and contexts of use became, over the course of the twentieth century, objects that were divorced from these unique contexts. Certainly, Davidsson's history of organ building could be challenged by organ builders, but his point is not in the details of his argument, it is in the recognition of a transition from craft production to industrial production and all that this entails.

Although the desire for a return to craft production influenced the demand for organs like the Van Straten, it was the Early Music movement, and in particular the demand for period-specific or authentic musical instruments, that provided the impetus for the construction of the Van Straten organ. Indeed, without the Early Music movement, there would be neither the need nor the desire for the Van Straten organ. From the 1960s onwards, more and more musicians undertook research that sought to recreate the original sound of Medieval, Renaissance and Baroque music. Pioneering musicians like Nikolaus Harnoncourt, Gustav Leonhardt and Frans Brüggen played from critical text editions, performed on restored original instruments or replicas, and adjusted the size of choirs, orchestras and ensembles to historical conventions. Musicians became researchers who studied autographs, sketches and drafts of a composition. They based their interpretations on primary source materials ranging from instrumental and theoretical treatises to surviving instruments, iconography, historical archives, references in literature, journals, newspaper reports, sometimes letters, diaries, catalogues, advertisements and, for post-1900 music, even recordings (Lawson and Stowell 1999, 17–41). Against this craving for historical accuracy and the establishment of what could be considered authentic early music, critics of the Early Music movement argued that this scientific strategy resulted in performances that focused on mere sound and completely lacked the living, expressive qualities of the music.⁴

Since the days of pioneering recordings of the works of Monteverdi and Bach by Harnoncourt and Leonhardt, Renaissance, Baroque, Classical and even Romantic repertory has become the domain of specialised conductors, musicians, ensembles and orchestras. European early music, which nowadays includes music as recent as from the 1920s, has been reinterpreted and recorded in a wide variety of historically informed performances and has become an essential part of modern classical music culture. This development would have been impossible without the flourishing development in instrument building and restoration that makes it possible for musicians to play string, wind and keyboard instruments from different time periods. Surviving instruments are used to study and experiment with matters of technique, style and interpretation and instrument builders take these old instruments as starting points to relearn old practices of instrument building. It would be a mistake, though, to think that this research was primarily organological; rather, this research, and attempts to construct the aura of early music through period-specific instruments, was part of an animated debate on what is called “historically informed/inspired performance practice (HIP)” (Haynes 2007; Lawson and Stowell 1999).

The restoration and rebuilding of old church organs is closely related to the reinterpretation of early music by musician-researchers and the corresponding development of instrument building (Fidom 2000). However, organs present a special case. They are very large and expensive instruments that, historically, were not simply replaced, but more or less continually extended and restored in different periods; these ancient instruments contain within them layers of material, scientific and artistic knowledge. Old organs that have survived to the present day often have been changed in many ways. Pipes have been removed, renewed

or retuned. An electric blower may have replaced the person who once trod the bellows by foot. The mechanical action of the keyboard, the stops and the sliders in the wind chests have been changed. New pipes and parts have been added. All of these components carry information about how the instruments were designed and built, how they were meant to sound, and how they formed part of musical practices, both secular and religious. In this sense, organs are both a historical and an aesthetic mirror that have “stories to tell about the times in which they were built that go far beyond the music that was played on them” (Snyder 2002, 1).

A conference in the Northern Dutch city of Groningen in 1969 to commemorate the North German organ builder Arp Schnitger (1648–1719), who built many organs in the northern provinces of the Netherlands and Germany, marked the start of a lively discussion on what could be called “historically informed organ restoration” (Davidsson 2000). Existing organs should not be restored to match the technical and artistic criteria of today, but rather brought back as much as possible to the state that they were in when they were first built. The restoration of organs should be based on scientific research into the original disposition of the organ. However, as van Dijk points out, these changes in the practices of organ building and organ restoration were accompanied by “tumultuous” debates in which opponents disagreed on the relevance of historical approaches to the artistic quality of an instrument (Van Dijk 2000, 19).

Since the 1990s, replicating old instruments has opened new ways of understanding fifteenth-, sixteenth- and seventeenth-century organs. A milestone project of this kind was the North German Organ Research Project at the University of Göteborg (Carlsson et al. 2000; Snyder 2002; Speerstra 2003). The organ research centre GOArt built a copy of the 1699 Schnitger organ from the Lübeck Dom. The original organ was destroyed during a bombing raid in 1942 and the only evidence of this organ that remains are a few photographs. The aim of the GOArt project was to gain the knowledge and experience necessary to construct an organ in a Swedish church the way it might have been built by the famous organ builder Arp Schnitger in the late seventeenth century in Northern Germany. The new pipework made in the project is a research copy of the surviving pipework in the Schnitger organ in Hamburg’s St. Jacobi church. Using the old pipes as the main study material for the new organ, the ambition was to come as close as possible to the “language” of Schnitger:

So, using the most coherent collection of pipework to survive from any Schnitger organ, we tried to learn about the craft processes that produced the original object, in order to perform them well enough to build a new object in the same language as the original. (Speerstra 2003, 18–19)

The GOArt project was an important source of inspiration for the process of designing and building the Van Straten organ. In what follows, we examine three moments from this process. The aim of this research is to gain a better understanding of, first, how closely the Van Straten organ is modelled on the Gerritsz organ and, second, the materiality that constitutes the Van Straten organ as an experimental system through which knowledge about fifteenth- and sixteenth-century musical cultures is produced.

The wind chest

What makes the Gerritsz organ singularly unique is its wind chest, which is the only remaining example of a fifteenth-century wind chest in the world. Every organ has one or more wind chests. It is the part of the organ where the air-flow is distributed to the various organ pipes.

Bloklade met: a. ventiel- of windkast; b. speelventiel; c. cancel.

Sleeplade met: a. ventiel- of windkast; b. speelventiel; c. cancel; d. de geopende sleep; e. geopend ventiel.

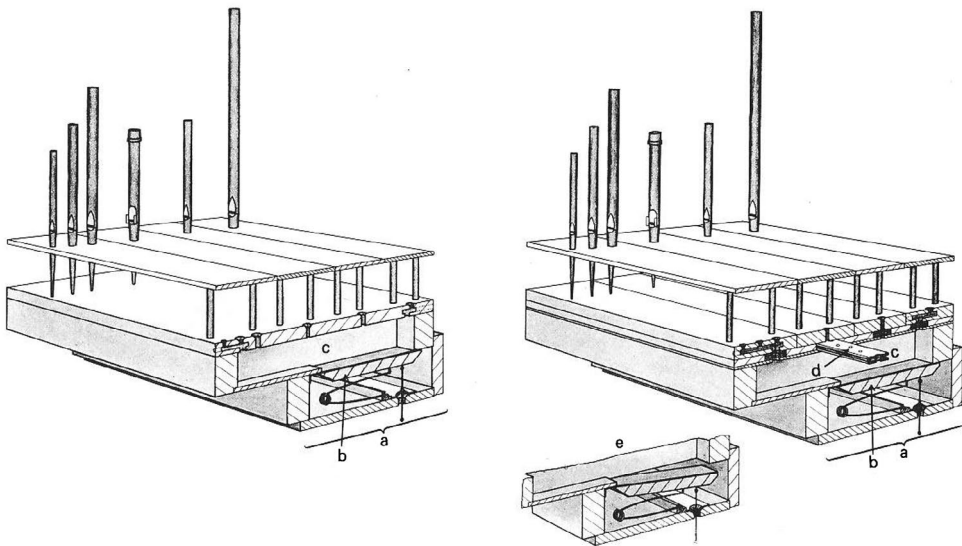


Figure 1. A *bloklade* wind chest on the left and a *sleeplade* slider chest on the right. Source: Peeters and Vente (1984, 16).

The wind chest is a wooden box on which the pipes are placed. If the organist presses a key, this action transfers this movement to a valve in the wind chest. When the valve opens, air flows through a “tone cancel” to the pipes that sound at the pitch of the corresponding key. Early organs, such as the 1479 Gerritsz organ, have a relatively simple wind chest, the *bloklade* or *bloklade* (blockwerk) (see Figure 1). Once a key is pressed, the wind flows to several pipes at the same time. In later stages of organ development, the slider chest was developed. This gave the organ player the possibility to create different combinations of pipes for every key.

The blockwerk wind chest from the Gerritsz organ is unique in that it can be read as a kind of Rosetta stone, as CHA organ advisor Wim Diepenhorst put it in an interview. Read by an expert like Diepenhorst, the wind chest contains information about the number of keys of the original organ, the number of pipes that sound when a key was pressed, the circumference of these pipes, the width of the keys on the keyboard, and the dimensions of the organ. Reading the blockwerk, though, is not a straightforward process; it is one of conjectures and refutations. The details of the blockwerk have to be interpreted using historical knowledge from descriptions and drawings found in archives that date back to the fifteenth century. Over the centuries, the parts of the Gerritsz organ have been described, drawn and measured, in various degrees of precision and scale, by different people. For the purposes of replication, this information was combined and checked against recent measurements of the remaining original pipes and their metallurgic qualities, pictures and paintings of the Gerritsz organ, and written sources, included texts by the German composer, organist and musical theorist Praetorius (1571–1621), who wrote extensively about the contemporary and older organs he was familiar with in the second volume of his *Syntagma Musicum* titled *De Organographia*.

Building a replica is not simply a matter of handling fifteenth-century organ components. In the reconstruction of the Gerritsz organ's wind chest, the computer played an important role. The conventional process for designing an organ today starts with the specifications (height, width, depth) of the organ and the scaling of the pipes. The design of the wind chest is deduced from these instructions, providing the organ with a heart. The wind chest will determine the number of stops, the placing of the pipes, and the layout of the key action and from the measurements of the pipes it follows what dimensions the organ case should have. The replica's builders started from the opposite direction. They had the measurements of the existing case, as well as the main wind chest that contained small holes through which the metal wires were lead that connect the organ keys to the valves of the upper wind chest. From this information, the layout and measurements of the mechanical action could be deduced. Following this, the process of recombining the wind chest, the action and the organ case was done on screen:

Actually, the main wind chest does not fit, that is the problem, also in the old organ. You have to start thinking: how would they have done this, and you are never sure. Many of the first questions were answered just by drawing. Thinking in medieval terms started at the computer. (Interview with Wim Diepenhorst)

Reading the wind chest and deducing from it how to place the pipes and construct the key action could be seen as part of the hermeneutic phase in the reconstruction process. From an actor's perspective, the main question was how the organ was designed. The research process to answer this question focused on analysing the remaining parts of the organ through close inspection, measurements, and using what could be called circumstantial evidence taken from historical and organological sources, including the writings of Arnout de Zwolle and Praetorius. In this sense, the parts of the Peter Gerritsz organ were studied and interpreted as "travelling facts". As Valeriani (2011) has argued, facts are not only expressed in verbalised descriptions, but are also transmitted and recorded in material objects. Drawing on examples from architecture, she shows how these "embodied, multi-layered facts" carry knowledge over time and space, far beyond the contexts in which the original objects were produced and used.

The pipes

Organological research in the preceding epistemological register, specifically reading the parts of the Gerritsz organ as objects that produce knowledge about this organ, enhances our detailed understanding of the material design of the Peter Gerritsz organ. But there is a limit to what can be known from reading parts of the Gerritsz organ as a Rosetta stone. Building a replica of a medieval organ is not an easy task. Living in a society made up of indistinguishable mass-produced objects can lead many to believe that with modern measurement tools, imaging technologies and building techniques, an exact replica of anything can be made quite easily. Indeed, objects, images and sounds that cannot be easily duplicated are anachronistic reminders that replication requires the very recent idea of standardisation. The Gerritsz organ is one such reminder. The original organ was designed prior to techniques that we take for granted: standardised measurements. The reproduction of an organ begins with measurements, and the most important measurements concern the pipes. The construction and voicing of the pipes, in combination with the wind pressure, control the tone qualities of the instrument; in short, they are essential to the sound of any organ.

Wim Diepenhorst explained that the replication of the earliest phase of the Gerritsz organ benefitted from the results of the Swedish GOArt project. Learning the language of Peter Gerritsz meant relearning the skills of his organ builders. An example of such a skill is the casting of the sheet of metal from which an organ pipe is made. In modern organ-building traditions, the casting bench is made of stone or wood and is covered with a cloth. In some earlier traditions, however, the casting bench was a fairly deep box filled with fine sand. It was established that casting on sand gives the metal a different quality than casting as is normally done today. Due to the sand bed beneath the molten metal, the metal cools quickly to a certain temperature that remains more or less constant, causing the pipe metal to become harder than modern pipe metal. The right type of sand, the right proportion of impurities or trace materials in the metal, and the right casting temperature are all factors that are thought to have vital importance for the end result (see Figure 2):

Casting on sand means that the metal cools quicker than when you cast on stone. As a result of this, the metal is harder, it has a different elasticity factor. This gives another resonance, and another resonance means another sound. During the day, the sand gets warmer and warmer, so the metal cools down slower and slower. (Interview with the organ builder Hans Reil from *Orgelmakerij Reil*)

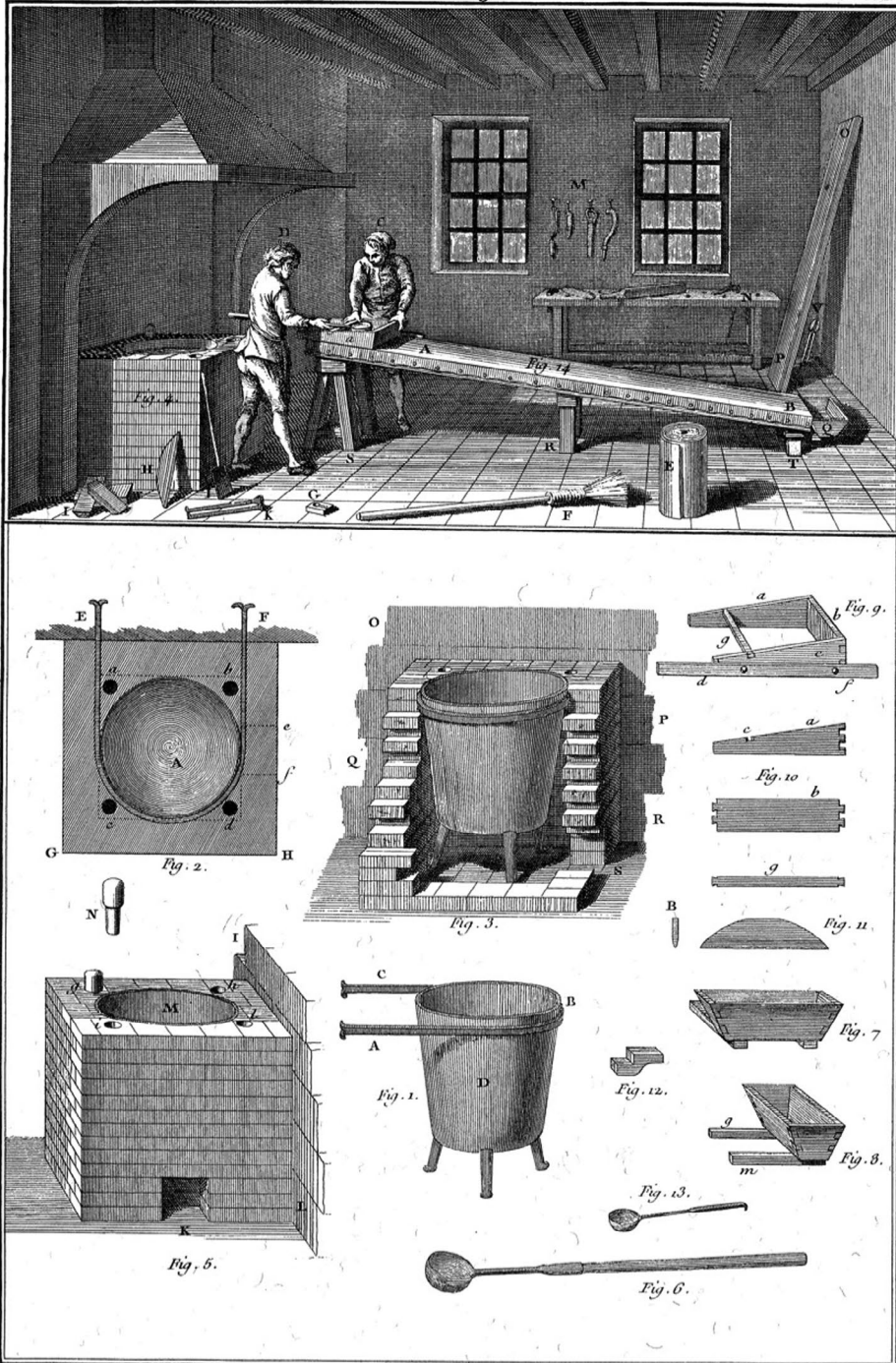
According to Diepenhorst, relearning skills through actually *making* a sounding organ was essential in deepening the understanding of the Gerritsz organ. The organ makers of Reil Organ Builders (Heerde, the Netherlands), who were commissioned to replicate the Gerritsz organ in the Van Straten organ, could neither rely on their experience nor could they just copy the old parts of the wind chest and the pipes. In this process of trial and error, mistakes were made and new knowledge was gained, sometimes by using twenty-first century technologies. For example, the team developed a sensor to measure the cooling speed of the metal when cast on stone, sand and cloth. The team chose to cast on sand, even though there was no evidence that Gerritsz had done the same. In the end, a pragmatic decision had to be taken:

We cast the metal on a very fine sand that was mixed with olive oil. After several attempts, the people in the workshop asked if they were allowed to cover the sand with fine cloth, because every single chisel went blunt. The whole place smelled like a pizzeria. (Interview with Wim Diepenhorst)

The actual sound of an organ is the result of many interrelated factors, most importantly the construction and voicing of the pipes, but also important is the construction and measurements of the wind chest and the tone channels, and the wind pressure. From the Peter Gerritsz organ, some pipes from the earliest stage of the organ have been preserved:

These pipes are the most honest facts you have. When you blow a pipe too hard, it will over-blow. You only hear upper tones, not the ground tone. This tells you something about the wind pressure in the organ. So after a lot of testing and listening to remaining pipes we knew: this is the way they have to speak, this is the way they voiced the pipes. (Interview with the organ builder Hans Reil from *Orgelmakerij Reil*)

The researchers and organ builders who contributed to the design and construction of the Van Straten organ had no idea how the ensemble of pipes would sound once these pipes were put in the wind chest. Because in a blockwerk organ all pipes on one tone channel sound when a key is pressed, they expected that they would not speak at the same time, but with short intervals. This did not happen. All pipes spoke at exactly the same time. They also did not influence each other, meaning that when a low pipe speaks this does not affect the sound of the high pipes and vice versa. The layout of the wind chest as Peter Gerritsz



de la Gardette del. et Sculp.

Figure 2. Slanted casting bench, Plate LXIV from Dom Bédos, *L'Art du facteur d'orgues* (1770). Reproduced from Speerstra (2003, 173).

had designed it proved to be effective in practice. Not only that, the beauty of the sound of the pipes surpassed the expectations of the builders and designers:

It is very lively, very honest sound, and it mixes so well together. It is incredible. Technically it is a very good sound. For me the most beautiful stop on the organ is the “Doof” – that is really a treasure. I expected something like that in my head, but I could not imagine how it would work. It is beautiful. (Interview with Wim Diepenhorst)

Whereas the first phase of the study of the Peter Gerritsz organ, the analysis of its wind chest, could be characterised as a hermeneutic way of knowing, in the second phase this was extended by a more experimental way of knowing. From the actor’s perspective, the question was how the organ was built and how it sounded. The organ builders struggled with a problem that in German is summarised as *kopieren aber nicht kapiieren* – copying but not understanding. In the actual making of the organ, it proved to be essential to connect existing, modern experience and expertise in organ building with old building practices. Some of these practices have been lost, such as casting pipes on sand, and had to be relearned. Relearning also meant “un-learning” as much as is possible: the organ builders could not wholly rely on their own knowledge and expertise, but had to learn to think as fifteenth-century builders as well. The design and construction of the Van Straten’s pipes reveals that there was no exact information on the precise design of the pipes that were intended to be replicated and so the designers and builders had to rely on their own expertise and experience in the casting of the pipes. Replicating an organ not only means reproducing objects, but sounds as well. Listening to the old pipes proved to be indispensable to make design decisions that determine the actual sound of the organ, such as the wind pressure and the voicing of the pipes. Listening skills and auditory appreciation thus were central to the production process.

The keyboard

As the original fifteenth-century keyboard from the organ had been lost, the organ builders had to reconstruct it from what they knew from the remaining material. Diepenhorst recounts how he could deduce the number of keys and the width of the keys from markings on the original blockwerk wind chest. Knowing the total width of the keyboard from the dimensions of the wind chest and from old drawings, Diepenhorst and the organ builders found that the keys were wider than those found in later organs:

It was only after we had concluded the width of the keys that I read a text by Praetorius from 1619 in which he describes an organ from 1490 that gave additional evidence. I had read that text many times, but building an actual organ made me read it in a completely different way. Praetorius’s description exactly matched our own keys. He describes what we found from the remaining parts of the organ. (Interview with Wim Diepenhorst)

The greater width of the keys is important for the understanding of musical performance practice at the time the Peter Gerritsz organ was built because it shows that musicians did not use wide intervals such as an octave; their hands would not have been big enough to span eight keys. Organists of the time did not use the thumb and only occasionally used the little finger. The wide keys suggest that the fifth was the interval used most, and also that scales were played using the second, third and fourth finger. Knowing more about the fingerings that were used enhances our understanding of medieval music and performance practice, and as this expectation is materialised in the Van Straten organ, it comes to influence contemporary understandings of so-called early music.

Building a replica is not the same as constructing an exact copy of an original. The new organ is a musical instrument that has to be played. This is where the modern organ builder meets his fifteenth-century colleague. Both have to find practical solutions for problems. One of these problems is reducing the friction that is caused when the movement of the fingers pressing the keys is transferred through the organ case to the valve in the wind chest. Less friction means more control and better playing. This friction is determined by many aspects. One is the metal of the little spring that closes the valve. Peter Gerritsz made them of iron, today they are made of brass. Following his example means that the organ builder cannot rely on his experience and has to experiment. As the organ builder Hans Reil remarks:

I sit here sometimes in the evening and I think, Wim [Diepenhorst] is gone, and the organ is standing, and it has to play. But I am sure that Peter Gerritsz has also been sitting in the evening, thinking: it has to play. (Interview with the organ builder Hans Reil from *Orgelmakerij Reil*)

In this third phase of the replication, from the actor's perspective the question was how the Gerritsz organ was played as a musical instrument. The research to answer this question assumes a combination of hermeneutic and experimental ways of knowing and making. The Gerritsz organ provided knowledge not just about its construction or its sound, but about its actual use in Medieval and Renaissance performance practices. Having the Van Straten organ enables scholars and musicians to test existing knowledge about historical performance practice by actually playing on a musical instrument of which no playable originals remain. Thus they will not only be able to develop new technical and auditory skills, but also to interpret and artistically evaluate the sounding result as well. Next to *reading* the original artefacts such as the wind chest and *making* the sound of the Van Straten, *performing* it as a musical instrument in a twenty-first-century musical culture that aims towards historically informed performance could thus be seen as a third research strategy.

Conclusion

In the introduction to this paper we explained that we were interested in the process by which the Gerritsz organ became the Van Straten organ and, more importantly, to reflect upon the relationship between the Van Straten organ and the culture of early music that this organ was intended to replicate. The intention behind the Van Straten organ was that as a replica of the Gerritsz organ, it would be an important object through which knowledge about fifteenth-, sixteenth- and seventeenth-century compositions and performance practices came to be known, which is of great value to the Early Music movement. However, the idea that the Van Straten organ is a replica of the Gerritsz organ becomes problematised once the process of design and construction is studied in detail. Opening the black box of the Van Straten organ, it is revealed that it is as much a uniquely contemporary organ as it is a replica of a medieval organ (Pinch and Bijker 1984). This has interesting implications for the role of historically informed organ restoration within the context of the Early Music movement.

Returning to a point that we made in the introduction, within the Early Music movement it is possible to argue that the role of instruments in this movement is, a priori, experimental systems. Following Rheinberger, who argues that the material objects through which knowledge is produced cannot be considered distinct from this knowledge, our study of the Van Straten reveals that this organ, as a material object, is a constituent element of what we now know as fifteenth- and sixteenth-century musical practices and organ building techniques.

The process of designing and building the Van Straten organ was, in other words, the process of constructing knowledge about older musical cultures, and this knowledge would not have been possible without the Van Straten. In this way, then, by making a new organ old, the new organ tells us much more about older musical culture than the old organ did. The most obvious aspect of this is the sound of these organs. It is impossible to know, with accuracy, how the Gerritsz organ sounded. It is only by re-creating the pipes, the wind chest and the keys in the Van Straten that we now “know” how the older organ sounded.

Extending this insight beyond the case of the van Straten, it can be argued that, within the Early Music movement, all instruments play this type of role. Recreating older instruments is not a process of replication, but rather an attempt to project contemporary insights regarding sound and performance techniques onto the past. Early Music practitioners, in this sense, “experiment” with instruments to create knowledge of older musical cultures. This knowledge, to quote from Rheinberger again, is propositional knowledge and cannot be separated from the material assemblage that is set up to produce this knowledge. Early Music, then, is as contemporaneous as any other musical culture. From this, the important question is not whether or not the Van Straten organ or any other early music instrument is a replica, but rather how to properly theorise what types of knowledge these objects produce.

Notes

1. “In een zondagochtendbeurt in de maand Mei 1885 kon het nog de voorzang begeleiden, maar het was den organist niet meer mogelijk om voort gaan; zijn gewoon krijschend en kreunend geluid kon het oude instrument zelfs niet meer voortbrengen” (translated by Peter Peters).
2. The project of building a replica, although initiated and organised by the CHA, was funded by the *Orgelpark*, a concert venue in Amsterdam that aims to integrate the organ into contemporary musical cultures by presenting it in new ways. The organ is named after Rudi van Straten from the department of Sounding Monuments of the CHA who took the initiative for the replication project.
3. For an overview of the history of the Gerritsz organ and the dating of the remaining parts, see Van Dijk (2009) and Diepenhorst (2009). Van Dijk and Diepenhorst built on the work of the Dutch musicologist Jan van Biezen (1995) and Onno Wiersma (1946–2004) who was organ advisor at the Cultural Heritage Agency (CHA) of the Dutch Ministry of Education, Culture and Science.
4. In his book *Musik als Klangrede*, the conductor Harnoncourt countered this criticism. In an age of airplanes, televisions and computers, he argued, early music has lost its meaning. People are no longer able to understand it as a language. Music from previous epochs had become an ornament that was meant to be beautiful. The goal of musician-researchers such as Harnoncourt was not to ban early music to the museum, but instead to create modern interpretations of masterpieces in which the performance and listening conventions shaped in the past decades were questioned (Harnoncourt 1983, 9–10).

Acknowledgements

We would like to thank Wim Diepenhorst (RCA), Hans Fidom (*Orgelpark* Research Program) and Hans Reil (*Orgelmakerij Reil BV*) for sharing their research on the Peter Gerritsz organ, historical organs and organ building with us.

Disclosure statement

No potential conflict of interest was reported by the authors.

Notes on contributors

Peter Peters is an assistant professor in the Philosophy Department at the Faculty of Arts and Social Sciences, Maastricht University. He is a sociologist by training (with philosophy of science and musicology as MA minors), and did his PhD in Science and Technology Studies. His current research focuses on the role of knowledge, techniques and craftsmanship in historical and contemporary historicising practices of pipe organ building.

Darryl Cressman is an assistant professor in the Philosophy Department at the Faculty of Arts & Social Sciences, Maastricht University. He is interested in the philosophy of technology and sound studies and is the author of *Building Musical Culture in Nineteenth-Century Amsterdam* (Amsterdam University Press, 2016).

References

- Biezen, J. van. 1995. *Het Nederlandse orgel in de Renaissance en de Barok, in het bijzonder de school van Jan van Covelens* [Dutch pipe organs in the Renaissance and Baroque, specifically the school of Jan van Covelens]. Utrecht: Koninklijke Vereniging voor Nederlandse Musiekgeschiedenis.
- Bormann, K. 1966. *Die gotische Orgel zu Halberstadt: eine Studie über mittelalterlichen Orgelbau* [The gothic organ in Halberstadt: a study on medieval organ building]. Berlin: Merseburger.
- Carlsson, A. et al. 2000. *Tracing the Organ Masters' Secrets: The Reconstruction of the North German Baroque Organ for Örgryte Nya kyrka*. Goteborg: GOArt.
- Davidsson, H. 1993. "The North German Organ Research Project at the School of Music and Musicology." University of Göteborg. Accessed April 3, 2015. http://musikforskning.se/stm/STM1993/STM1993_1Davidsson.pdf
- Davidsson, H. 2000. "Orgelbouw in Noord-Europa sinds 1969: historische interesse en vernieuwing" [Organ building in Northern Europe since 1969: historical interest and innovation]. In *Het orgel: een historisch instrument. Vier lezingen over historiserende orgelbouw* [The organ: a historical instrument. Four lectures on historicizing organ building], edited by H. Fidom, 5–18. Groningen: Stichting Groningen Orgelland.
- Diepenhorst, W. 2009. "Beschrijving van het orgel" [Description of the organ]. In *Het oude orgel van de Nicolaïkerk te Utrecht. Kroongetuige van de Nederlandse muziekgeschiedenis* [The old organ of the Nicolai church in Utrecht. Key witness of Dutch music history], edited by H. Verhoef, 204–247. Zutphen: Uitgeversmaatschappij Walburgers.
- Dijk, P. van. 2000. "Van 'neobarok' tot 'historiserend': een koersverandering in de Nederlandse orgelbouw" [From "neo baroque" to "historicizing": a change of course in Dutch organ building]. In *Het orgel: een historisch instrument. Vier lezingen over historiserende orgelbouw* [The organ: a historical instrument. Four lectures on historicizing organ building], edited by H. Fidom, 5–18. Groningen: Stichting Groningen Orgelland.
- Dijk, R. van. 2009. "Het Peter Gerritsz-orgel van de Nicolaïkerk te Utrecht" [The Peter Gerritsz organ in the Nicolai church in Utrecht]. In *Het oude orgel van de Nicolaïkerk te Utrecht. Kroongetuige van de Nederlandse muziekgeschiedenis* [The old organ of the Nicolai church in Utrecht. Key witness of Dutch music history], edited by H. Verhoef, 11–153. Zutphen: Uitgeversmaatschappij Walburgers.
- Fidom, H., ed. 2000. *Het orgel: een historisch instrument. Vier lezingen over historiserende orgelbouw* [The organ: a historical instrument. Four lectures on historicizing organ building]. Groningen: Stichting Groningen Orgelland.
- Harnoncourt, N. 1983. *Musik als Klangrede. Wege zu einem neuen Musikverständnis* [Music as speech. Ways to a new understanding of music]. Kassel: Bärenreiter.
- Haynes, B. 2007. *The End of Early Music*. Oxford: Oxford University Press.
- Lawson, C., and R. Stowell. 1999. *The Historical Performance of Music*. Cambridge: Cambridge University Press.
- Owen, B. 2002. "Technology and the Organ in the Nineteenth Century." In *The Organ as a Mirror of its Time*, edited by K. Snyder, 213–229. Oxford: Oxford University Press.

- Peeters, F., and A. A. Vente. 1984. *De orgelkunst in de Nederlanden* [Organ art in the Netherlands]. Den Haag: Gaade/Amerongen.
- Pinch, T., and W. Bijker. 1984. "The Social Construction of Facts and Artefacts: Or How the Sociology of Science and the Sociology of Technology Might Benefit Each Other." *Social Studies of Science* 14: 399–441.
- Rheinberger, H. J. 1997. *Toward a History of Epistemic Things: Synthesizing Proteins in the Test Tube*. Stanford, CA: Stanford University Press.
- Snyder, K. 2002. "Organs as Historical and Aesthetic Mirrors." In *The Organ as a Mirror of its Time*, edited by K. Snyder, 1–22. Oxford: Oxford University Press.
- Speerstra, J. 2003. *The North German Organ Research Project at Göteborg University*. Göteborg: Göteborg Organ Art Center.
- Valeriani, S. 2011. "Facts and Building Artefacts: What Travels in Material Objects?" In *How Well do Facts Travel? The Dissemination of Reliable Knowledge*, edited by P. Howlett and M. S. Morgan, 43–71. Cambridge: Cambridge University Press.